SWEDISH TRANSPORT AGENCY

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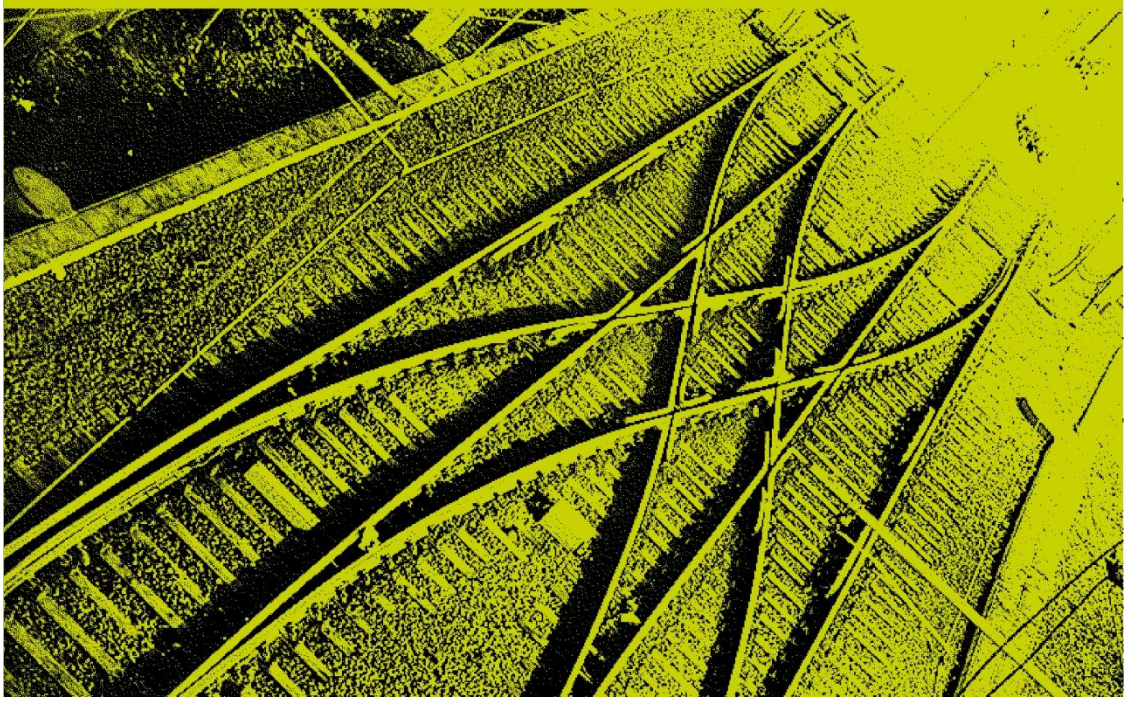
RAILWAY SAFETY REPORT

SWEDISH TRANSPORT AGENCY 2010 ANNUAL REPORT PURSUANT TO ARTICLE 18 OF DIRECTIVE 2004/49/EC (the Railway Safety Directive)



Revisions

Rev.	Date	Prepared by	Approved by
0.1	14/09/2012	Eva Karlsson	
1.0	25/09/2012	Eva Karlsson	Staffan Widlert

CONTENTS

A.1 Scope of the report

This report aims to describe the safety of the Swedish railway system as proposed in the Railway Safety Directive[1] (hereinafter referred to as the Safety Directive). The conditions under which the Swedish railway system operates are mainly regulated by the Railways Act[2].

In accordance with the EU Safety Directive (2004/49/EC), all Member States must submit to the European Railway Agency (ERA) an annual report concerning the safety of the national railway system. This year's report, which covers 2011, is the sixth of its kind and primarily follows the guidance provided by ERA for said purpose. As a result of an amendment (2009/149/EC) to the Safety Directive, some new indicators are reported, some indicators have been modified, and one indicator has been completely removed. The directive amendment has resulted in the Swedish Transport Agency revising the Swedish Rail Agency's regulations (JvSFS 2008:1) on accident and safety reporting. The 2010 report on the number of killed and seriously injured persons who were on tracks without authorisation showed a large increase and may signify a negative trend. ERA asked the Swedish Transport Agency to analyse the increase and present the results in this year's safety report; the results are available in section D.2.2. This is the first year in which the operators' application of Regulation 352/2009 on a common safety method for risk evaluation is reported.

Please note that trams and subways are not included in this report. As certain infrastructure managers and railway undertakings are exempt from submitting safety reports (see section B.2.1), the indicators do not provide a measure for all railways in Sweden. For example, operations on local and regional rail networks that are independent and only intended for passenger or museum traffic, such as the Saltsjöbana and the Roslagsbana, are excluded from this report. Operations on rail networks which are not managed by the state and are used only by the infrastructure manager for the transportation of private goods are also excluded from this report.

A.2 Summary in English (optional)

Please contact us for a summary in English.

B INTRODUCTION

B.1 Background and target audience

This report has been prepared for and at the request of the European Railway Agency (ERA). However, it may also be of interest to employees of the Transport Agency, the Ministry of Enterprise, Energy and Communications, Trafikanalys, other government agencies and research institutes, railway undertakings, infrastructure managers, and other stakeholders in the rail industry. The report may also be of interest to those with a general interest in railways and rail safety.

The report will be published on the Transport Agency website www.transportstyrelsen.se and the ERA website www.era.europa.eu where the reports from other countries will also be published. ERA also publishes a consolidated report based on the reports that the countries submit.

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[1] Directive 2004/49/EC

[2] Järnvägslagen (Railways Act) (2004:519)

The Safety Directive stipulates that the national safety authority of each Member State shall submit a report to the European Railway Agency (ERA) no later than 30 September each year [3]. The purpose of this report is to describe national safety levels and, pursuant to the Safety Directive, it should contain information on the development of railway safety, important changes in legislation and other regulations concerning railway safety, the development of safety certification and safety authorisations, as well as results of and experience relating to the safety authority's oversight activities.

The Safety Directive stipulates that the operators, i.e. railway undertakings and infrastructure managers, shall submit a safety report to the safety authority by 30 June each year[4]. In accordance with the directive, this report should contain information on how the organisation's corporate safety targets are met, reporting of information relevant to common safety indicators (CSIs), results of internal safety auditing and observations on deficiencies and faults of railway operations that might be relevant to railway safety.

Swedish railways are governed by the Railways Act[5]. The government's Railways Ordinance[6] gave the Swedish Transport Agency the right to issue regulations which regulate the field in detail. The Swedish Transport Agency's regulations are published in the Agency's Code of Statutes (TSFS).

Templates and guidance for reporting have been prepared by a working party within ERA consisting of representatives from interested Member States' safety authorities (including Sweden). In Sweden, a reference group of representatives from both railway undertakings and infrastructure managers then contributed their opinions on the Swedish Transport Agency's guidance[7], which contains instructions and definitions for the operators' safety reports.

The Safety Directive included in the Second Railway Package has been incorporated in Swedish law since 1 July 2007. Annex 1 to the Safety Directive (which describes the reporting of CSIs) has been amended by Directive 2009/149/EC. Sweden was part of the task force that developed the revised annex. The same task force has also developed a common guidance for the indicators in order to improve reporting consistency.

In order to simplify and reduce the administrative burden on operators who are subject to reporting, the Swedish Transport Agency has collected safety reports together with other accident data collected and reported to Trafikanalys since 2008 (which, in turn, self-publishes the data on official accident statistics and also reports this data to the EU statistical office; Eurostat). However, there are certain differences in definitions which means that the figures vary somewhat, as accidents on independent networks are included in the Trafikanalys statistics but excluded from those of ERA; see sections D.2 and J. The reporting operators are invited to submit reports via a web-based form on the Swedish Transport Agency's website, via email, or by traditional mail.

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[3] Directive 2004/49/EC, Chapter IV, Article 18.

[4] Directive 2004/49/EC, Chapter II, Article 9.

[5] Järnvägslagen (Railways Act) (2004:519)

[6] Järnvägsförordningen (Railways Ordinance) (2004:526)

[7] Guidance for the application of TSFS 2011:86, Dnr. TSG2012-152.

The Swedish Transport Agency is also collaborating with Trafikanalys in its use of transport and track data gathered by the Swedish Transport Administration and thereafter forwarded to Trafikanalys, starting with the 2011 reporting (which covers 2010 data). The undertakings thus need not report this data to both Trafikanalys and the Swedish Transport Administration[8].

B.2 Operators

The operators, i.e. railway undertakings and infrastructure managers, are the railway industry's main stakeholders. Those who wish to conduct rail operations in Sweden must apply for a permit to do so from the Transport Agency. Permits are reviewed in accordance with the terms of the Swedish Railways Act and granted to railway undertakings and infrastructure managers separately. Therefore, an organisation may have one or more permits. For example, an infrastructure manager may also have a rail transport permit. In Swedish legislation, infrastructure managers and railway undertakings are defined as follows[9]:
Railway undertakings: those who by virtue of license or specific permit provide traction and conduct rail transport.

Infrastructure manager: entity that manages railway infrastructure and operates installations belonging to that infrastructure.

Under these definitions, Sweden had 506 operators permitted to conduct railway operations in 2011.

Permit holders	**2011**
Railway undertakings	101
Infrastructure managers	405
Total	**506**

Table 1: Data on number of operators in 2011. The figures do not include transport operators and track owners that operate trams or subways unless they are also the railway undertaking or infrastructure manager.

The railway sector can be divided into two submarkets; a rail market and an infrastructure market.

Railway undertakings act on the rail market, upon which the transport of passengers and goods is conducted. The largest stakeholder on the rail market originates from the time when all railway operations were in the hands of the state. In Sweden, the conditions for passenger and goods transport were separated in 2008. Passenger transport was still regulated in 2008 and a state-owned company had the exclusive right to operate inter-regional passenger transport.

In 2009, the Swedish Parliament approved the 'Competition on the railways' bill (2008/09:176), which entails a gradual opening-up of the market for the transport of passengers by rail. The first step in this process was taken on 1 July 2009, when the market was opened up for weekend and

[8] The Swedish Transport Agency has also asked Trafikanalys / the Swedish Transport Administration for data from previous reporting years in order for the compilation method to be uniform for every year. The Swedish Transport Agency will make any necessary adjustments when the data are available.

[9] Railways Act (2004:519), Chapter 1 Section 4

holiday services. On 1 October 2009, the international passenger transport market was opened. Parliament's decision also meant that the market was fully open as of 1 October 2010. Freight traffic was already open to competition but is still dominated by the company which was formerly a part of the state railway administration.

The infrastructure market is strongly dominated by the state, which means that the dominant player is the infrastructure manager of the national track system. The rail network in Annex A.1 shows the geographical distribution of the state-owned rail network. In 2011 there were 405 infrastructure managers. Of these, only 20 or so were major players in terms of the number of kilometres of track. The other infrastructure managers typically have smaller track systems for their own use, for instance industrial companies with their own track linking them to the national track system, for the transport of their own goods.

B.2.1 Exempted operators

The Swedish Transport Agency has in this report, and on the basis of the Swedish Railways Act (2004:519), exempted railway undertakings and infrastructure managers that only operate on

1. local and regional rail networks that are independent and only intended for passenger or museum transport, or

2. rail networks that are not managed by the state and are only used by infrastructure managers for transporting their own goods.

The Swedish Transport Agency has made use of its ability to grant exemptions from the submission of safety reports; a consequence of this is that most of the infrastructure managers have not needed to submit safety reports. A large group that is not exempted is comprised of the municipalities and ports permitted to conduct railway operations.

This report is based on 152 safety reports from operators. A few (smaller) non-exempt operators did not submit safety reports to the Swedish Transport Agency on time. Among these are a number of municipalities.

B.3 Summary/general trend analysis

2011 partly returned to an old pattern with regard to serious accidents and the number of deaths and serious injuries. The Swedish Transport Agency has put considerable effort into investigating and checking operators' track work procedures and measures taken to avoid a repeat of the 2010 accident in which a passenger died.

Another accident type with an increased number of occurrences is persons who have died as a result of unauthorised track access. A large number of these consist of events in which the police have not taken a position as to whether the event was an accident or a suicide. The Swedish Transport Agency's Director-General has tasked the Road and Rail Department with developing an action plan to reduce the number of suicides in railway operations and a pilot study was initiated in 2011.

Unlike accident data, the request for deviation data to be included in the safety reports reported by the operators was made only recently, which is clear from the fact that some operators still report all SPADs instead of only those that have to be reported, for example. Whenever the

number of deviations has become too high compared with previous years, the Swedish Transport Agency has posed follow-up questions and then obtained corrected figures.

The Swedish Transport Agency has issued safety certificates and safety authorisations and exercised oversight primarily in the form of audits in accordance with the Safety Directive. Transport Agency's oversight activities in 2011 resulted in 46 injunctions and 4 bans. Railway undertakings' and infrastructure managers' safety management systems essentially operate properly. The most common deficiencies uncovered by safety oversight activities concerning infrastructure managers are that measures are still not taken in good time following a track system inspection. Another common deficiency is that the traffic safety instructions of undertakings have not been updated to reflect the 2008 adoption of the Swedish Rail Agency transport regulations. One reason that these deficiencies are still being discovered is that there are many more operators which were authorised prior to the adoption of the Swedish Rail Agency transport regulations than the Swedish Transport Agency has time to review each year.

The audits of railway undertakings have often resulted in a greater number of deviations that stem from an inability of the undertakings to manage their own safety management and internal follow-up. The Swedish Transport Agency is taking action to correct the problem, including inspections specifically targeted at internal system audits.

The Swedish Transport Agency has addressed a number of recommendations from the Swedish Accident Investigation Board during the year.

One area of development in which the Transport Agency is working concerns a pilot project to gain access to hospital data on persons injured in railway and boating accidents. The Swedish Transport Agency is already collaborating with the healthcare system on road traffic accidents. Another area under development is an IT system that will facilitate the permit application process. The Swedish Transport Agency has also created intermodal centres of competence for oversight activities, permit application processing, and HF/HTO[10] related tasks.

On 3 June 2010, the Swedish Transport Agency was tasked with presenting how permit, oversight and record-keeping activities could be primarily funded by charges starting on 1 January 2011. Since January 2011, the Road and Rail Department has charged a fee for their record-keeping of railway vehicles and for the processing of technical system approval applications. The Swedish Transport Agency proposal considered it inappropriate to introduce total funding by direct charges on railway sector operations by 2011 and therefore decided that the fees should be introduced in three stages: 2011, 2012, and 2013. The next step in 2012 is to begin charging for safety and market oversight and for the issuing of permits. It is still too early to say if the funding by direct charges will affect the number of applications.

More detailed descriptions of developments regarding accidents, indicators, legislation, licensing, and oversight are contained in later chapters.

[10] Human Factors/Humans, Technology, and Organisation

C ORGANISATION

C.1 The Swedish Transport Agency's organisation

The Swedish Transport Agency has overall responsibility for standardisation, oversight, issuing permits, and record-keeping for the four types of transport: rail, aviation, maritime, and road. The Agency also has a normative role and conducts oversight of the railway system. In this respect, Sweden has met the requirements of the Safety Directive which states that each Member State must have a safety authority which – independently of infrastructure managers and railway undertakings – is responsible for, inter alia, granting safety certificates and safety authorisations, approval decisions for placing technical subsystems and components into service, and ensuring registration of rolling stock.

The Transport Agency is also a regulatory body under Article 30 of Directive 2001/14/EC[11] but this report concerns the duties of the Agency under the Safety Directive.

The Swedish Transport Agency's mission is specified in the Ordinance[12] with instructions for the Swedish Transport Agency. The government's annual appropriation directions state the terms that are to apply to Swedish Transport Agency operations during the following financial year. The appropriation directions contain, inter alia, targets for transport policy, requirements for the Swedish Transport Agency to report levels of target achievement to the government, and budgetary constraints.

The Swedish Transport Agency is a board authority, which means that it is headed by a board responsible for efficient execution of operations, with good internal governance, and supervised by the government. The Director-General is on the board and is responsible for day-to-day operations.

The Swedish Transport Agency has 15 locations throughout the country and has approximately 1 650 employees. The majority of operations are based in Borlänge, Norrköping, and Örebro. The head office is in Norrköping, where the Director-General works, as is the Office of the Director-General, the Legal Division of the Director-General, the Registry of the Director-General, and the following departments: Finance and Administration, IT Strategy, Communications, and Human Resources. In addition to the departments at headquarters, the Agency has six other departments: the Driving License Department, the Tax and Fee Department, the Road and Rail Department, the Transport Registry Department, the Civil Aviation Department and the Maritime Department. There are currently efforts underway to merge the Civil Aviation Department and the Maritime Department into a single department for both modes.

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[11] The Swedish Transport Agency has the task of monitoring whether competition on the railway services market functions effectively and for reporting disparities to the Swedish Competition Authority. As part of its oversight, the Swedish Transport Agency monitor, inter alia, whether capacity allocation of rail infrastructure and certain rail-bound services takes place in a competition-neutral and non-discriminatory manner and whether fees for use of the rail infrastructure are competition-neutral and non-discriminatory. The Swedish Transport Agency must consult with the Swedish Competition Authority on competition matters. In addition, the Agency is responsible for settling disputes between railway undertakings and infrastructure managers where the parties disagree on the legality of a decision by the infrastructure manager. The Swedish Transport Agency is also tasked with monitoring compliance of railway undertakings and infrastructure managers with the specific requirements on the financial accounting of such operators.

[12] Ordinance (2008:1300) with instructions for the Swedish Transport Agency.

The Road and Rail Department was formed on 1 April 2011 and – in addition to a Department Head and his/her immediate staff – has eight units, responsible for authorisations, vehicles and technology, legal matters, market oversight and market surveillance, strategy and analysis, support, services and infrastructure, and commercial transport. The following briefly describes the various railway issues for which the units are responsible in addition to road issues. The services and infrastructure unit and the commercial transport unit issue permits and conduct oversight. Before a permit is granted, the safety management systems of both the infrastructure manager and the railway undertaking are examined. The vehicles and technology unit issues approvals of technical subsystems. In order to obtain subsystem approval before being placed in service, the applicant must demonstrate that the subsystem is safe and interoperable. The legal unit's responsibilities include the development of regulations. The strategy and analysis unit's responsibilities include management of the Swedish Accident Investigation Board recommendations as well as accident statistics and the preparation of this report. There is also a unit for market analysis and market surveillance which, inter alia, has the long-term task of monitoring railway sector market development.

The Swedish Transport Agency's Road and Rail Department has approximately 280 employees consisting of 147 men and 133 women. Approximately 60 of these work primarily on railway issues. The corresponding distribution throughout the whole of the Transport Agency is 685 men and 805 women. Annex B contains the Transport Agency's organisational chart.

C.2 The Swedish Transport Agency's Road and Rail Department's relationships

This section describes the relationships of the Swedish Transport Agency's Road and Rail Department with other authorities. The focus is on relationships in the railway sector, and though the Swedish Transport Agency is also responsible for road, maritime, and aviation transport, a number of other relationships are not covered in this report.

The Swedish Transport Agency is not a solitary authority with exclusive responsibility for regulation of the entire railway system. There are several other national authorities that are responsible for their respective areas, such as the National Electrical Safety Board, the Swedish National Board of Housing, Building and Planning, and the Swedish Civil Contingencies Agency (hereinafter referred to as MSB). These authorities interact and exercise their official authority over the various actors in the railway system within their respective areas of responsibility. The figure below (Figure 1) illustrates this with some of the national authorities that affect the Swedish Transport Agency and other actors in the railway system by virtue of their normative tasks on certain safety-related issues, for example.

Swedac accredits companies which issue declarations that technical subsystems comply with the relevant technical specifications for interoperability (TSIs). MSB has an overarching and coordinating responsibility in efforts to ensure a safer society. The Swedish Transport Agency cooperates with MSB on, for example, oversight of dangerous goods transport.

The Transport Agency reports accidents and incidents to the Swedish Accident Investigation Board, which is an independent investigating body in accordance with the Safety Directive. The Swedish Accident Investigation Board submits its recommendations to the Swedish Transport Agency which, acting as a safety authority, is required to follow-up and take appropriate action in response to those recommendations. The Agency also has to report back to the Swedish Accident

Investigation Board on how the latter's recommendations have been addressed and the measures taken in response to them (see Section D.3 of this report).

The Transport Agency also cooperates with Trafikanalys. The Agency submits statistical data to Trafikanalys, which in turn submits accident statistics to Eurostat. Trafikanalys also publishes national statistics.

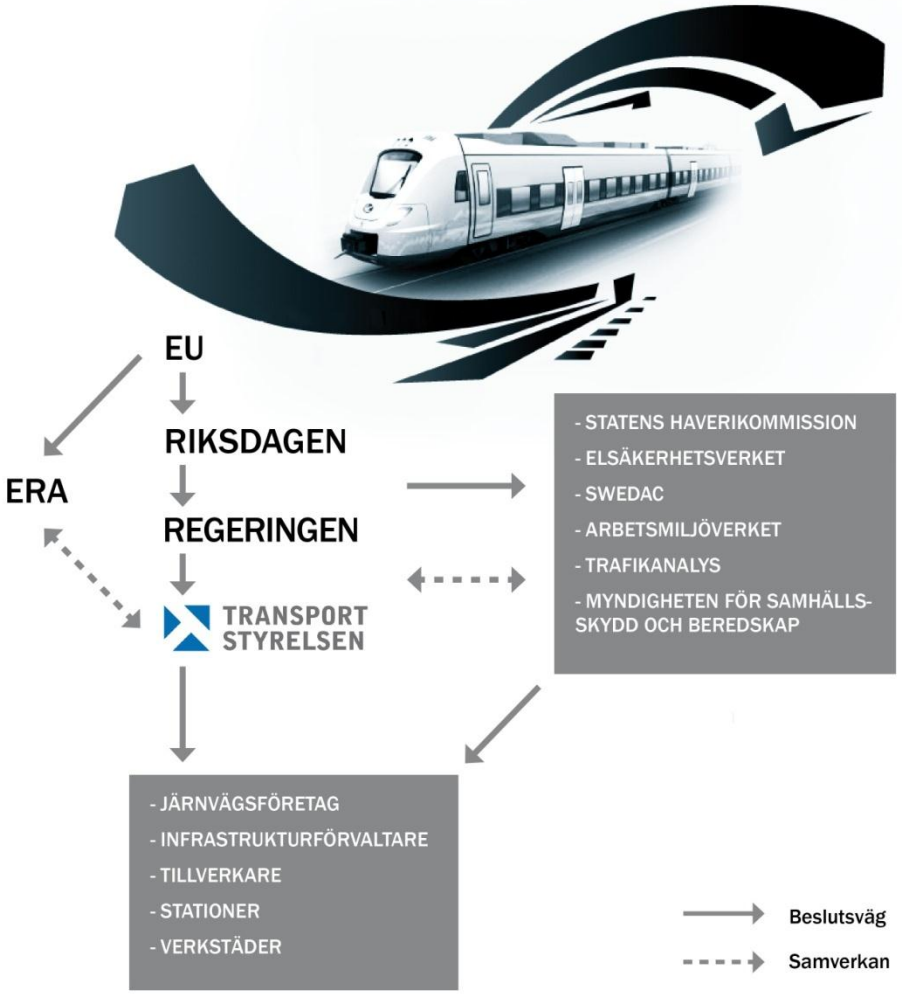

Figure 1: The Swedish Transport Agency's Road and Rail Department's national relationships.

ERA – EU PARLIAMENT GOVERNMENT THE SWEDISH TRANSPORT AGENCY	ERA – EU RIKSDAGEN REGERINGEN TRANSPORT STYRELSEN	
- Railway undertakings	- Järnvägsföretag	

- Infrastructure managers	- Infrastrukturförvaltare	
- Manufacturers	- Tillverkare	
- Stations	- Stationer	
- Workshops	- Verkstäder	
- Swedish Accident Investigation Board	- Statens haverikommission	
- National Electrical Safety Board	- Elsäkerhetsverket	
- Swedish Board for Accreditation and Conformity Assessment	- Swedac	
- Swedish Work Environment Authority	- Arbetsmiliöverket	
- Trafikanalys	- Trafikanalys	
- Swedish Civil Contingencies Agency (MSB)	- Myndigheten för Samhällsskydo och beredskap	
- Decision path	- Beslutsväg	
- Cooperation	- Samverkan	

Solid arrows in the diagram (Figure 1) represent decision paths. These are therefore one-way, whereas the two-way broken lines represent cooperation.

Railway undertakings and infrastructure managers are not the only players in the rail sector, there are also manufacturers of technical systems such as vehicles, signal installations, and signal boxes. Vehicles need maintenance and repair which is carried out by workshops that are sometimes also authorised as both railway undertakings and infrastructure managers. Manufacturers are not included in the Swedish Transport Agency's area of responsibility. However, the Agency approves subsystems to be placed in service. Similarly, the operations of workshops are not regulated by railway legislation, although there are rules which affect the workshops' maintenance work, e.g. the requirement that the safety management system of infrastructure managers and railway undertakings also covers maintenance of vehicles and railway infrastructure.

D THE RAILWAY SAFETY PROCESS

Efforts to maintain a high and uniform level of safety in the rail system involves all stakeholders in the rail system as described in Figure 1. For example, the Transport Agency follows-up on the safety goals set by the government. The Agency is supported in these efforts, inter alia, by safety oversight activities and regulations. The operators, in turn, follow the prescribed regulations and take action where necessary.

Hence, the national safety level is dependent upon a strong and well-functioning chain; from the government to the Swedish Transport Agency to the operators. For this reason, the national safety level is described in the form of objectives and safety improvements that are implemented by both the Swedish Transport Agency and the operators.

D.1 Initiatives to maintain/improve safety

D.1.1 The Swedish Transport Agency's safety improvements

Since 1996, oversight of Swedish railway sector stakeholders has been geared to verifying that the operators have internal control systems which operate properly – now referred to as safety management systems – and are able to take appropriate action when a deviation occurs. Hence, as part of their oversight, the Swedish Transport Agency verifies that the operators' safety management systems are in compliance with the current regulatory framework and that they have

the organisation, procedures, delegation of responsibility, finances, etc., to ensure that they can continue to meet the requirements of their permits.

The actions/activities which the Swedish Transport Agency has a mandate to perform include bans with or without fine, injunctions with or without fine, and ultimately the suspension of permits. It is the operators who take the concrete steps to reduce the number of undesired events (accidents, incidents, and other deviations). The Swedish Transport Agency monitors whether the operators take appropriate action.

The Swedish Transport Agency is mapping out how road, railway, maritime, and aviation oversight is performed, which may lead to new methods. The first result of the project was a common basic training programme and an oversight centre of competence was also established in 2010. As of 1 January 2011, there were three centres of competence established at the Swedish Transport Agency. In addition to the centre for oversight activities there is one for permit application processing and one for HF/HTO[13] related tasks. Each centre of competence works from an intermodal perspective so as to ensure that the efforts of the centres benefit the whole of the Agency.

In both 2010 and 2011 there were a number of accidents and incidents involving work in the track environment and considerable oversight efforts have therefore been made to check operators' procedures and the steps they have taken to ensure that such incidents do not happen again.

Reference should also be made to section D.3 for steps taken by the Swedish Transport Agency and by operators as a result of recommendations from the Swedish Accident Investigation Board.

Accident/incident or other deviation that triggered the activity			**Safety improvements made**
Date	**Location**	**Description of event**	
07/04/2011	Malmö	Uncertainty concerning DSB Sverige AB's financial capacity	An inspection has been conducted in which the Transport Agency reviewed whether DSB Sverige AB met the financial capacity requirement

Table 2: Examples of safety improvements made by the Swedish Transport Agency which were triggered by an accident or incident.

[13] Human Factors/Humans, Technology, and Organisation

Safety improvement	Description of trigger	Description of the problem area
Inspection of the Swedish Transport Administration regarding the implementation and enforcement of regulatory framework relating to work in the track environment, such as emergency planning and reduced speed past work sites.	Inspection discovered that information and new regulations on this were not being followed within the Transport Administration.	Contractors are exposed to considerable risk during work in the track environment.
Inspections have been conducted in which the Transport Agency reviewed whether DSB Sverige AB met the financial capacity requirement.	Inspection discovered shortcomings in DSB Sverige AB's finances. The company was required to develop an action plan to address these shortcomings.	The company should be capable of meeting its financial obligations during the following 12 months.
Brake test performed by the driver. Check procedures of relevant railway undertakings. Activity in progress.	In response to recommendations from the Swedish Accident Investigation Board.	A number of trains have been operating with greatly diminished braking effect.
Management of drawings	In response to recommendations from the Swedish Accident Investigation Board.	If there are drawings in circulation that do not correspond to reality, serious safety faults may result, especially during switching.
Inspection notes	The media	Operational track systems that are impaired by acute and weekly faults.

Table 3: Examples of Swedish Transport Agency safety improvements with triggers other than one specific event.

A number of accidents and incidents occurred in 2010 during work on or near in-service tracks. The Swedish Transport Agency required the Swedish Transport Administration to take steps to increase safety in both the short and long term. On 4 October 2010, the Swedish Transport Administration introduced tightened internal rules for work in the track area. The new rules were temporary and were to be replaced by more long-term measures by 15 April 2011.

In the spring of 2011, the Swedish Transport Administration presented the long-term measures to the Transport Agency; they included, inter alia, the following:

- The Swedish Transport Administration would develop a new safety policy;
- Together with the subcontractors concerned, the Swedish Transport Administration would develop a checklist for risk assessment prior to work in the track area;
- The Swedish Transport Administration's planned audit programme would be complemented by workplace inspections – at least ten of which would be unannounced – to be carried out by independent auditors.

The Swedish Transport Agency wanted to ensure that the Swedish Transport Administration would continuously check traffic safety in connection with work in the track area. On 16 May 2011, the Agency issued an injunction (TSJ 2010-1860) to the Swedish Transport Administration imposing the following requirements on them vis-à-vis the supervisory authority:

- By 30 September 2011, they were to report on how the checklist had been implemented in their organisation and those of the subcontractors concerned;
- By 1 October 2011 they were to submit the first monthly report on workplace inspections;
- There were to be at least 10 unannounced workplace inspections between 01/06/2011 and 01/06/2012, the results of which were to be reported to the Swedish Transport Agency;
- Serious deviations that occurred during work in the track area were to be reported by the next business day during the period of 01/06/2011 to 01/06/2012; this goes beyond the usual accident reporting (TSFS 2011:86[14]) that is required of all operators.

The Swedish Transport Agency is of the opinion that the Swedish Transport Administration has worked seriously on the problem and has taken several steps beyond the requirements of the injunction. This has resulted in a downward trend in accidents and incidents in the course of work in the track environment. The Agency has decided to close the case as the Transport Administration has fulfilled the required points of the injunction. However, the developing trend of accidents and incidents in the course of work in the track environment will be addressed by the Agency at future corporate meetings[15] with the Swedish Transport Administration.

D.1.2 Operators' safety improvements

The majority, approximately 90%, of the operators who submitted a safety report have not experienced any events that led to death or serious injury. In addition to the CSIs, the safety reports include information on the operator's safety targets and measures taken to increase safety.

D.1.2.1 Safety targets

All operators for whom railway operations are their core business have reported their safety targets. Of all the safety reports received, 102 operators out of 152 specified their safety targets (67%). There is vast diversity in the way the targets are formulated. Some of the reporting undertakings have set several safety targets that often include long-term comprehensive targets combined with detailed and specific targets, such as a maximum number of SPADs per year. Municipalities often have general targets for their operations but not targets specified by the infrastructure they manage; the majority of them have therefore not reported safety targets.

The comprehensive targets provided are often expressed in terms of no deaths or serious injuries as a result of the organisation's own activities, such as 'Travelling by train should be safe and secure.' The responses in the safety reports also contain examples of quantitative targets such as a reduction in the number of accidents to a certain level. There are also more specific targets, such as finding ways to prevent unauthorised track access and measures for the safety of children and young people.

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[14] Previous regulations: JvSFS 2008:1

[15] The corporate meeting is a form of oversight in which the Swedish Transport Agency comprehensively checks the safety management system's application and effect as well as the safety developments of a licensee (Swedish Transport Agency governing document TSG 2011-505 *Corporate meeting procedure description [Rutinbeskrivning för företagsmöten]).*

D.1.1.2 Action plans with safety improvements

Of the safety reports received, 41% of operators indicated that they have made safety improvements in response to an event or incident or as a preventive measure, which is a decrease from the previous year (46%). Most of the operators have reported more than one safety improvement. The event need not have had serious consequences. Less serious events – such as incidents and events with impacts less severe than other possible outcomes – have also led to the implementation of safety improvements. Several of the operators have implemented safety improvements as preventive measures, such as improved deviation reporting. Table 4 below shows some examples of safety improvements implemented by operators and the reason(s) for them. In addition to the examples in Table 4, which shows some specific activities, it is reported that an annual safety inspection – including measures to reduce inspection notes – and skills enhancement of personnel through both training and workplace meetings are activities that lay the foundation for a high level of safety in railway operations. Some operators also mention that the Transport Agency's investigation led to safety improvements, such as a new managerial structure, updated and improved documentation, subcontractor reviews, and the performance of risk analysis.

Reason(s) for the activity	**Consequence or potential consequence**	**Safety improvement**
Too many SPADs: Errors in wagons lists.	Number of SPADs went down, the wagon lists got better.	Monitoring SPADs. Review of the processes for handling wagon lists. Driver training.
Too many SPADs: Talking on the phone and SPADs are related and new drivers have higher rates of SPAD.	New regulations were introduced in late 2011, no measurable results yet. Potential impact is fewer SPADs and safer procedures for new drivers.	New rules for mobile phones in the driver's cab, new procedures for monitoring new drivers, and new stop signal rules.
Derailment.	Fewer derailments.	Reduced axle loads and reduced speed on certain sections within port areas.
Accidents during embarking and disembarking	Fewer accidents during embarking and disembarking	Alteration to the doors to prevent them opening when the train is in motion.

Table 4: Examples of safety improvements in 2011 reported by operators

The safety report of the state infrastructure manager, the Swedish Transport Administration, described the overall safety target as a reduction in the number of fatalities and serious injuries in the rail transport system. The target has not been met, despite various measures to prevent unauthorised track access, for example. The Transport Administration believes this may result from a combination of insufficient knowledge, insufficient respect for risks and regulations, and increased traffic.

As the target has not been met, the Swedish Transport Administration has decided to use the same approach to rail safety as that used for road safety. The Administration is a member of the European RESTRAIL project which is to put forward measures to prevent unauthorised track access, including suicides, and they have initiated a systematic approach to the management of safety efforts, with milestones that are monitored through selected indicators. The approach is based on the long-term and systematic management of safety efforts, with milestones that are

monitored through selected indicators. Milestones will be developed in collaboration. A national joint action group (GNS Järnväg [GNS Railway]) has been established. The group will handle both specific rail traffic issues and intermodal issues. Work began in 2011 to produce condition indicators, develop measurements, and make initial analyses.

One of the safety improvements mentioned in the safety report is an outline for systematic planning – both short and long-term – of contractors' track work. The aim is for all track measures to be coordinated. The Swedish Transport Administration has also produced an activity plan that puts forward possible measures to impede unauthorised track access at particularly vulnerable locations.

As opposed to directly informing children in schools about the dangers of railways, as in previous years, the Swedish Transport Administration is now providing teacher guides to primary schools. The guides are linked to the curriculum in order to give teachers the opportunity to deal with the issues over a longer period of time.

The Swedish Transport Administration continued to expand the detector system during 2011. Fifteen new pantograph detectors and two new hot box / blocked brake detectors have been installed.

There were fewer broken rails on the state's infrastructure in 2011 while reports of buckling increased, compared to 2010.

The Swedish National Audit Office has safety inspected some of the yards within the operational area of the state infrastructure manager. The Office observes that the Swedish Transport Administration does not comply with legal requirements and that the risk level is unacceptable. The Transport Agency has allocated SEK 14.5 million to the inspected yards in 2012 and has developed a model for the safety inspection of yards.

Copper theft is a large and growing problem for the railways. In addition to increased risks for contractors working in the track, the thefts lead to train delays and increased maintenance and investment costs. The Swedish Transport Administration has a task force working on measures to prevent such thefts, examples of which include increased surveillance and altered designs to hinder theft. Together with the police, the Swedish Tax Agency, customs, and other authorities, the Administration is attempting to combat the organised gangs' activities. One proposal is to introduce greater permitting and reporting requirements for scrap dealers.

After the Gudrun and Per storms, the Swedish Transport Administration made the decision in 2006 to secure approximately 4 300 kilometres of rail from the hazard of downed trees. The project will proceed until 2016 and by the end of 2011 it had already secured over 3 400 kilometres.

The Transport Administration's railway safety management system is based on the ERP system previously used by the former Swedish Rail Administration [Banverket]. A gradual integration and review of the safety management system documents will take place during 2012 and 2013. The Transport Administration has five operating areas, all of which were audited in 2011. The two recurring notes concern the risks of reorganisation, such as the allocation of responsibilities and unclear interfaces between different organisational units.

The Swedish Transport Administration carried out a major reorganisation in 2011. Two new fields of activity were created – Traffic Management and Maintenance – and one field of activity was terminated – Traffic. New Rules of Procedure were simultaneously introduced for the entirety of the Swedish Transport Administration. Of particular importance, the Society field of activity gained functional responsibility for traffic safety and all personnel that work on railway and road traffic safety were brought together under the one umbrella.

D.2 Common safety indicators

This section presents observations on the common safety indicators (CSIs). In principle, CSIs should be presented as an average value based on values of five years. Because 2012 is the sixth year that information has been collected in this way, the indicators for 2011 are presented as an average based on the values for 2011, 2010, 2009, 2008 and 2007. Some indicators have been added since the system started in 2006, in which cases the years that have available values are reported. The CSIs consist of data on accidents and deviations set against the number of train kilometres or, in certain cases, passenger kilometres. Trafikanalys has provided data on track work and track kilometres for this year's report. This may entail train kilometre and track kilometre deviations from other sources, such as the Swedish Transport Administration. Sources and definitions used for the collected information are presented in Chapter J.

As certain infrastructure managers and railway undertakings are exempt from submitting safety reports (see section B.2.1), the indicators do not provide a measure for all railways in Sweden. For example, activities on local and regional networks that are independent and intended solely for passenger or museum traffic, such as the Saltsjöbana and the Roslagsbana, are excluded from this report. The figures for the number of deaths and serious injuries are therefore different from the figures provided annually by Sweden to Eurostat and from the figures that are published annually in Trafikanalys's official statistics publication, 'Bantrafikskador[16]' [Rail Traffic Injuries].

D.2.1 Accidents

In 2011 there were 54 (69, 46, 46, 56) accidents to be reported in accordance with Annex 1 of the Safety Directive[17]. Figures in parentheses refer to 2010, 2009, 2008, and 2007 respectively. The average for the last five years is 0.39 accidents per million train kilometres. In short, it can be said that the figures include accidents involving railway vehicles in motion resulting in: the death or serious injury of at least one person, costs of more than SEK 1.4 million, or a complete blockage of traffic for at least six hours.

[16] See Chapter J for a more detailed account of the differences in accident statistics.

[17] Accidents in which at least one trackbound vehicle in motion was involved and in which at least one person was killed or seriously injured, or in which damage to stock, tracks, or other installations resulted in costs of at least one hundred and fifty thousand euro. Accidents that cause environmental damage or which significantly delay traffic are also regarded as accidents that must be reported. Suicides are excluded. Events in which the police have not taken a position as to whether the event was an accident or a suicide are included as accidents. See definitions, Annex F.

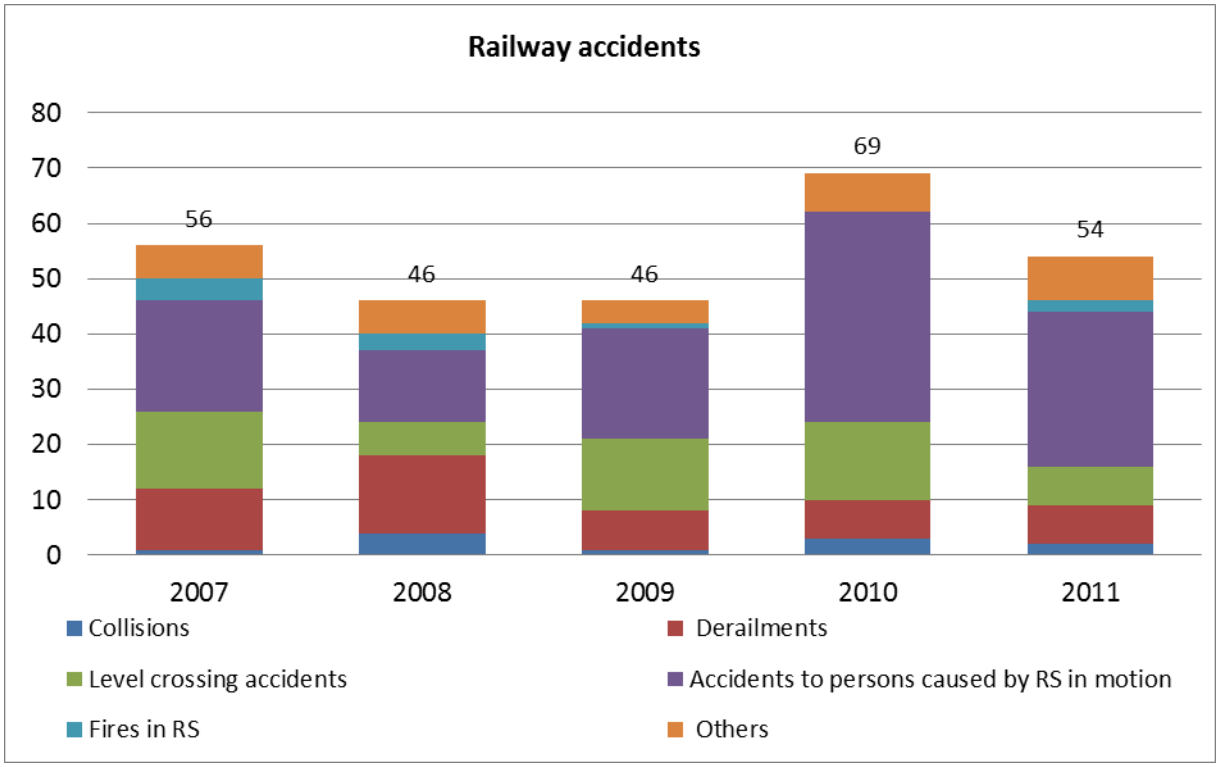


Figure 2: Diagram of number of railway accidents per accident category.

The accidents in Figure 2 are divided into different categories: train collisions, train derailments, level crossing accidents, accidents to persons caused by rolling stock, fires in rolling stock, and other accidents.

The accident category for which the most accidents were reported in 2011 is accidents to persons caused by rolling stock in motion 28 (38, 20, 13, 20). As in previous years, the majority of the consequences involving people have occurred as a result of unauthorised track area access. Fifteen persons died and eight were seriously injured in 2011. Suicides have been excluded from these figures, but it is rarely possible to say with certainty whether or not a death was a case of suicide. Cases on which the police – the competent authority – have not taken a position as to whether an event was an accident or a suicide are included as accidents. See section D.2.2 for further analysis – produced by the Swedish Transport Agency on behalf of ERA – of the increased number of deaths and serious injuries due to unauthorised track access in 2010.

In previous years, level crossing accidents have been in second place among the accident categories. This trend was broken in 2011, when there were seven level crossing accidents, which compares well with 2010-2007 (14, 13, 6, 14). 2008 also saw few level crossing accidents, thus it is best to await further developments before drawing any conclusions on a downward trend. 'Other accidents' were the second most frequent with eight such in 2011 (7, 4, 6, 6). Several of the 'other accidents' are collisions and derailments with shunting movements and have been reported because they led to significant consequences in terms of damage costs and/or major traffic disruptions.

Two train collisions (3, 1, 4, 1) and seven derailments (7, 7, 14) reported for 2011 were also reported because of damage costs and/or significant traffic disruptions. However, they did not lead to any serious injuries or fatalities. Two fires (0, 1, 3, 4) have been reported for 2011. Both

were reported because they involved extensive stock costs, but no persons were seriously injured or killed in the fires.

In addition to the accidents reported here, there were also 62 (68, 67, 71, 78) suicide attempts which resulted in death or serious injury in 2011.

D.2.2 Killed and seriously injured

This group of indicators includes the number of killed and seriously injured persons. In 2011, there were 24 (42, 19, 13, 23) fatalities and 15 (25, 15, 6, 14) serious injuries. The indicator for the number of fatalities per billion train-km (CST 6) has decreased from 2010, which was an extraordinary year, and the values for 2011 are once again comparable with previous values (2007-2009).

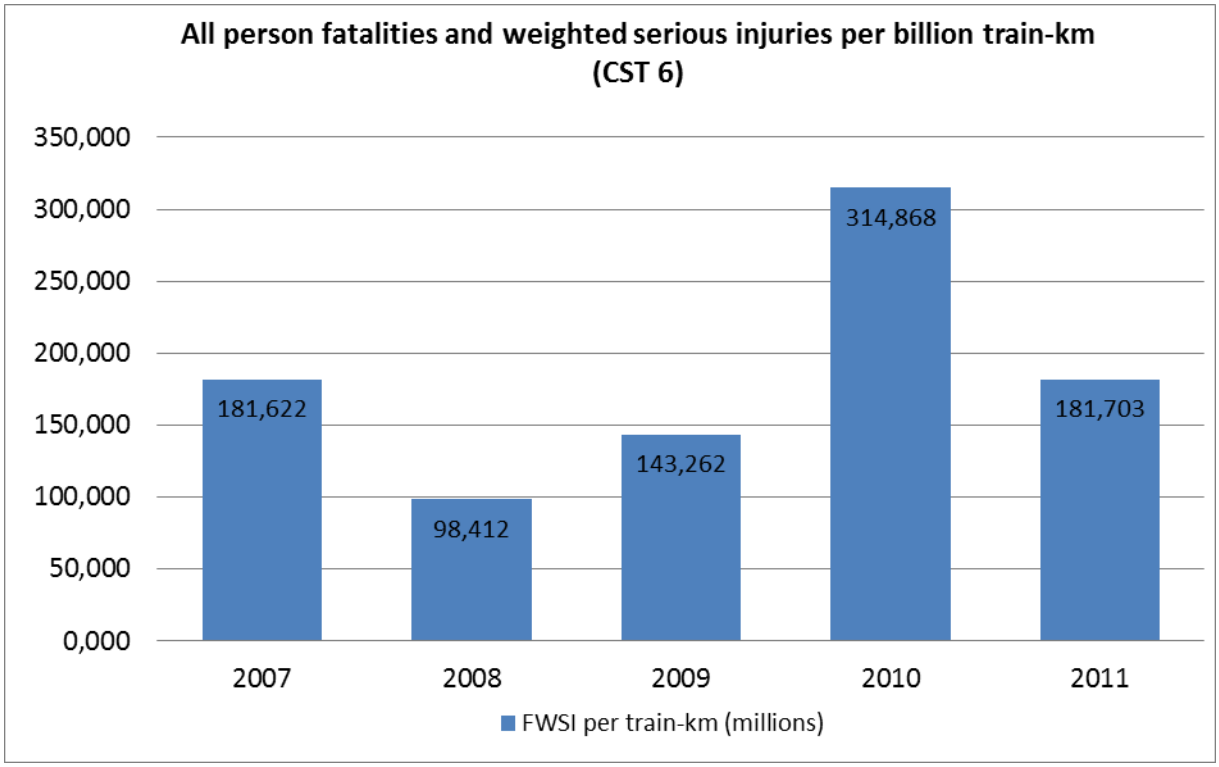


Figure 3: Indicator for number of fatalities and serious injuries per billion train kilometres (CST 6).

Twenty-four (42, 19, 13, 23, 16) persons died in accidents caused by railway operations in 2011. The largest group was accidents to persons in which 17 (34, 13, 9, 14, 9) persons died due to unauthorised track access. The remaining deceased persons were level crossing users 7 (7, 6, 4, 9). There were fewer deaths due to unauthorised track access than in 2010.

Fifteen (25, 15, 6, 14) persons were seriously injured as a result of railway operations in 2011. Two passengers were seriously injured, one in a collision and one while disembarking. Two employees were injured during a shunting movement. However, the majority of those seriously injured were persons who accessed tracks without authorisation: 8 (5, 2, 1, 2, 4). The number of seriously injured persons who accessed tracks without authorisation increased in 2011. There is some uncertainty regarding the number of serious injuries as it is difficult to obtain reliable data

on 24-hour stays in hospital. Data on the degree of personal injury is retrieved from the police or the companies concerned. The Swedish Transport Agency has begun a pilot project to investigate whether it is possible to obtain data through the hospital contacts that are currently used for road traffic accidents. The project has revealed that data on level crossing accidents are largely available in the Swedish Road Administration's national vehicle register, STRADA, where both the police and the healthcare system report accident data.

The Swedish Transport Agency's analysis of the number of killed and seriously injured unauthorised persons on tracks

In the spring of 2012, ERA presented its report on monitoring of national safety targets (CST) for 2010. Some Member States had negative trends on certain points but all were accepted, except Sweden's negative trend for killed and seriously injured unauthorised persons on tracks. The Swedish Transport Agency has further analysed this to see if the statistics are based on a negative trend or on coincidence.

The Transport Agency compiles annual statistics on, inter alia, the trends in the number of killed and seriously injured persons in railway operations, known as 'serious accidents involving personal injury'. The statistics for 2006-2011 are reported in the common safety indicators (CSI). The monitored categories are: passengers, employees, level crossing users, and unauthorised persons on track, or unauthorised track access. The category with the most deaths and serious injuries is consistently unauthorised track access.

Another large group killed and seriously injured are those who commit or attempt to commit suicide by train. Suicide and suicide attempts are a separate category and are not included in the statistics of serious accidents involving personal injury. Information from police investigations determine whether a killed or seriously injured person is to be classified as suicide, attempted suicide, or a serious accident involving personal injury as a result of unauthorised track access. The unauthorised track access category includes injury accidents where the injured/killed persons are not passengers, employees, level crossing users, or people who have committed/attempted suicide. Uncertain cases, especially when it is not clear whether suicide was the case or not, are assigned to the unauthorised track access group.

Analysis of unauthorised track access

If one examines the number of killed and seriously injured persons in railway operations during the period of 2000 to 2011, it is clear that 2010 was an anomalous year with 67 killed/seriously injured (see Figure 4). For the other years, including 2011, the number of killed and seriously injured persons varies between 23 and 49. The deviation in 2010 consists entirely of an increased number of unauthorised track accesses.

In 2010, the Swedish Transport Agency administrator who was checking injuries to persons reported an increasing number of cases for which the police had not taken a position as regards suicide. These events were classified as unauthorised track access in accordance with current practice.

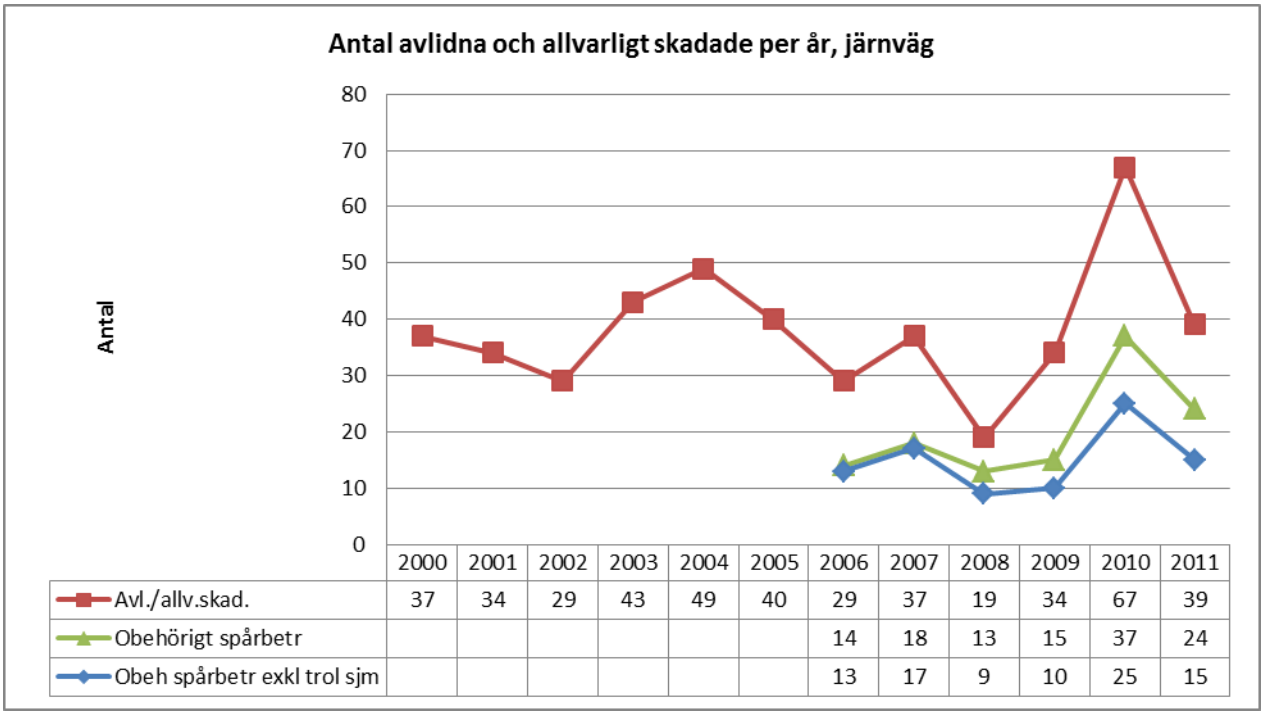
The Transport Agency's IT system for reported railway events contains 112 events classified as unauthorised track access during the period of 2006[18]-2011. Among these 112 events are a

[18] During the years 2000-2005, level crossing users and unauthorised track access were reported in the category 'Other', unauthorised track access has therefore only been monitored since 2006.

number of *probable suicides/suicide attempts*, that is to say events that have not been classified as suicides/suicide attempts by the police. Suicides and suicide attempts will henceforth be referred to as suicides.

Figure 4 presents the official number of unauthorised track accesses per year; from 2006 as a CSI. Figure 4 also presents unauthorised track access both before and after probable suicides have been subtracted. The probable suicides excluded from the unauthorised track access group are those where the event description clearly suggests suspected or probable suicide or where it is clear that the person lay down or sat on the tracks and did not react to the train driver's warning signal. When the unauthorised track access group is cleared of the probable suicides, the unauthorised track access excluding probable suicide group is markedly reduced in both 2010 and 2011. The difference between unauthorised track access and unauthorised track access excluding probable suicides has gradually increased since 2008. This reinforces the view that it is difficult, and has become even more difficult, to obtain data to help determine whether an event should be classified as suicide.

The statistics in Figure 4 show that 2010 was an anomalous year, whether probable suicides/attempts at suicide are taken into account or not. This impression is reinforced by the 2011 figures showing a return to a lower level, although there is still a high number of serious accidents involving personal injury due to unauthorised track access.



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Avl./allv.skad.	37	34	29	43	49	40	29	37	19	34	67	39
Obehörigt spårbetr							14	18	13	15	37	24
Obeh spårbetr exkl trol sjm							13	17	9	10	25	15

Figure 4: Number of killed and seriously injured persons in railway operations from 2000 to 2011.

Number killed and seriously injured per year, railways	Antal avlidna och allvarligt skadade per år, järnväg
Killed/seriously injured	Avl./allv.skad.
Unauthorised track access	Obehörigt spårbetr
Unauthorised track access excluding probable suicide	Obeh spårbetr exkl trol sjm

Swedish suicide statistics
The National Centre for Suicide Research and Prevention of Mental Ill-Health (NASP) monitors the suicide trend in Sweden. There are statistics up to the end of 2010. The statistics show that suicides in Sweden are trending downwards (Självmord i Sverige [Suicide in Sweden] 1987-2010, page 4). The report also shows that both definite and uncertain suicides are included in the national statistics and that suicide by 'jump/fall from height or in front of an object in motion, and by motor vehicle' shows an upward trend for both men and women (page 23).

Conclusions from 2010 unauthorised track access analysis
One conclusion from the analysis is that coincidence underlies the increase in serious accidents involving personal injury resulting from unauthorised track access in 2010 and that it has become more difficult to gain access to data that confirms suicide, which has led to a further increase in the unauthorised track access group. The conclusions are based on the fact that 2011 statistics for serious accidents involving personal injury have returned to previous levels and that the proportion of probable suicides remains high. The analysis confirms the reality of the perceived difficulties in obtaining data that confirms suicide.

D.2.3 Technical safety of infrastructure

This group of indicators includes, inter alia, the percentage of tracks fitted with ATP/ATC (Automatic Train Protection/Control) or ERTMS and the number of level crossings with various types of level crossing safety installations. The largest infrastructure manager in Sweden is the Swedish Transport Administration. Their 2011 safety report states that they have 9 714 km with ATC out of a total 11 969 km of track. This means that the percentage of tracks with Automatic Train Control (ATC) in use is approximately 81% (65%). The difference between 2010 and 2011 may be due to the use of different sources (the Swedish Transport Administration versus Trafikanalys).

The Swedish Transport Administration states in this year's safety report that the preliminary number of train kilometres with ATC in 2011 was approximately 140.6 million. The percentage of train-km run on tracks with ATC in use is approximately 97%. The majority of traffic is therefore on tracks which are extremely safe in technical terms.

The state-owned infrastructure manager, the Swedish Transport Administration, has worked actively for several years on improving the safety of level crossings, resulting in a downward trend in the number of serious level-crossing accidents. One of the measures taken was to replace level crossings without active safety installations with level crossings that do have active safety installations or, alternatively, to remove the level crossings.

Type of level crossing		Number	
1.	Number of level crossings with automatic acoustic and/or visual systems that warn level-crossing users	843	(918)
2.	Number of level crossings with automatic barrier systems (whole or half barriers, including gates or similar) that warn/protect level-crossing users	9	(31)
3.	Number of level crossings with automatic systems comprising both 1 and 2	2196	(2280)
4.	Number of level crossings with both 1 and 2 that are also equipped with obstacle detectors	78	(19)
5.	Number of level crossings with manually controlled acoustic and/or visual systems that warn level-crossing users	87	(62)
6.	Number of level crossings with manually controlled barrier systems, including gates or similar that warn/protect level-crossing users	2	(5)
7.	Number of level crossings with manually controlled systems comprising both 5 and 6	29	(19)
8.	Number of passive level crossings	5486	(8036)
Total:		**8 730**	**(11 370)**

Table 5: Number of level crossings by type of safety installation and the total of all received safety reports, i.e. incl. the Swedish Transport Administration. Figures in parentheses refer to 2010.

Type of level crossing		Number	
1.	Number of level crossings with automatic acoustic and/or visual systems that warn level-crossing users	710	(721)
2.	Number of level crossings with automatic barrier systems (whole or half barriers, including gates or similar) that warn/protect level-crossing users	0	(0)
3.	Number of level crossings with automatic systems comprising both 1 and 2	2111	(2120)
4.	Number of level crossings with both 1 and 2 that are also equipped with obstacle detectors	78	(76)
5.	Number of level crossings with manually controlled acoustic and/or visual systems that warn level-crossing users	17	(17)
6.	Number of level crossings with manually controlled barrier systems, including gates or similar that warn/protect level-crossing users	0	(0)
7.	Number of level crossings with manually controlled systems comprising both 5 and 6	0	(0)
8.	Number of passive level crossings	3422	(3521)
Total:		**6 338**	**(6 455)**

Table 6: Level crossings on the state-owned infrastructure by type of safety installation. Figures in parentheses refer to 2010.

Tables 5 and 6 differ in that Table 5 includes all level crossing safety installations that operators reported in their safety reports. The tables differ only in that the smaller infrastructure managers in Table 5 have both manual and automatic installations with barriers or gates, which is not the case with the state infrastructure manager. The state-owned infrastructure has 6 338 (6 455) level crossings. The 2010 data in Table 6 has been updated to reflect that in the Swedish Transport Administration's safety report. Table 5, which includes all reported level crossings, has not been updated on account of a lack of information from infrastructure managers. In some isolated cases, infrastructure managers stated that they have level crossings but did not specify what type of protection they have, thus the total number of level crossings in Table 5 may be slightly higher than 8 730 (11 370). Overall, it can be confirmed that the number of level crossings is decreasing.

D.2.4 Deviations

This indicator combines all reported deviations relating to broken rails, track geometry faults, broken axles and wheels, SPADs (signals passed at danger), and wrong-side signalling failures. Reported deviations for 2011 total 429 (477, 723, 594, 516).

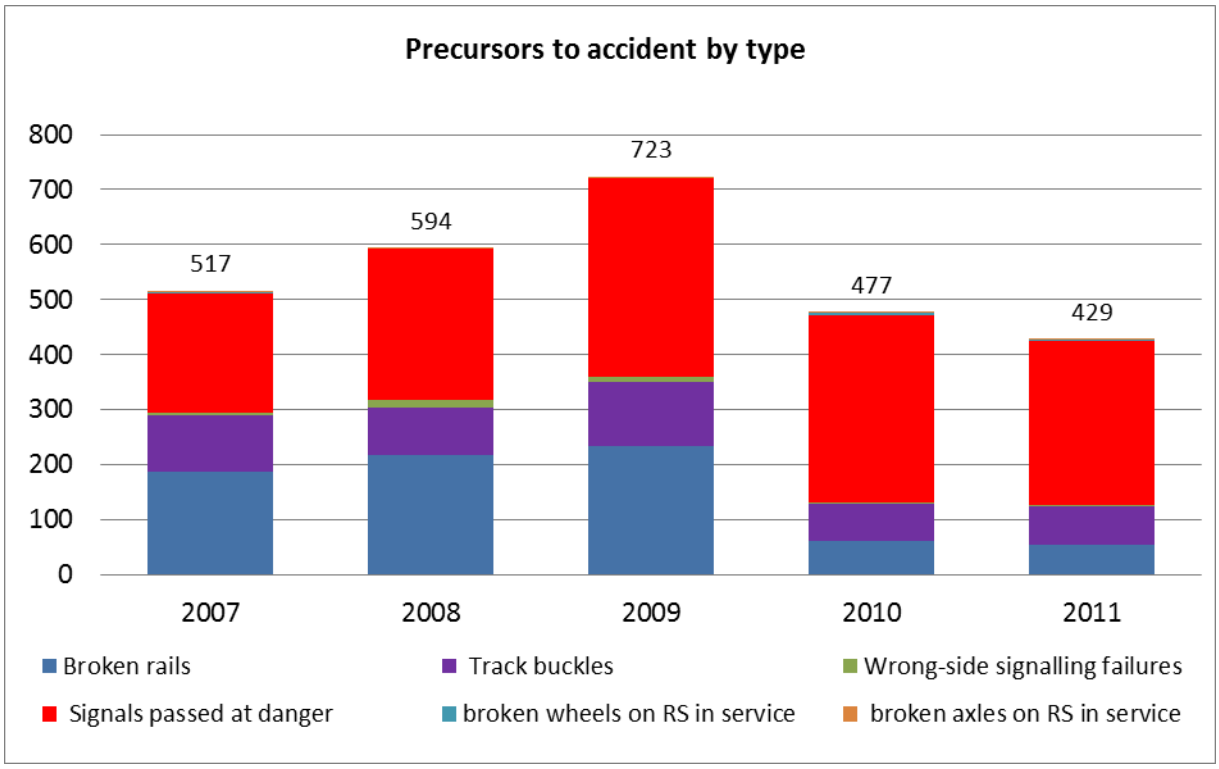


Figure 5: Number of deviations per year.

The signals passed at danger category 297 (341, 362, 275, 217) is clearly the dominant indicator. It may be worth noting that the number of reported SPADs has decreased for the second year in a row since reporting began, but there were still more than in 2007 and 2008.

All deviations, except for broken wheels, have decreased. However, please bear in mind the comments above on data uncertainties.

Track geometry faults: 70 (68, 115, 87, 102)

Broken rails: 55 (62, 235, 218, 187)

Wong-side signalling failure 2 (1, 9, 12, 6)

Broken wheels: 4 (4, 0, 1, 2)

Broken axle: 1 (1, 2, 1, 3)

D.2.5 Costs and working hours lost as a consequence of accidents

This indicator is an attempt to measure the total costs incurred in the railway system as a consequence of accidents. The costs are expressed in euro[19].

ERA has developed new methods for reporting costs. The new methods are based on societal costs instead of the costs to railway undertakings and infrastructure managers. However, two types of costs are still based on the costs incurred by railway undertakings and infrastructure managers.

1. Experience has shown that railway undertakings and infrastructure managers bear the environmental costs of restoring a damaged area to the condition it was in before a railway accident. The undertakings have not reported any environmental costs for 2011. The stated reasons are that they either had no such costs or that they are not aware of any environmental costs. No environmental costs were reported in 2010, either.

2. The cost of providing new rolling stock or infrastructure with the same function and technical parameters as those that cannot be repaired and the cost to restore the rolling stock or infrastructure to the condition they were in before the accident. Undertakings' costs reported for 2011 are approximately EUR 19 million (EUR 8 million in 2010 and EUR 16 million in 2009). Undertakings have indicated that there is considerable uncertainty in these data.

The following costs are based on the costs to society:

- Costs of fatalities: approximately EUR 59 million (approximately EUR 98 million in 2010 and EUR 46 million in 2009); costs of serious injuries: approximately EUR 7 million (approximately EUR 11 million in 2010 and EUR 7 million in 2009) (in railway accidents).

- Costs of delays due to accidents: approximately EUR 24 million (approximately EUR 72 000 in 2010).

The information on costs for fatalities and serious injuries is based on calculated values for deaths and serious injuries from a socio-economic perspective, produced by SIKA (the Swedish Institute for Transport and Communications Analysis) in PM 2008:3 Socio-economic principles and calculation values for the transport sector: ASEK 4. The costs are then multiplied by the number of fatalities and serious injuries.

[19] For calculating costs in euro, an exchange rate of EUR 1 = SEK 9.034 (Swedish Central Bank mean exchange rate for 2011) has been used for 2011 where reporting railway undertakings and infrastructure managers quote their costs in SEK.

The calculation of costs incurred from delays due to accidents is reported this year for the second time. The calculated value is obtained from the ERA's CSI data form. The data on the number of delay minutes also contain delay minutes resulting from incidents and only covers the state-owned infrastructure.

There are major differences in the data, which suggests a need to improve the validation of reported delay minutes. 2010 saw 2 054 delay minutes for passenger trains and 2 723 delay minutes for freight trains while 2011 saw 120 742 delay minutes for passenger trains and 151 430 delay minutes for freight trains.

D.2.6 Safety management

For 2011, the key figure used is the ratio of system audits that operators planned, 202 (214, 221, 177, 194), and the number of audits performed, 179 (187, 164, 156, 188). 65 of 152 operators indicated that they planned and performed at least one system audit in 2011. A few other operators indicated that they planned to, but did not carry out system audits in 2011. An example of an audit area might be an audit of subcontractors and the safety management system. Some examples of more general shortcomings that were found include shortcomings in compliance with regulatory requirements, deficiencies in skills management, and safety management deficiencies. Planned and completed maintenance inspections, which are considered to be safety improvement activities, are also reported under this point. In approximately 10 reports, the operators refer to the Swedish Transport Agency's audit as a source for the notes.

D.3 Result of safety recommendations

The Swedish Transport Agency is the recipient of the rail traffic safety recommendations that are provided by the independent investigative authority; the Swedish Accident Investigation Board (SHK). During 2011, the Swedish Transport Agency addressed all 20 safety recommendations made in the following investigation reports:

Swedish Accident Investigation Board (SHK) Report	**Recommendation**	**Swedish Transport Agency response**
RJ 2010:03 Near-collision between train and shunting in Stockholm Östra (east) on 5 August 2007.	RJ 2010:03 R1 – R4	20 April 2011
RJ 2010:04 Derailment of train on the Upplands Väsby – Rotebro stretch on 24 June 2008.	RJ 2010:04 R1 – R3	30 March 2011
RJ 2011:01 Incident with rolling wagons on the Östavall – Alby stretch on 2 May 2009.	RJ 2011:01 R1 – R2	9 June 2010
RJ 2011:02 Near-collision between two trains at Skutskär södra (south) on 13 March 2010.	RJ 2007:02 R1 and RJ 2011:02 R2 RJ 2011:02 R1 – R4	31 May 2011

RJ 2011:03 Accident involving track worker being hit by a train in Linghem on 1 February 2010 .	RJ 2011:03 R1 – R4	19 September 2011
RJ 2011:04 Level crossing accident with train at Solgården on 9 September 2010 .	RJ 2011:04 R1 – R3	29 November 2011

Table 7: Summary of Swedish Accident Investigation Board recommendations to which the Swedish Transport Agency replied during 2011.

The SHK safety recommendations are found below, in italics, and are followed by the Swedish Transport Agency response to the investigation authority on the handling of the recommendation.

RJ 2010:03 Near-collision between train and shunting in Stockholm Östra (east) on 5 August 2007.
Response submitted on 20 April 2011

Recommendation RJ 2010:03 R1

- *in connection with licensing and auditing of infrastructure managers, check that the safety management system ensures safety-critical equipment compliance with any requirements for safe operation*

Under the provisions of BV-FS 1997:2 *Track system inspection and maintenance,* the infrastructure manager is responsible for ensuring that a commissioning inspection is performed prior to entry into service of a newly built, rebuilt, or part of track system. According to § 7, the infrastructure manager is responsible for ensuring that there are inspection and maintenance provisions.

As part of the application assessment, the Swedish Transport Agency checks that the infrastructure manager has a system for commissioning inspections and a deviation management system for the infrastructure and its safety-critical equipment. The Agency does not perform an examination of technical safety management when a safety authorisation application is made.

Technical safety management is included in the process *railway subsystem approval* under the JvSFS 2010:116 regulations. Under these provisions, upon modification of components and subsystems, operators have to demonstrate to the supervisory authority that:

- A new subsystem is at least as safe as the existing subsystem used in an equivalent manner.
- Failure of a single component will not result in serious injury or damage to passengers, personnel, equipment, or the environment.
- Vehicles, control-command and signalling systems, and infrastructure are at least as safe after modification as they were before.

The Swedish Transport Agency has different criteria depending on the scope of technical and safety systems. This then has an indirect influence on what requirements the Agency sets for documentation of a system's safety. The Agency requests more documentation for the approval of new and modified subsystems that have significant safety implications.

The Swedish Transport Agency has always performed regular safety oversight of infrastructure managers' systems for commissioning inspections and deviation management, and continues to do so.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2010:03 R1 to be fulfilled.

Recommendation RJ 2010:03 R2

- *conduct an audit of how the requirements are followed for archiving documentation concerning personnel qualifications and completed inspections*

The Swedish Transport Agency has decided to conduct safety oversight of AB Storstockholms Lokaltrafik (SL) based on the documentation and archiving requirements of BV-FS 1997:2 *Regulations on track system inspection and maintenance*.

The Agency has decided to place the recommendation's second part – regarding safety oversight of documentation and archiving of personnel qualifications – in its oversight schedule for upcoming operational planning.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2010:03 R2 to be fulfilled.

Recommendation RJ 2010:03 R3

- *investigate the feasibility of establishing a qualification registry (similar to the registry of driver licenses) for all personnel with duties of importance to traffic safety in order to facilitate transition between different operators*

The European Railway Agency (ERA) has presented a report based on Article 28 of *the Train Drivers Directive* (2007/59/EC) on the professional qualifications and safety-critical tasks performed by other crew members. *Report on the profile and tasks of the other crew members performing safety-critical tasks under Article 28 of Directive 2007/59/EC* (ERA/CON/2010-03/INT).

According to the report, ERA has determined that the safety-critical tasks differ in freight and passenger transport and that professional freight qualifications should not be covered by Article 28. The basic professional qualification requirements for other crew (passenger transport) are partly covered by the technical specification for interoperability (TSI) on the subsystem *Traffic Operation and Management* (2006/920/EC) and there is no need to further regulate this subject. However, ERA adds that if an EU system should be developed, it could be adopted in several ways: as a new legal document, through a revision of the *Train Drivers Directive* (planned for 2013), or through an amendment to the requirements already found in the TSI *Traffic Operation and Management.*

The Swedish Transport Agency's consultation response to Ds 2009:54 *Train drivers authorisation* proposes the introduction of certification and a national register for all safety functions concomitant with their introduction for train drivers. The department's position was not to prejudge a possible decision of the European Commission.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2010:03 R3 to be fulfilled.

Recommendation RJ 2010:03 R4

- *in connection with the approval of traffic safety instructions, check that there are clear rules for how safety-critical communications are to be performed in order to avoid misunderstandings*

Upon receiving a safety authorisation application, the Swedish Transport Agency checks that the infrastructure manager has its own traffic safety instructions or that it applies the Swedish Rail Agency's traffic regulations (JvSFS 2008:7) at its facility. The Agency does not examine any traffic safety instructions in detail, but rather focuses on how the regulatory framework is produced.

The following, inter alia, are checked:

- that persons with competence in the area participated, and
- the structure and methodology used in the process, and
- that risk analyses were performed, and
- that the risks were assessed and addressed.

Detailed knowledge of the facility and responsibility for how it is to be used lie with the infrastructure manager. The Swedish Transport Agency believes that it cannot and should not perform a detailed examination of each infrastructure manager's own traffic safety instructions in the manner referred to in the recommendation, rather the undertakings themselves must be responsible for ensuring that the rules they have for safety-critical communications, for example, are safe and appropriate for their infrastructure.

Traffic safety instructions are a keystone of infrastructure manager authorisations. The supervisory authority must be contacted upon changes to the traffic safety instructions. The authority then decides if the change requires a safety authorisation review.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2010:03 R4 to be fulfilled.

RJ 2010:04 Derailment of train on the Upplands Väsby – Rotebro stretch on 24 June 2008.
Response submitted on 30 March 2011

Recommendation RJ 2010:04 R1

- *explore the possibility of ensuring the implementation of a comprehensive study on the risks of material fatigue on wheel flanges caused by long runs or high speeds*

The Swedish Transport Agency will, in consultation with the Swedish Transport Administration, deliver the contents of the recommendation on studying the risks of material fatigue on wheel flanges to the Swedish Transport Administration and its research and innovation group. The Transport Agency intends to suggest that the Swedish Transport Administration assess both the current knowledge and whether increased efforts in research and innovation – with a focus on the problem area – are warranted.

By virtue of the above, the Swedish Transport Agency considers recommendation RJ 2010:04 R1 to be fulfilled.

Recommendation RJ 2010:04 R2

- *ensure that the railway undertakings, during periodic or needs-driven maintenance, have procedures to ensure that wheels are adequately inspected so that wheels with incipient fractures are prevented from leaving the workshop without being attended to*

SJ AB has stated that it has revised the company's internal provisions *Maintenance Instructions for Wheelsets - Inspecting and checking wear and damages on wheel tread* with clearer inspection requirements for the exterior and interior sides of wheel flanges. SJ AB has also tightened requirements for workshop inspections after 'flat spot' wheel damage notices.

The Swedish Transport Agency considers the SJ AB measures to be reasonable. The Agency has also placed the recommendation in its oversight schedule for operational planning of safety oversight of railway undertakings.

By virtue of the above, the Swedish Transport Agency considers recommendation RJ 2010:04 R2 to be fulfilled.

Recommendation RJ 2010:04 R3

- *ensure that railway undertakings have procedures that help personnel to take proper action when reporting faults which may have serious safety implications*

SJ AB has stated that they have checklists/instructions for technical operational support but, on the basis of the recommendation, have appointed a task force to review the need for additional checklists and instructions for different situations.

The Swedish Transport Agency has decided to follow-up on the work with the checklists/instructions at the next corporate meeting with SJ AB. The Agency has also placed the recommendation in its oversight schedule for operational planning of safety oversight of railway undertakings.

By virtue of the above, the Swedish Transport Agency considers recommendation RJ 2010:04 R3 to be fulfilled.

RJ 2011:01 Incident with rolling wagons on the Östavall – Alby stretch on 2 May 2009
Response submitted on 9 June 2011

Recommendation RJ 2011:01 R1

- *explore the possibility of developing standards for how protection should be arranged for parking tracks to prevent vehicles from rolling out onto/near the connecting main line, even when there is not a reserved trainset on the main line*

The Swedish Transport Agency has placed the recommendation in its knowledge base for assessment and evaluation in the process of producing the national regulatory technical specifications, which will complement the European regulatory framework on technical specifications for interoperability (TSI). The latter is the basis for new builds and renovations of existing infrastructure. The Agency will also contact the Swedish Transport Administration to obtain their views on the recommendation.

During 2011, the Swedish Transport Agency decided to conduct safety oversight in track areas with parking tracks regarding access to and application of track shoes, scotches, and other mobile equipment to prevent railway vehicles rolling when parked on parking tracks.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:01 R1 to be fulfilled.

Recommendation RJ 2011:01 R2

- *in connection with oversight, examine whether the operators' safety management systems are sufficient to pick up behaviour that may cause traffic safety hazards*

The European *Train Drivers Directive* (2007/59/EC), which is the basis for the forthcoming Swedish legislation on train driver qualifications (Prop. 2010/11: 122), states that train drivers are to be selectively tested for occupational fitness and then regularly examined for occupational physical and mental fitness. The health regulations for train drivers and other safety functions, which are being revised by the Swedish Transport Agency, determine how and how often examinations are to be conducted.

The Swedish Transport Agency performs safety oversight in order to verify operators' use of their safety management systems in operations. The Agency checks, inter alia, the systems that the operator has in accordance with the provisions on *Safety management systems for railway undertakings etc.* (JvSFS 2007:1 Article 7c) regarding verification of personnel suitability. The operators are also obligated to review their systems for verification of personnel suitability and evaluate if the systematic preventative safety efforts achieve their objectives (JvSFS 2007:1 Article 11).

The Swedish Transport Agency has decided to examine the recommendation to establish what legal support exists and how it may be put into practice as part of safety oversight.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:01 R2 to be fulfilled.

RJ 2011:02 Near-collision between two trains at Skutskär södra (south) on 13 March 2010. Response submitted on 31 June 2011

Recommendations RJ 2007:02 R1 and RJ 2011:02 R2

- *ensure that the risk of single faults in connection with the establishment of a train's braking capacity is minimised by the introduction of checklists or the like (RJ 2007:02 R1)*
- *in its oversight activities, also verify that railway undertakings have systems which ensure that personnel have sufficient working hours to perform duties in accordance with the regulations (RJ 2011:02 R2)*

The Swedish Transport Agency has planned to perform safety oversight in 2011 based on the events that occurred in 2010 involving poor braking capacity on freight trains. The safety oversight will include, inter alia, verification of the procedures that railway undertakings have in place to minimise the risk of single faults in connection with the establishment of a train's braking capacity, operating instructions for various types of locomotives, brake test directions for locomotives with multiple coupling, the competence of personnel who perform safety functions, the carrying out of instructions after transition from driving with radio control equipment to driving from the driver's cab, and verification of procedures and systems to ensure there are adequate working hours in the duty roster for personnel who perform safety functions to execute the prescribed tasks.

As a result of the above, the Swedish Transport Agency considers that recommendations RJ 2007:02 R1 and RJ 2011:02 R2 will be fulfilled.

Recommendation RJ 2011:02 R1

- *examine whether the rules for brake tests can be adapted to achieve greater clarity so that the braking tests ensure that the driver can brake the train*

On 1 April 2011, the Swedish Transport Agency launched a feasibility study with a view to provide a basis for decisions and planning of efforts to adapt and more clearly divide the Swedish Rail Agency traffic regulations (JvSFS 2008:7) (known as *JTF*) into regulations and a handbook. The feasibility study will be completed in late September 2011.

On 31 May 2009, the JTF were introduced as national regulations for the Swedish railway network, with the exception of local and regional independent networks. Four amending regulations and a JTF Handbook have been published in the two years since their introduction. The JTF Handbook as a whole consists of a loose-leaf system, which facilitates regulation changes with annexes.

With the recent amending regulations, TSFS 2010:163, the Swedish Transport Agency has also taken the first step towards a separation of the JTF Handbook from the regulations. The Agency believes that there will be a continuing need to make changes, for the foreseeable future, to the regulations and thus also to the JTF Handbook.

The regulations are currently drawn up with detailed instructions and, in some places, with dialogue flow charts. With that they differ from the requirements of the Code of Statutes Ordinance (1976:725). The regulations in their current form would also be conservative for railway operations and slow down the streamlining of rail transport as regulatory changes take a long time due to legal formalities. On the other hand, changes to a handbook can be made more quickly.

For these reasons, the Swedish Transport Agency's strategy is to split the JTF into regulations with comprehensive traffic safety rules and requirements and a handbook with detailed instructions that follow these rules and requirements. The strategy includes issuing the rules that are common and essential for traffic safety as national regulations, even for transport on tracks with ERTMS (European Rail Traffic Management System).

The Swedish Transport Agency has determined that the recommendation to require brake tests is not affected, but rather that it is the detailed instructions after a completed brake test that the Swedish Accident Investigation Authority (SHK) believes should be clarified. The Agency believes that clarification can wait until work begins to separate the regulations and the JTF Handbook.

The Swedish Transport Agency is of the opinion that a deceleration test and the previously prescribed brake testing have the same purpose, i.e. to determine during movement if the braking effect is the same as calculated and input into the train protection system. The difference in execution is that in a deceleration test the driver uses a technical aid (the train protection system) to evaluate the braking effect while in the previously prescribed braking tests the driver made a personal evaluation of the braking effect based on training and experience. The Swedish Transport Agency has determined that a deceleration test is a better tool for the driver to evaluate the braking effect than is brake testing.

The Swedish Transport Agency has planned to perform safety oversight in 2011 based on the events that occurred in 2010 involving poor braking capacity on freight trains, as presented in the above recommendation response.

The Swedish Transport Agency believes that recommendation RJ 2001:02 R1 will be fulfilled.

Recommendation RJ 2011:02 R3

- *perform and document risk analyses when proposing regulatory amendments that may impact traffic safety*

In accordance with Regulation (2007:1244) *on impact assessment*, the Swedish Transport Agency assesses the impact of regulatory amendments and additions. Most regulations issued by the Swedish Transport Agency are amendments to existing regulations. It is then imperative that the impact assessment differentiates the new from the old. It is always the amendments that are subject to the impact assessment. In the case of formally completely new regulations, the point of departure is therefore that all rules will be subject to an impact assessment. If existing provisions are transferred unchanged to new regulations, according to the Swedish Agency for Economic and Regional Growth, the Agency may focus the impact assessment on the provisions that are new or that have actually changed in substance.

Transport policy has several objectives. The *overall objective* is socio-economically efficient and long-term sustainable transport services. The *functional objective* of transport policy is the creation of accessibility while there are also objectives regarding safety, the environment, and health (SHE objectives). The different objectives are often in conflict with each other, that is, if an action is performed that moves us in a positive direction towards an objective, one of the other objectives is often adversely affected. This means that we are often forced to weigh the various consequences against each other when we take a position on whether certain actions – such as certain regulations – are worth implementing.

The impact assessment is a tool to evaluate whether regulation is really necessary and whether the positive impacts – benefits – of a particular regulation outweigh the negative. It is also a tool which helps ensure that the regulations are drawn up as well as possible so that the positive impacts will be as great as possible in relation to the negative. When the Transport Agency works on a regulation it should, if possible, put forward facts that demonstrate the existence of a problem, such as – on issues of safety regulation – data on the number of accidents that occur each year in the type of events which the regulation is intended to prevent. Regulations often aim to prevent events with a low probability, but with considerable consequences. The problem definition in the impact assessment thus describes the risk (probability) of events occurring and the consequences should they do so. An unregulated area is never a relevant problem, as such. Regulation always entails infringement into the private sphere or the business realm, which in itself is negative. Society really wants to be regulated as little as possible and regulation should only be used when a problem is so great that the positive effects of the regulation exceed the negative effects.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:02 R3 to be fulfilled.

Recommendation RJ 2011:02 R4

- *investigate whether protection requirements for interlocking routes are sufficient to achieve sufficient safety in the railway system*

The Swedish Transport Agency will contact the Swedish Transport Administration regarding this recommendation.

The Agency has planned to perform safety oversight in 2011 based on the events that occurred in 2010 involving poor braking capacity on freight trains.

RJ 2011:03 Accident involving track worker being hit by a train in Linghem 1 February 2010.
Response submitted on 19 September 2011.

The Swedish Transport Agency and the Swedish Work Environment Authority have been in contact regarding recommendation RJ 2011:03 R1. The supervisory authorities have both taken action individually as the regulatory framework involved in the case addresses various legal entities.
The Swedish Transport Agency has written to the Swedish Transport Administration regarding recommendation RJ 2011:03 R2. The Transport Agency presents parts of the Transport Administration's reply in its response below.

Recommendation RJ 2011:03 R1

- *together with the Swedish Work Environment Authority, take the necessary steps to ensure that track work is performed with adequate safety standards*

A number of accidents and incidents occurred in 2010 during work on or near in-service tracks. The Swedish Transport Agency has asked the Swedish Transport Administration to take steps to increase safety. On 4 October 2010, the Swedish Transport Administration introduced tightened internal rules for work in the track area. The new rules were temporary and were to be replaced by more long-term measures by 15 April 2011.

In the spring of 2011, the Swedish Transport Administration presented the long-term measures to the Transport Agency. They included, inter alia, the following:

- That the Swedish Transport Administration would develop a new safety policy;
- Together with the subcontractors concerned, the Swedish Transport Administration would develop a checklist for risk assessment prior to work in the track area;
- That the Swedish Transport Administration's planned audit programme would be complemented by workplace inspections to be carried out by independent auditors.

The Swedish Transport Agency wanted to ensure that the Swedish Transport Administration would continuously check traffic safety concerning work in the track area. The Agency issued an injunction (TSJ 2010-1860) to the Swedish Transport Administration to report the following to the supervisory authority:

- By 30 September 2011, report how they and the subcontractors concerned have implemented the checklist;
- By 1 October 2011, submit the first monthly report on workplace inspections;
- There were to be at least 10 unannounced workplace inspections between 01/06/2011 and 01/06/2012, the results of which were to be reported to the Swedish Transport Agency;
- Serious deviations that occurred during work in the track area were to be reported by the next business day during the period of 01/06/2011 to 01/06/2012. This goes beyond the usual accident reporting (JvSFS 2008:1) that is required of all operators.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:03 R1 to be fulfilled.

Recommendation RJ 2011:03 R2

- *examine factors that may reduce the pressure of time that leads to the use of unauthorised working methods*

The Swedish Transport Administration submits that they established an internal advisory committee to find factors that contribute to the pressure of time. The findings of the advisory committee indicate that there is much to gain from better planning of work in track areas. For this reason, the Swedish Transport Administration has been working for some time to coordinate some of the maintenance measures at specific times when several actions can be performed simultaneously in a concentrated period of time. The Transport Administration also intends to work with railway contractors to further review the planning procedure.

The Transport Administration also points out that they are working on an injunction from the Transport Agency (see Recommendation RJ 2011:03 R1) and that those efforts will also affect the time pressure on work in the track.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:03 R2 to be fulfilled.

Recommendation RJ 2011:03 R3

- *through its oversight, also verify that the undertakings' safety management systems pick up operational deviations*

In assessing applications the Swedish Transport Agency reviews operator compliance with Article 7(j) of *the Regulations on Safety Management Systems* (JvSFS 2007:2) regarding deviation management systems. In its system audits the Agency verifies, inter alia, whether operators' deviation management systems function properly.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:03 R3 to be fulfilled.

Recommendation RJ 2011:03 R4

- *use incident reports as a systematic basis for taking immediate measures to prevent accidents and incidents*

Under the Railways Act (2004:517), the Swedish Transport Agency issues permits to operators (infrastructure managers and railway undertakings) after assessment of the safety management system, etc. Safety management means that operators have procedures in place to prevent accidents as well as procedures to identify errors and shortcomings in operations and procedures to correct them. After a permit has been obtained, the operators are fully responsible for their own operations with the help of their safety management, of which the Transport Agency should not be seen as a part.

Under the regulations on *Railway accidents and safety reporting* (JvSFS 2008:1), operators are to report accidents and incidents – of a certain severity – in their operations to the supervisory authority. This does not mean that once such a report has been made the Swedish Transport Agency assumes responsibility for the notifier's operations and begins to analyse and assess what action should be taken immediately; that is incumbent upon the operator itself. An operator should not wait until the supervisory authority gets in touch after one or more incidents and asks what actions are being taken before taking any action. The Agency may issue an injunction to the

operator if similar incidents continue to be reported. Nor does an injunction mean that the Swedish Transport Agency assumes responsibility for the operations or decides which actions are to be taken; rather it is the operator that should indirectly demonstrate its ability to take remedial action that leads to decisions on improvements in order to improve safety because those improvements have to be presented to the supervisory authority. Ultimately, the supervisory authority can revoke the operator's permit.

The Swedish Transport Agency conducts risk-based oversight and uses, inter alia, the operators' accidents and incidents reported to the Agency's telephone assistance line to analyse potential risk areas for oversight. The supervisory authority currently has a computerised case registry with a somewhat inadequate analysis function, but plans are on track to implement a new computerised case registry with a more developed analysis function in 2012.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:03 R4 to be fulfilled.

RJ 2011:04 Level crossing accident with train at Solgården on 9 September 2010. Response submitted on 29 November 2011.

The Swedish Transport Agency has been in contact with the Swedish Transport Administration regarding recommendations RJ 2011:04 R1 and R2. The Agency presents parts of the Transport Administration's reply in its response below.

Recommendations RJ 2011:04 R1 and R2

- *ensure that the Swedish Transport Administration carries out a review of level crossings so that dangerous crossings are noted and creates updated action plans to deal with them*
- *ensure that the Swedish Transport Administration, in cooperation with relevant stakeholders such as municipalities and road maintenance authorities, creates action plans, addresses deficiencies found, and systematically carries out a review of the criteria that form the basis for decisions on level crossing protection*

The Swedish Transport Administration has a project underway to develop a common model for management by objectives for rail safety, in the same manner as that currently used for road traffic. The model will include indicators with measurement standards to enable monitoring of rail safety development over time (and level crossings will be a subarea). The Administration intends to conduct a review of level crossing safety systematically under the new model. The project's mission also includes the establishment of stakeholder collaboration in order to work together on the development of a model with criteria that characterise what is a 'Safe Level Crossing'. This stakeholder collaboration will evolve from today's Level Crossing Delegation, which is an established forum for collaboration on level crossing issues. The Transport Administration has revised the document BVH 701 *Level crossings - Build new, Eliminate, Choose the right protection options,* which provides support when selecting level crossing protection.

In October 2011, the Swedish Transport Agency launched a safety review (TSJ 20111618) of the Swedish Transport Administration in order verify the application of governing document BVF 701 *Level crossings - Decision on protective devices.* This is a follow-up of a safety review carried out in 2008 of – at that time – the Swedish Rail Administration on how they absorbed changing traffic flows at level crossings, which resulted in the governing document being drawn up.

As a result of the above, the Swedish Transport Agency considers that recommendations RJ 2011:04 R1 and R2 have been addressed.

Recommendation RJ 2011:04 R3

- *in its oversight, verify that infrastructure managers inspect the facilities that affect traffic safety, that the inspections are documented, and that the deficiencies found in the inspections are remedied*

The Transport Agency performs safety oversight of infrastructure managers regarding inspection of the track systems pursuant to the regulations (BVFS 1997:2) *on the inspection and maintenance of track systems*.

During April - May 2011, the Swedish Transport Agency performed a review of the Swedish Transport Administration measures to remedy detected and confirmed acute and weekly faults from safety inspections (TSJ 2011636). The Agency will review the same operator with the same objective in the first quarter of 2012. If deviations are found in the documentation of completed inspections or if discovered deficiencies have not been remedied within the specified time frame, the supervisory authority has a mandate to issue an injunction to the operator.

As a result of the above, the Swedish Transport Agency considers recommendation RJ 2011:04 R3 to have been addressed.

E IMPORTANT LEGISLATION AND REGULATORY FRAMEWORK CHANGES

Commission Directive 2009/149/EC of 27 November 2009 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 was transposed into Swedish law through amendments to the Railways Ordinance (2004:526). The Swedish Transport Agency has decided on new regulations based on Directive 2009/149/EC. The regulations, the Swedish Transport Agency regulations (TSFS 2011:86) on railway accident and safety reporting, entered into force on 17 October 2011.

Directive 2007/59/EC of the European Parliament and of the Council of 23 October 2007 on the certification of train drivers operating locomotives and trains on the railway system in the Community was transposed into Swedish law through amendments to the Railways Act, the Railways Ordinance, and a new act (2011:725) and regulation (2011:728) concerning train driver qualifications. The Swedish Transport Agency has adopted regulations on health requirements, etc., driver's licenses and supplementary endorsements, driver training, and records based on the Directive (TSFS 2011:58-61). More information can be found in bill 2010/11:122 on train driver qualifications. The rules entered into force on 1 July 2011.

Directive 2008/57/EC of the European Parliament and of the Council of 17 June 2008 on the interoperability of the rail system within the Community and Directive 2008/110/EC of the European Parliament and of the Council of 16 December 2008 amending Directive 2004/49/EC on railway safety within the Community have now been transposed into Swedish law; more information can be found in bill 2010/11:160 on railway vehicle approval and maintenance responsibility. As a result of the transposition of Directive 2008/110/EC into Swedish law, amendments have been made to the Railways Act and the Railways Ordinance, which now include provisions on entities in charge of maintenance. The amendments to the Railways Act (SFS 2011:1118) and the Railways Ordinance (SFS 2011:1117) entered into force on

1 December 2011. Permits and certification for entities in charge of maintenance for freight wagons in Sweden can be issued by both accredited certification bodies and the Swedish Transport Agency. The Agency's regulations on inspection, system testing, and maintenance of vehicles – which entered into force on 31 May 2012 – have been updated on account of the provisions on entities in charge of maintenance (TSFS 2012:33). A large part of this work was done by the Swedish Transport Agency in 2011.

In 2011, no major changes were made to the Swedish Railways Act (2004:519) regarding issues of rail safety, except for the rules on entities in charge of maintenance.

By virtue of the amendment to Chapter 8, Section 11, of the Railways Act via SFS 2010:1568, which entered into force on 1 January 2011, the government – or the authority to which the government delegates – is authorised to issue regulations on fees for oversight, registration, and case handling under the Railways Act, in accordance with regulations that have been issued under the Act and, inter alia, 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 the Safety Directive. A new provision, Chapter 6, Article 2a, was introduced into the Railways Ordinance via SFS 2010:1605 and entered into force on 1 January 2011. According to the provision, the Swedish Transport Agency is authorised to issue regulations on fees for oversight, registration, and case handling under the Railways Act, in accordance with regulations that have been issued under the Act and, inter alia, Commission Regulation (EC) No 352/2009. These changes enable the Agency to issue regulations regarding fees in certain cases, and this has in fact already occurred.

F DEVELOPMENT OF SAFETY CERTIFICATES AND SAFETY AUTHORISATION

The requirement for safety certificates and safety authorisation in accordance with Directive 2004/49/EC (Railway Safety Directive) has been implemented through amendments to the Swedish Railways Act, which entered into force on 1 July 2007. The requirements can now be found in Chapter 3, Section 3, and Chapter 3, Section 7, respectively of the Railways Act.

During 2010 and 2011, the Swedish Transport Agency simplified the renewal procedures for safety certificates and safety authorisations in accordance with Article 10(5) and Article 11(2) of Directive 2004/49/EC.

F.1 National legislation

1.1. The starting date for issuing safety certificates in accordance with Article 10 of Directive 2004/49/EC was 1 July 2007.

1.2. The starting date for issuing safety authorisations in accordance with Article 11 of Directive 2004/49/EC was 1 July 2007.

1.3 National safety rules are available electronically on the Swedish Transport Agency’s website, in the rulebook on track-bound traffic that can be purchased on the Transport Agency's website, and in the Swedish Code of Statutes (SFS).

F.2 Numerical data

The Railway Safety Directive was implemented in Sweden 01/07/2007. Annex E presents relevant numerical data.

F.3 Procedural aspects

3.1 Queries, Part A safety certificates

3.1.1. Reasons for updating/amending Part A safety certificates (e.g. change to type of service, extent of traffic, size of company).

3.1.2. Main reasons for the average processing time for Part A safety certificate applications exceeding the four months specified in Article 12(1) of the Safety Directive (restricted to the authorisations referred to in Annex E. Average processing time calculated from the date when all the required information was received by the authority).

3.1.3. Overview of the requests from other National Safety Authorities to verify/access information relating to a Part A safety certificate of a railway undertaking that has been certified in the home country, but is applying for a Part B certificate in another Member State.

3.1.4. Summarise problems with the reciprocal acceptance of Part A safety certificate validity throughout the EC.

3.1.5. Does the NSA charge a fee for issuing a Part A safety certificate?

3.1.6. Summarise the problems encountered with the use of harmonised rules for Part A safety certificates.

3.1.7. Summarise the common problems/difficulties for the NSA in preparing a permit application for a Part A safety certificate.

3.1.8. Summarise the problems mentioned by railway undertakings when applying for a Part A safety certificate.

3.1.9. Is there a feedback or query procedure that allows railway undertakings to express their opinion on application procedures/practices or to file complaints?

Replies

3.1.1 Changed competence in management, increased traffic, changed size of company, expansion into dangerous goods transport.

3.1.2 There was no overrun.

3.1.3 - 3.1.4 No comment.

3.1.5. Yes, the fees are differential depending on the railway undertaking category. The fee is between SEK 13 000 and SEK 72 600.

3.1.6 - 3.1.8 The problem has been getting railway undertakings to understand the difference in what is included in Part A and Part B. When undertakings apply for both Part A and Part B, the documents are often mixed, i.e. elements belonging in Part A or Part B are found in the same document. It would be clearer to have separate documents for Parts A and B. One challenge is to get all undertakings to understand the purpose of having a functioning safety management system; it is not just about having the right documents. Some requirements are seen as bureaucratic by small businesses.

3.1.9 No specific structure for complaints or views on this has been introduced. There is regular communication – by letter and by telephone – between the Agency and the applicant during the application process to allow the applicant the opportunity to express opinions and ask questions. For larger railway undertakings, there are regular corporate meetings. Finally, there is always the possibility to lodge complaints about the Agency's decisions. The Transport Agency is developing an IT system that will facilitate the permit application process.

3.2 Queries, Part B safety certificates
3.2.1. Reasons for updating/amending Part B safety authorisations (e.g. change to type of service, extent of traffic, type of vehicles, category of personnel, significant changes to operating procedures, etc.).

3.2.2. Main reasons for the average processing time for Part B safety certificate applications exceeding the four months specified in Article 12(1) of the Safety Directive (restricted to the authorisations referred to in Annex E. Average processing time calculated from the date when all the required information was received by the authority).

3.2.3. Does the NSA charge a fee for issuing a Part B safety certificate? (Yes, No, Level of fee).

3.2.4. Summarise the problems encountered with the use of harmonised rules for Part B safety certificates.

3.2.5. Summarise the common problems/difficulties for the NSA in preparing a permit application for a Part B safety certificate.

3.2.6. Summarise the problems mentioned by railway undertakings when applying for a Part B safety certificate.

3.2.7. Is there a feedback or query procedure that allows railway undertakings to express their opinion on application procedures/practices or to file complaints?

Replies
3.2.1 See 3.1.1.

3.2.2 There was no overrun.

Yes, the fees are differential depending on the railway undertaking category. The fee is between SEK 20 400 and SEK 113 600**.**

3.2.4. Different interpretations of what the regulations mean in different EU States.

3.2.5 Incomplete applications from applicants, leading to extensive dialogue with the applicant before the application is ready for final assessment.

3.2.6 See 3.2.4.

3.2.7 See comments on 3.1.9.

3.3 Queries, safety authorisations
3.3.1 Reasons for updating/amending safety authorisations. (Reasons may refer to individual applications, e.g. new track systems, new signalling systems, significant changes to operating procedures).

3.3.2. Main reasons for the average processing time for safety authorisation applications exceeding the four months specified in Article 12(1) of the Safety Directive (restricted to the authorisations referred to in Annex E. Average processing time calculated from the date when all the required information was received by the authority).

3.3.3 Summarise the regular problems/difficulties in application procedures for safety authorisations.

3.3.4. Summarise the problems mentioned by infrastructure managers when applying for a safety authorisation.

3.3.5. Is there a feedback or query procedure that allows infrastructure managers to express their opinion on application procedures/practices or to file complaints?

3.3.6. Does the NSA charge a fee for issuing safety authorisations? (Yes, No, Level of fee).

Replies
3.3.1 Changed corporate identity number, change in competence within management team, or significantly altered organisation.

3.3.2 There was no overrun.

3.3.3 Updates to the traffic safety instructions due to the introduction of the Swedish Transport Agency's regulations on said instructions, remedied inspection notes, and – primarily with the smaller infrastructure managers – insufficient railway knowledge (primarily) of traffic safety instructions.

3.3.4 Nothing in particular other than that the smaller infrastructure managers consider it too bureaucratic and that the requirements are too far-reaching.

3.3.5 All decisions can be appealed. For the larger infrastructure managers, there are regular corporate meetings. We are also happy to hold meetings to explain the requirements during the application period.

3.3.6 Yes. The fee is differential depending on track length, and whether it is a main track or siding. The range is SEK 10 000 to SEK 780 000.

G SAFETY OVERSIGHT

Rail sector oversight consists of safety oversight, which covers railways, trams, and subways. The oversight is aimed at the operators' safety management systems and how they function in operational service so that they themselves can detect any deficiencies.

The selection of what should be subject to oversight is risk-based. The oversight performed is intended to maintain and improve the current situation. The following two criteria serve as guidance in performing oversight activities:

- activities where an accident could have a major impact and the probability of such an accident happening is not negligible.
- activities with a high probability of an accident occurring, the consequences of which would not be acceptable.

Furthermore, the ambition is that the planning of oversight activities should be provisional. Planning is re-evaluated every quarter on the basis of events that have occurred. Planning also allows for the quick launch of new oversight activities if an event indicates the need for this. The oversight has thus become both risk and event based to enable a quick reaction to changes in the rail system. Both internal procedures and checklists have been prepared for oversight activities.

All audits are carried out by the Swedish Transport Agency's own personnel. Approximately six annual work units (AWUs) are spent on safety oversight. Oversight cost approximately five million Swedish kroner (approximately EUR 538 000) in 2011.

The Swedish Transport Agency is mapping out how road, railway, maritime, and aviation oversight is performed, which may lead to new methods. One of the first results of the project was a common basic training programme and an oversight centre of competence was also established in 2010.

Number of inspections carried out by the Swedish Transport Agency

		Part A safety certificates issued	**Part B safety certificates issued**	**Safety authorisations issued**	**Other activities (specify)**
3. Number of inspections of RU/IM in 2011	**Planned**	0	8 (dangerous goods inspections)	0	0
	Unplanned (unannounced to RU/IM)	0	0	0	0
	Completed	0	8 (dangerous goods inspections)	0	0

Table 8: Number of inspections planned, unplanned, and carried out in 2011.

A comparison between the number of inspections carried out and the number of inspections planned reveals that eight were carried out and eight were planned (see Table 8). That is a performance rate of 100%. Most of the Transport Agency's oversight consists of audits.

The Transport Agency performs four types of audits:

- Audit 1 comprises a written check of part of the safety management system (SMS)
- Audit 2 comprises interviews with management and verification with operational personnel focussing on one or more parts of the SMS
- Audit 3 comprises interviews with management and verification with operational personnel focussing on the whole SMS.
- FM is a corporate meeting for exchanging information based on changes to and effects of the SMS

Number of audits carried out by the Swedish Transport Agency

		Part A safety certificates issued	Part B safety certificates issued	Safety authorisations issued	Other activities (specify)
4. Number of audits of RU/IM in 2011	**Planned**	54	54	66	0
	Completed	56	56	103	0

Table 9: Number of audits planned and carried out in 2011.

The audits performed on part A safety certificates were simultaneously performed on part B safety certificates. With regard to audits performed on issued safety authorisations, most were planned in advance, but some were performed after an accident or incident or after the Transport Agency had in some other way learned that a deficiency might exist. In some cases, a planned audit coincided with the infrastructure manager having to renew its authorisation and was therefore handled as part of the authorisation renewal process.

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		Number
RESULTS	Bans	4
	Injunctions	46
	Prosecutions	0

Table 10: Summary of results from oversight activities in 2011

As can be seen in Table 10, oversight activities performed in 2011 resulted in four bans and 46 injunctions, injunctions being he most typical result of oversight activities. Railway undertakings' and infrastructure managers' safety management systems essentially work well.

In 2011 there were a number of accidents and incidents involving work in the track environment and great efforts have therefore ben made to check operators' procedures and the steps they have taken so that this does not happen again.

The audits of railway undertakings have often resulted in a greater number of deviations that stem from an inability of the undertaings to manage their own safety management and internal follow-up. The Swedish Transport Agency has activities in progress to correct the problem. One such activity is an inspection specifically targeted at internal system audits.

The most common deficiencies uncovered by oversight activities concerning infrastructure managers are that measures are not taken in good time following an inspection of the track

system. Another common deficiency is that the traffic safety instructions of undertakings are not updated.

H REPORTING ON THE IMPLEMENTATION OF COMMON SAFETY METHODS FOR RISK VALUATION

Reporting on the implementation of common safety methods for significant technical changes affecting vehicles or structural subsystems, under Article 15(1) of Directive 2008/57/EC or in accordance with a TSI, was optional until 19 July 2010. The Swedish Transport Agency's duty to report organisational and operational changes applies from 1 July 2012.

2011 is thus the first year for which the Swedish Transport Agency is to report on how the common method risk valuation has been applied to technological changes. For this reason, the Swedish Transport Agency posed questions to operators based on ERA's guidance and template for this safety report. The questions did not exclude the organisational and operational changes and the responses from operators therefore touched on all areas.

The responses received vary widely. Of the 152 safety reports received, approximately 20 indicate that minor changes have been implemented which did not require risk analyses. The changes referred to include hiring of a new safety administrator and a new production manager for a wagon shop, and cleaning up the track area of old rails and refurbished existing rails. Respondents also stated that they had carried out risk analyses, however. Approximately 15 safety reports indicate that important changes were made. A risk analysis was performed in all cases but not in accordance with Commission Regulation (EC) No 352/2009. It was reported that different risk analysis models had been used instead – their own or another approved method – including ISO 9001:2008 (standard for quality management systems). In conclusion, it can be stated that the Regulation (EC) No 352/2009 on a common safety method on risk evaluation is known but is not yet broadly applied.

I CONCLUSIONS AND PRIORITIES

2010 was a dark year on the accident front, including a passenger fatality in a collision for the first time in several years, while according to the follow-up of accidents in 2011, no passengers died as a result of rail operations. The Swedish Transport Agency has prioritised oversight activities that, inter alia, follow how work takes place in the track, the procedures applied, and how operators monitor subcontractor's safety efforts. This is reflected both in the Transport Agency's reported activities and in the operators' safety reports, several of which mention that the Transport Agency's investigation led to such comments and thus to safety improvements.

An accident category that increased in 2010 was the number of persons killed or seriously injured as a result of unauthorised track access. On behalf of the ERA, the Swedish Transport Agency has conducted a deeper analysis of the accident category. A large proportion of this accident category consists of events in which the police have not taken a position as to whether the event was an accident or a suicide. The number of fatalities and serious injuries due to unauthorised track access stopped increasing in 2011. The number of fatalities dropped to a level comparable with previous years while serious injuries increased slightly. The category of serious accident involving personal injury due to unauthorised track access included 39 (67, 34, 19, 37) deaths or serious injuries. The conclusion of the in-depth analysis is that 2010 was an exceptional year. However, the drop in fatalities is not satisfactory because the number of serious injuries increased and, therefore, the conclusion is that there is still a need for active measures in order to continue to reduce the number of serious accidents due to unauthorised persons on track.

Another area of development on which the Swedish Transport Agency has worked in 2011 concerns a pilot project for enhanced data capture (eDc) that aims to gain access to hospital data on persons injured in railway and boating accidents. The Swedish Transport Agency already collaborates with the healthcare system on road traffic accidents. Another data source tested in the pilot project for enhanced data capture (eDc) is reports from the National (Swedish) Board of Forensic Medicine. Their reports are important for quality assurance of data regarding time of death, determination of suicide, and also for the determination of data such as age and gender as well as comprehensive event descriptions. Another area of development on which the Swedish Transport Agency is working is an IT system to facilitate the processes of, inter alia, permit application, the reporting and analysis of unwanted events, and the creation of this safety report, for example.

J SOURCES/DEFINITIONS USED

Sources:

The indicators in this report are based on information that railway undertakings and infrastructure managers have provided in their safety reports. With regard to deaths, serious injuries, and suicides, the classification has been carried out by the police.

Data on Swedish Transport Agency operations in 2011 were acquired from unit managers in the Agency's Road and Rail Department's various units and from the internal registers.

The category of unauthorised track access includes events not yet classifiable as suicides or accidents. The former SIKA's (Swedish Institute for Transport and Communications Analysis; now Trafikanalys) PM 2008:3 Socio-economic principles and calculation values for the transport sector: ASEK 4 *2005:16* has been used as the source for calculated values for lives; see below for further details.

The Swedish Central Bank's mean annual exchange rate has been used for conversion to the euro and was downloaded from: http://www.riksbank.se/sv/Rantor-och-valutakurser/Arsgenomsnitt-valutakurser/?y=2011&m=12&s=Comma

Information on track and traffic data has been obtained from Trafikanalys. The Swedish Transport Administration has provided information on the expansion of Automatic Train Control (ATC, ERTMS) and delay minutes.

The report on Sweden's suicide statistics was obtained from the National Centre for Suicide Research and Prevention of Mental Ill-Health (2012). *Självmord i Sverige [Suicide in Sweden] 1987 – 2010*. Karolinska Institute. Internet address for the report: www.ki.se/nasp

Definitions:

The definitions below are mostly taken from the Transport Agency's guidance on the Swedish Rail Agency’s regulations (TSFS 2011:86) on rail accident and safety reporting. The guidance is also available on the Swedish Transport Agency’s website www.transportstyrelsen.se. The guidance will be updated as the Swedish Transport Agency adopts new regulations on accidents and safety reporting based on Commission Directive 2009/149/EC.

Accidents included in the report:

- are related to railway vehicles in motion;
- are unwanted or unintended, i.e. vandalism and sabotage are excluded;

Comment: suicides are presented separately.

- have not occurred in workshops, warehouses, or depots (e.g. engine sheds);

And have led to one or more of the following consequences:

- at least one person has died within 30 days;

- at least one person has been so seriously injured as to require hospital treatment for more than 24 hours;

National definition: as regards serious injury, in years prior to 2008 the national definition of 14 days' sick leave was used. Even after 2008 there is some uncertainty in the data because precise details of hospitalisation times are not always held by the police authorities.

- railway vehicles, the rail infrastructure, the environment, or property not being transported by railway vehicle suffers such damage that the costs are at least EUR 150 000 (approximately SEK 1.4 million);

- rail traffic on the line in question was completely blocked for at least six hours.

If an accident leads to a secondary accident, e.g. a collision that leads to a fire, the accident is reported according to the category of the primary accident. In the example, this means that even if the secondary accident of a fire had the greater impact, the accident should still be reported as a collision.

(Directive 2004/49/EC and Regulation 1192/2003/EC)

Differences with the accident statistics supplied to Eurostat

As certain infrastructure managers and railway undertakings are exempt from submitting safety reports (see section B.2.1), the indicators do not provide a measure for all railways in Sweden. For example, accidents on local and regional networks that are independent and intended solely for passenger or museum traffic, such as the Saltsjöbana and the Roslagsbana, are excluded from this report. The figures for the number of deaths and serious injuries are therefore different from the figures provided annually by Sweden to Eurostat and from the figures that are published annually in Trafikanalys's official statistics publication, 'Bantrafikskador' [Rail Traffic Injuries].

Definitions relating to accident categories

Train: One or more locomotives or multiple units, with or without carriages connected, running according to timetable under a given number designation. A single locomotive in motion is considered to be a train.

Train collision, including impact with objects within the clearance gauge: Train collisions are divided into two subgroups when the indicators are reported: train collision and train impact.

Train collision refers to any type of collision between a train and another railway vehicle, e.g. between a train and

- the front of another train

- the rear of another train

- part of another train that is within the clearance gauge

- a vehicle in a shunting movement.

Train impact refers to collisions between a train and

- a solid object
- an object that is temporarily present within the clearance gauge (except objects dropped by a road user at a level crossing).

Comments:
A train collision leading to derailment is reported as a train collision. The 'impact' category also includes impacts with animals if this leads to a significant accident. A collision only between vehicles which are not run as trains is reported under the 'other' category. Impact with an object which has been dropped by a road user on a level crossing is reported as a 'level-crossing accident'.

Train derailment: An accident involving at least one wheel leaving the rail.

Comments:
An event in which the train returns to the rail is also reported if it leads to an accident with the consequences stated above. Derailments involving movements other than train movements are reported as 'other' if they cause an accident with the consequences stated above.

Fire in rolling stock: Accidents involving fires or explosions occurring inside a moving railway vehicle (including the cargo). Fires or explosions occurring when a train stops at an intermediate passenger interchange or during shunting at an intermediate passenger interchange should also be reported. Fires are deemed to be fires in passenger trains from the time a train is stationary at the platform and ready to receive passengers until the train reaches its final destination and all passengers have left the train.

Comments: Fire also includes smoke production with a clearly defined source. Neither arson fires nor fires occurring during siding or shunting at railway yards are included.

Accident to person caused by rolling stock in motion: Accidents where one or more individuals are hit by a railway vehicle or by an object which is attached to or which falls from a railway vehicle. This includes accidents involving individuals falling from a moving railway vehicle as well as accidents involving individuals falling inside a railway vehicle or being hit by a loose object inside a railway vehicle.

Suicide accident: An intentional self destructive act resulting in death or serious injury; the Swedish Rail Agency verifies the details with the police authority.

Level-crossing accident: An accident occurring at a level crossing involving at least one railway vehicle and one or several road vehicles, pedestrians or cyclists. A collision with an object which has fallen from a road vehicle or been dropped on a level crossing by a road user is reported as a level-crossing accident.

Comments:
A collision with an object on a level crossing which has not fallen from a road vehicle or been dropped by a road user is reported as an impact and not as a level-crossing accident.

Other accident: All accidents related to railway vehicles in motion but which cannot be classified as a train collision, train derailment, level-crossing accident, accident to person, suicide, or fire.

Comments:
The main types of accident in this category should be:

- *Collisions and derailments with movements other than trains*
- *Discharge of dangerous goods during transport*
- *Loose objects not transported on or fixed to the train and which become detached from it, e.g. ballast, ice, etc.*

Definitions for death and serious injury

Passenger: A person travelling on a train and who is not part of the train crew. When accidents are reported, persons boarding or alighting from a moving train are also included in the 'passengers' category.

Comments:
A person crossing the tracks at a station where this is not allowed is classified as 'unauthorised', whereas in all other cases, this person is classified as 'other'. Individuals on the platform waiting for a train, for example, are classified as 'other'.

Employee: A person who has employment associated with the railway and who is on duty when an accident occurs. This includes train crew and employees working on railway vehicles or railway infrastructure.

Road user on level crossing: A person using a level crossing to cross railway tracks either on/in a vehicle or on foot.

Unauthorised person on railway premises: A person who, without permission, is on railway premises where this is not allowed.

Other person: A person who is not classified as a passenger, railway staff, road user on a level crossing, or unauthorised person.

Definitions for deviations

If a deviation results in an accident that must be reported then the deviation is also reported as an accident. If a SPAD leads to a collision, for example, this should be reported as one SPAD and one collision.

Unauthorised signal passed at danger (SPAD)

Event where a part or all of the train has, without permission, passed the reserved route's end of movement.

Comments:
Examples of SPADs:

- *Unauthorised passing of main signal showing 'stop'*
- *Unauthorised passing of end of movement for a route as indicated by cab information*
- *Unauthorised passing of an S-board or steadily held stop signal (flag or equivalent)*

Events involving vehicles starting to roll uncontrolled and passing a stop signal are not included in this indicator, nor are SPADs resulting from a signal changing to 'stop' too late for the driver to have time to stop.

Broken wheel: A wheel fracture creating a risk of derailment or causing a derailment.

Broken axle: An axle fracture creating a risk of derailment or causing a derailment.

Broken rail: A rail split into two or more parts, or a rail from which metal has come loose with a resulting gap of more than 50 mm in length and more than 10 mm in depth in the rail running surface.

Track geometry fault: All faults related to track geometry requiring immediate shut-down or reduction of speed in order to maintain safety.

Signalling failure leading to less certain signalling information than required: All faults of the signalling system (both railway infrastructure and vehicles) leading to less restrictive signalling information than required.

Comments:
This indicator refers to technical faults leading to signalling information allowing a higher speed than required or not showing a 'stop' signal when so required. The indicator also includes faults concerning the display in the driver's cab.

Definitions for the financial consequences of accidents

In terms of CSIs relating to the financial consequences of accidents, the total costs for the railway undertaking or infrastructure manager are reported for all accidents, i.e. including accidents not reported in the safety reports.

The information on costs for fatalities and serious injuries is based on calculated values for deaths and serious injuries from a socio-economic perspective, produced by SIKA in PM 2008:3 Socio-economic principles and calculation values for the transport sector: ASEK 4 *2005:16.* The calculated values, which are given in 2006 values, are then multiplied by the number of fatalities and serious injuries. The Swedish Central Bank's annual mean exchange rate for 2011 (9.0035) has been used.

The data on costs of environmental damage and the costs of replacement or repair of railway infrastructure and rolling stock is based on the reporting operator's experience with actual costs. The reporting operators have stated that this information is uncertain. The Swedish Central Bank's annual mean exchange rate for 2011 (9.0035) has been used.

Costs of delays due to accidents have been reported for 2010 for the state-owned infrastructure. The figure also includes accidents caused by incidents as the Swedish Transport Administration has not had the opportunity to differentiate them. Data on delay minutes, the value of time for travellers, and the breakdown of working/leisure travellers are taken from the Swedish Transport Administration. The Transport Administration has reported the values directly in Euro.

Compensation for damage to the environment: The sum that, based on the operator's experience, must be or was paid to restore a damaged area to its condition prior to a railway accident. This indicator concerns accidents involving the release of pollutants, transported substances such as dangerous goods as well as other environmentally hazardous substances such as fuel, for example.

Costs for replacement or repair of railway infrastructure or rolling stock: The costs for acquiring new railway infrastructure or rolling stock with the same functionality and technical performance as equipment that cannot be repaired, and the costs for restoring damaged railway infrastructure or rolling stock to the same level as before an accident. The costs are estimated by operators on the basis of their experience and include any costs for renting rolling stock during the period in which a vehicle is unavailable as a result of an accident.

Definitions relating to traffic data and the technical safety of the infrastructure

Trains

One or more locomotives or multiple units, with or without carriages connected, running according to timetable under a given number designation. A single locomotive in motion is considered to be a train.

Train kilometres

Unit of measure representing the movement of a train over one kilometre. The distance used is the distance actually travelled, if available, otherwise the standard network distance between the origin and destination should be used. Only the distance travelled on Swedish territory should be taken into account.

Train kilometre on track with an automatic train protection/control system in service

Unit of measure representing the movement of a train over one kilometre of track equipped with an automatic train protection system in service. An automatic train protection system is a technical system that monitors adherence to signalling information and speed restrictions by means of speed monitoring and automatic emergency stop at stop signals. The infrastructure manager should specify which such systems are in service. Examples of automatic train supervision control systems are ATC and ERTMS.

Passenger Kilometres

Unit of measure representing the transport of one passenger by rail over a distance of one kilometre. Only the distance travelled on Swedish territory should be taken into account.

Kilometres of rail

The length of the track being operated on. Double-track or multi-track lines are calculated separately. A 100 km line with double-tracks is therefore 200 kilometres of rail.

Kilometres of rail equipped with an automatic train protection system in service

The length of track being operated with an automatic train protection/control system in service. An automatic train protection system is a technical system that monitors adherence to signalling information and speed restrictions by means of speed monitoring and automatic emergency stop at stop signals.

Level crossings

A crossing on the same level between a road[20] and a railway, designated by the infrastructure manager and available to users of public or private roads.

Comments: Platform crossings are not considered as level crossings, nor are crossings used only by employees.

Definitions related to safety management

Certain elements of the operator's safety management system[21] and the outcome of certain activities related to the safety management system must be described. The elements to be described are safety targets, action plans, and system audits. Operators must also report any deficiencies and faults discovered in relation to the safety of railway operations and infrastructure management in general.

Safety targets

Indicate the long-term safety targets for operations and the safety targets for the year to which the reporting relates. The targets must be indicated in the documentation of the safety management system. Whether or not the targets are met must also be indicated. If the targets have not been met or have only partially been met, the identified or suspected reason for this should be reported. Measures that are planned or have been carried out in order to achieve the targets that have not been met or have only partially been met must also be indicated.

Action plans

Describe the action plans with safety improvements that were developed and the reason for deciding on said improvements. Also describe the results of the action plans.

Describe the reason for developing the safety improvements in the action plans. If, for example, an event has occurred that has led to the safety improvements, describe the event or events on a

[20] Public or private road or street, including footpaths and cycle paths.

[21] Rules on safety management systems are stipulated in the Swedish Rail Agency regulations (JvSFS 2007:1) on safety management systems and other safety regulations for railway undertakings and in the Swedish Rail Agency regulations (JvSFS 2007:2) on safety management systems and other safety regulations for infrastructure managers.

general level, e.g. the type of accident, incident, major fault or major deficiency, the circumstances surrounding the event(s), and the consequence(s) that could have occurred and the reason for the safety improvement(s).

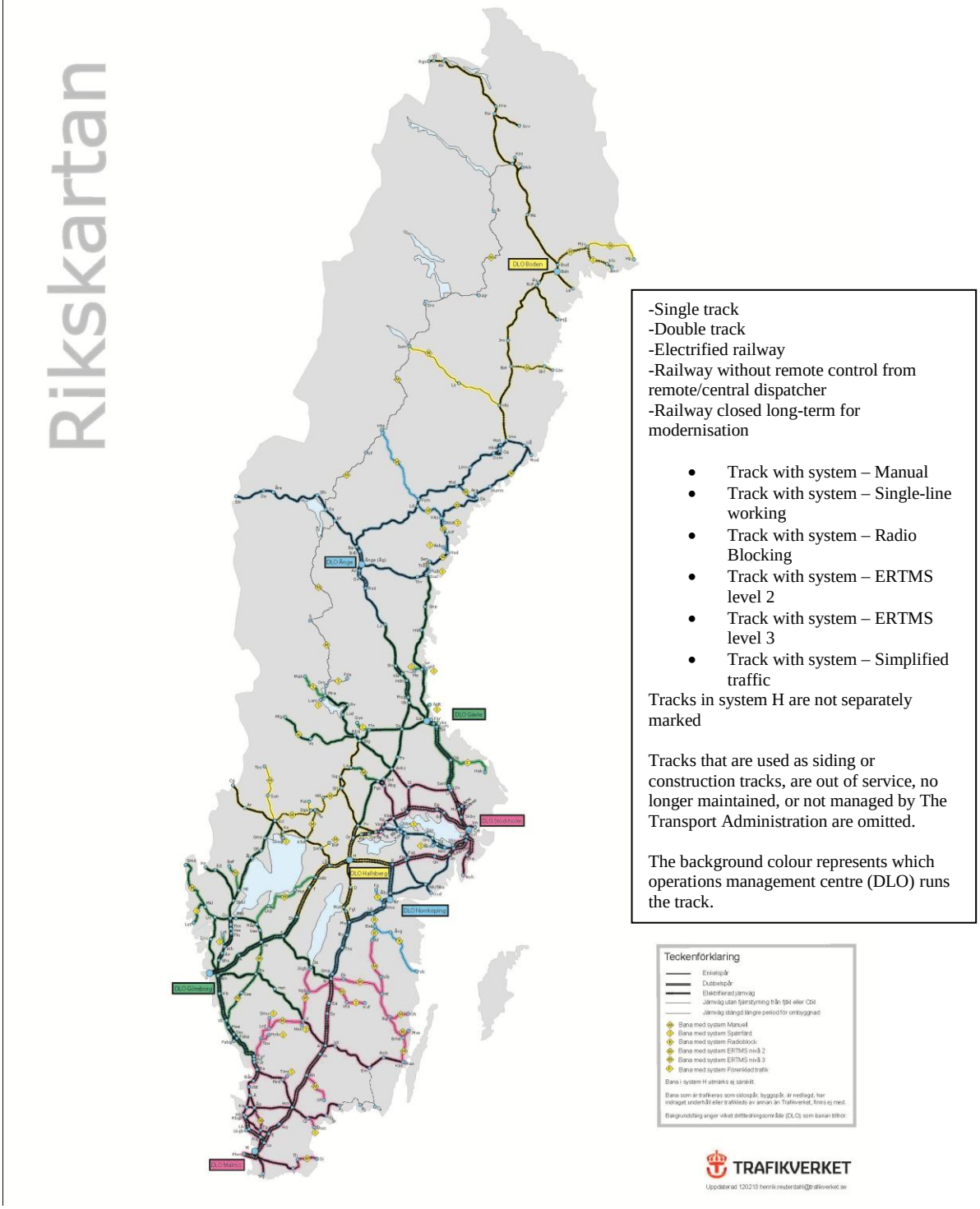
System Audits

A system audit is a systematic inspection to determine whether safety-related activities and the associated results correspond to what was planned and whether the activities were carried out in an effective manner and are appropriate to achieving targets (JvSFS 2007:1 and JvSFS 2007:2).

The following must be reported:

- The total number of system audits planned for the year to which the report relates
- The total number of system audits carried out during the year to which the report relates
- Description of the results of the system audits carried out during the year to which the report relates

Annex A.1: The state-owned rail network



Source: The Swedish Transport Administration website: http://www.trafikverket.se/Foretag/Trafikera-och-transportera/Trafikera-jarnvag/2012-02-13.

Annex A.2: List of active infrastructure managers at the turn of 2011/2012

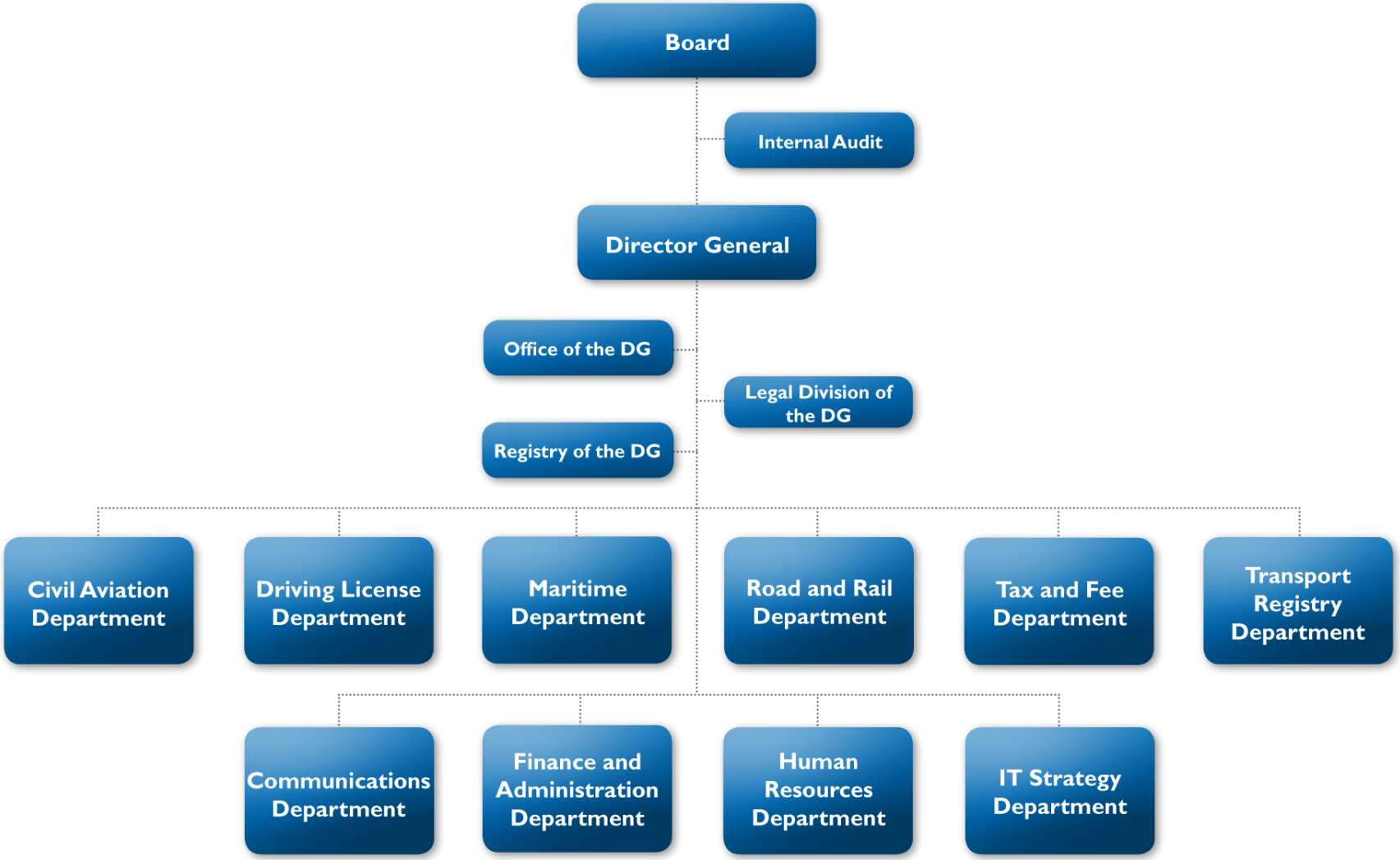
Because so many railway undertakings and infrastructure managers are involved, the complete list is not attached to this report. However, an appropriate list can be prepared upon request.

Many of the infrastructure managers in the table below are exempt from reporting as they only operate on rail networks that are not managed by the state and are used only by the infrastructure manager for the transportation of his own goods.

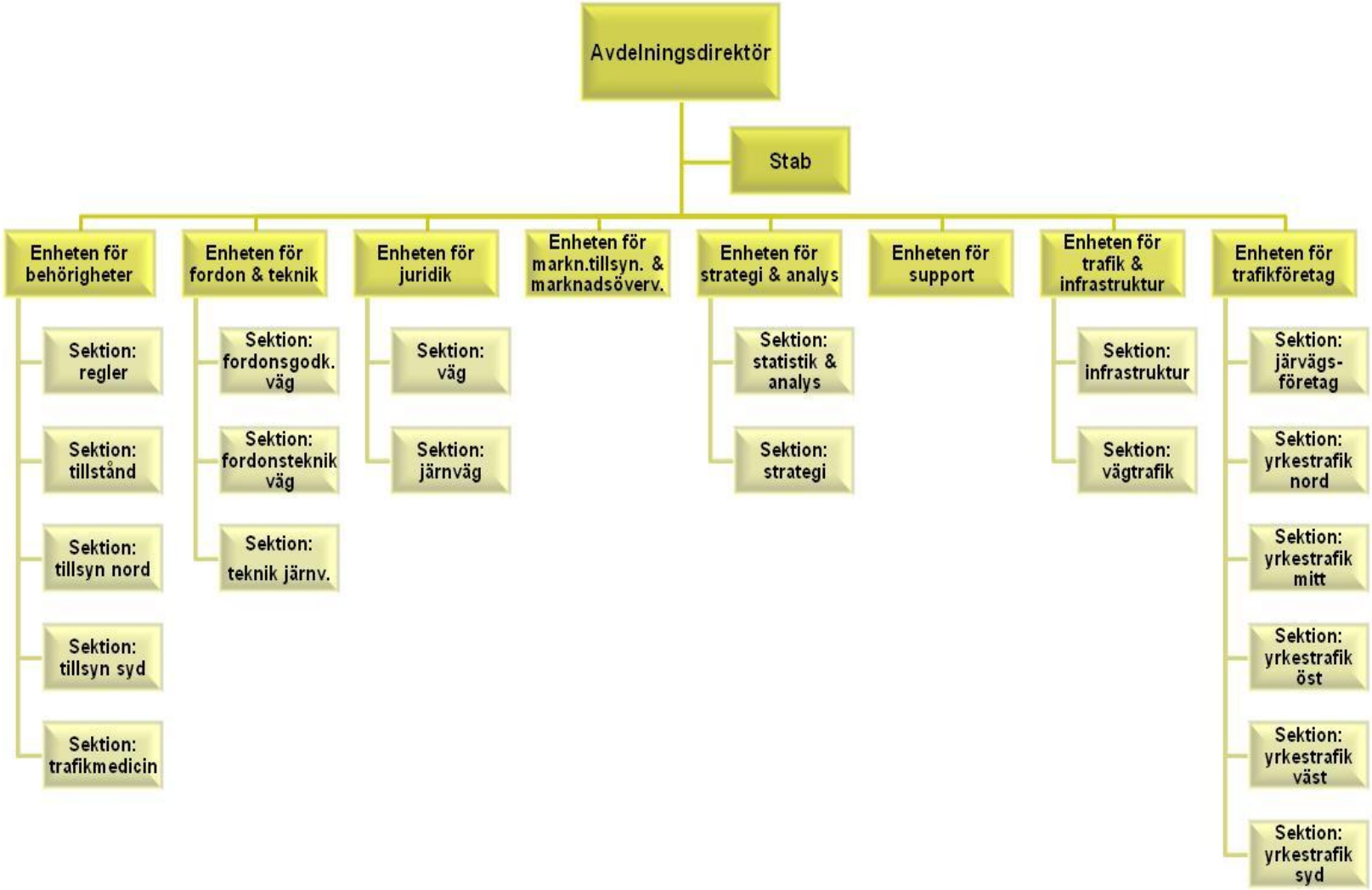
Permit holders	**2011**
Railway undertakings	101
Infrastructure manager	405
Total	**506**

Table 1: Data on number of operators in 2011. The figures do not include transport operators and track owners that operate trams or subways unless they also are a railway undertaking or infrastructure manager.

Annex B.1: 2011 Organisation Chart of the Swedish Transport Agency



Annex B.2: Organisation chart of the Swedish Transport Agency's Road and Rail Department



Director General Staff

Authorisations Unit	Vehicles & Technology Unit	Legal Unit	Market Oversight & Market Surveillance Unit	Strategy & Analysis Unit	Support Unit	Traffic & Infrastructure Unit	Traffic Companies Unit
Section: Rules	Section: Vehicle Approvals - Road	Section: Road		Section: Statistics & Analysis		Section: Infrastructure	Section: Railway Undertakings
Section: Permits	Section: Vehicle Technology - Road	Section: Railway		Section: Strategy		Section: Road Traffic	Section: Commercial Traffic - North
Section: Oversight - North	Section: Technology - Railway						Section: Commercial Traffic - Central
Section: Oversight - South							Section: Commercial Traffic - East
Section: Traffic Medicine							Section: Commercial Traffic - West
							Section: Commercial Traffic - South

Annex C: Statistical data, common safety indicators

See the Excel file '2011 Swedish CSI data form'. The data have also been uploaded directly to the European Railway Agency database.

Annex D: List of all important changes in national legislation and other national regulatory frameworks

	Legal reference	**Date legislation enters into force**	**Reason for introduction** (specify new law or amendment to existing legislation)	**Description**
General national legislation on railway safety				
Legislation concerning NSA	No change			
Legislation concerning notified body, assessor, third party bodies for registration, examination, etc.	No change			
National regulations concerning rail safety				
Regulations concerning national safety targets and safety practices	No change			
Regulations concerning requirements for safety management systems and the issuing of safety certificates to railway undertakings.	No change			
Regulations concerning requirements for safety management systems and the issuing of safety authorisations to infrastructure managers	No change			
Regulations concerning requirements for vehicle owners.	Act (2011:1118) on amendment to the Railways Act	1 December 2011	Article 14a Directive 2008/110/EC of the European Parliament and	A requirement has been introduced into the Railways Act that an Entity in Charge of

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
	(2004:519) The primary provisions that apply to Entities in Charge of Maintenance are Chapter 1, Section 4, Chapter 2, Sections 23-24, Chapter 3, Sections 11-13, Chapter 8, Section 1a, and Chapter 11, Section 3		of the Council amending the Railway Safety Directive.	Maintenance must be appointed. For freight wagons, the Entity in Charge of Maintenance must either have a permit from the supervisory authority or a certificate issued by an accredited certification body.
	Act (2011:1117) on amendment to the Railways Ordinance (2004:526)	1 December 2011	Article 14 a Directive 2008/110/EC of the European Parliament and o the Council amending the Railway Safety Directive.	Authorisation of the Swedish Transport Agency to issue regulations on Entities in Charge of Maintenance.
Provisions regarding requirements for maintenance workshops.	No change			

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
Regulations concerning requirements for authorisation to place in service and maintain new or significantly altered rolling stock, including provisions on the exchange of rolling stock between railway undertakings, registration systems, and requirements for testing procedures.	Swedish Transport Agency regulations (TSFS 2011:64) on technical specification of interoperability of the 'Energy' subsystem for conventional rail systems Swedish Transport Agency regulations (TSFS 2011:65) on technical specification of interoperability of the 'Infrastructure' subsystem for conventional rail systems	15 July 2011 15 July 2011		Commission decisions 2011/274/EU and 2011/275/EU have been transposed into Swedish law.
Common rules for operating the railway network, including provisions affecting procedures for signalling and traffic.	No change			
Provisions concerning requirements for additional internal operational provisions that must be established by railway undertakings and infrastructure managers.	No change			

	Legal reference	**Date legislation enters into force**	**Reason for introduction** (specify new law or amendment to existing legislation)	**Description**
Provisions concerning requirements for personnel with duties of importance for traffic safety, including selection criteria, health requirements, occupational training, and certification.	Act (2011:725) on train driver qualifications; Ordinance (2011:728) on train driver qualifications; Swedish Transport Agency's regulations (TSFS 2011:58) on drivers licenses and supplementary endorsements; Swedish Transport Agency's regulations (TSFS 2011:60) on driver training, etc. in accordance with Act (2011:725) on train driver qualifications; Swedish Transport Agency's regulations (TSFS 2011:61) on health requirements, etc. in accordance with Act (2011:725) on train driver qualifications	1 July 2011	2007/59/EC	Statutes on health requirements, driver training, driver's licenses, and supplementary endorsements in accordance with the Train Drivers Directive 2007/59/EC.
Provisions concerning the investigation of accidents and incidents, including recommendations	No change			

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
Provisions concerning requirements for CSIs, including reporting and analysis.	Swedish Transport Agency's regulations (TSFS 2011:86) on rail accident and safety reporting	17 October 2011	2009/149/EC	Regulation (JvSFS 2008:1) that stated what information infrastructure managers and railway undertakings had to submit has been replaced with a new regulation as a result of amendments to the Railway Safety Directive.
Provisions concerning requirements for authorisation to place in service rail infrastructure (tracks, bridges, tunnels, ATC, radio, signalling, interlocking, level crossings, platforms etc.).	Swedish Transport Agency regulations (TSFS 2011:64) on technical specification of interoperability of the 'Energy' subsystem for conventional rail systems Swedish Transport Agency regulations (TSFS 2011:65) on technical specification of interoperability of the 'Infrastructure' subsystem for conventional rail systems	15 July 2011 15 July 2011		Commission decisions 2011/274/EU and 2011/275/EU have been transposed into Swedish law.

Annex E: The development of safety certification and authorisation

E.1 Safety Certificates according to Directive 2004/49/EC

A. To ensure the information on ERADIS is current in place, please supply numbers of existing certificates in ERADIS which were valid at the end of the reporting year B. Please ensure that the information provided in this table is in line with the information provided in section ''G. Supervision of Railway Undertakings and Infrastructure Managers ''		Total number of certificates	Number of certificates Part A in ERADIS	
E.1.1. Number of safety certificates Part A issued in the reporting and in previous years and remain valid at the end of year 2011		34	34	

C. To ensure the information on ERADIS is current in place, please supply numbers of existing certificates in ERADIS which were valid at the end of the reporting year D. Please ensure that the information provided in this table is in line with the information provided in section ''G. Supervision of Railway Undertakings and Infrastructure Managers ''		Total number of certificates	Number of certificates Part B in ERADIS	
E.1.2. Number of safety certificates Part B issued in the reporting and in previous years by your member state and remain valid in the year 2011	Number of certificates Part B, for which the Part A has been issued in your Member-State	34	34	
	Number of certificates Part B, for which the part A has been issued in another Member-State	2	2	

Please provide input on applications for certificates Part A received in the current reporting year for new certificates or existing certificates which need to be renewed or updated/amended			A	R	P
E.1.3. Number of new applications for Safety Certificates **Part A** submitted by Railway Undertakings in year 2011		New certificates	6		
		Updated/amended certificates	16		
		Renewed certificates	8		

Please provide input on applications for certificates Part B received in the current reporting year for new certificates or existing certificates which need to be renewed or updated/amended			A	R	P
E.1.4. Number of new applications for Safety Certificates **Part B** submitted by Railway Undertakings in year 2011	Where the Part A has been issued in your Member-State	New certificates	6		
		Updated/amended certificates	17		
		renewed certificates	8		
	Where the Part A has been issued in another Member-State	New certificates			
		Updated/amended certificates			
		Renewed certificates			

A = Accepted application, certificate is already issued
R = Rejected applications, no certificate was issued
P = Case is still pending, no certificate was issued so far

To ensure the information on ERADIS is current in place, please supply numbers of certificates in ERADIS revoked at the end of the reporting year	Total number of revoked certificates in the year 2011	Number of revoked certificates in ERADIS (which were revoked in 20xx)
E 1.5 Number of certificates Part A revoked in the current reporting year	1	1
E 1.6 Number of certificates Part B revoked in the current reporting year	1	1

E.1.7. List of countries where RUs applying for a Safety Certificate Part B in your Member-State have obtained their Safety Certificate Part A

Name of RU	Member-State where Safety Certificate Part A was issued
Cargonet AS	in Sweden
DB Schenker Rail Scandinavia A/S	Denmark

E.2. Safety Authorisations according to Directive 2004/49/EC

Guidance: please ensure that the information provided in this table is in line with the information provided in section ''G. Supervision of Railway Undertakings and Infrastructure Managers ''	Total number of safety authorisations		
E.2.1. Number of valid Safety Authorisations issued to Infrastructure Managers in previous years and remain valid in the year 2011	405		

Guidance: Please provide input on applications for Safety Authorisations received in the current reporting year for new authorisations or existing authorisations which need to be renewed or update/amended		A	R	P
E.2.2. Number of applications for Safety Authorisations submitted by Infrastructure Managers in year 2011 being registered in your Member State	new authorisations	23		
	updated / amended authorisations	58		
	renewed authorisations	50		

A = Accepted application, authorisation is already issued
R = Rejected applications, no authorisation was issued
P = Case is still pending, no authorisation was issued so far

E 2.3 Number of authorisations revoked in the current reporting year	46

E.3. Procedural aspects – Safety Certificates part A

		New	Updated /amended	Renewed
The average time after receiving of the application with the required information and the final delivery of a Safety Certificate **Part A** in year 2011 for Railway Undertakings		2 weeks/2-3 months	2 weeks/2-3 months	-

E.4. Procedural aspects – Safety Certificates part B

		New	Updated /amended	Renewed
The average time after receiving the application with the required information and the final delivery of a Safety Certificate **Part B** in year 20xx for RUs	Where the part A has been issued in your Member-State	2 weeks/2-3 months	2 weeks/2-3 months	-
	Where the part B has been issued in another Member-State			

E.5. Procedural aspects – Safety Authorisations

		New	Updated/ amended	Renewed
The average time after receiving the application with the required information and the final delivery of a Safety Authorisation in year 2011 for Infrastructure Managers		2 weeks/2-3 months	2 weeks/2-3 months	-

In Tables E.3, E.4, and E.5, the time of two weeks concerns the average time between the receipt of all necessary information and a safety certificate decision, while two to three months and one month concern the average time between the first application and a safety certificate decision.