SWEDISH TRANSPORT AGENCY

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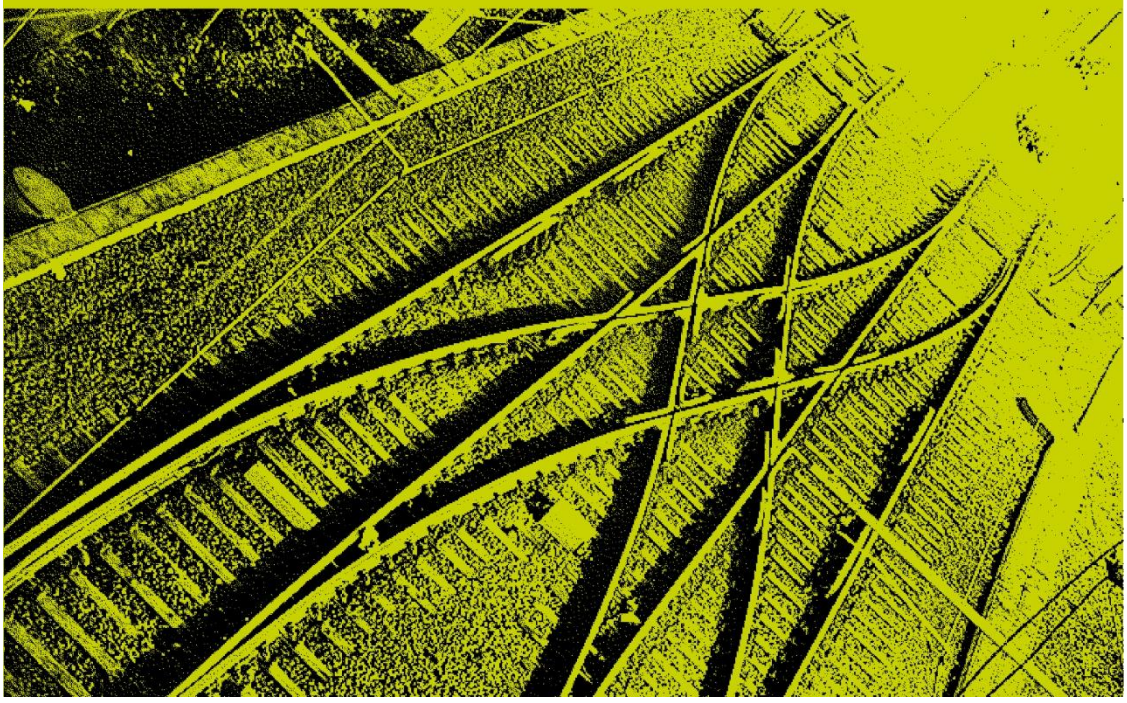
RAILWAY SAFETY REPORT

SWEDISH TRANSPORT AGENCY 2010 ANNUAL REPORT PURSUANT TO ARTICLE 18 OF DIRECTIVE 2004/49/EC (THE RAILWAY SAFETY DIRECTIVE)



Version information

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CONTENTS

A SCOPE OF THE REPORT

A.1 SCOPE OF THE REPORT

This report is intended 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 requirements for the Swedish railway system are mainly regulated by the Swedish Railway Act[2].

In accordance with the EU Safety Directive (2004/49/EC), all Member States must send the European Railway Agency (ERA) an annual report concerning the safety of the national rail system. This year's report, on the activities of 2010, is the fifth of its kind. It mainly follows the guidelines provided for this purpose by ERA. As a result of an amendment (2009/149/EC) to the Safety Directive, some indicators are reported for the first time this year, some indicators have been modified, and some indicators have been dropped completely. The amendment to the Directive resulted in the Swedish Transport Agency revising the Swedish Rail Agency regulations (JvSFS 2008:1) on accident and safety reporting. At the time of writing this report, the new regulations have just been adopted and are to be sent for printing. Thanks to the cooperation of the reporting undertakings, Sweden is able to report the requested information for 2010, despite the fact that the implementation of 2009/149/EC in Swedish legislation is late.

Please note that trams and metros are not included in this report. Because some infrastructure managers and railway undertakings are exempt from submitting safety reports (see Section B.2.1), the indicators are not a measure of all railways in Sweden. For example, operations 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. Activities on rail networks that are not managed by the state and are used only by the infrastructure manager for the transportation of its own goods are also excluded.

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, Transport Analysis, 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 Swedish Transport Agency website at www.transportstyrelsen.se and on the ERA website at www.era.europa.eu where reports from other countries are also published. ERA also publishes a compiled report based on those submitted by the various countries.

[1] Directive 2004/49/EC

[2] The Swedish Railway 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 the 30 September each year[3]. The purpose of the 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 gained through the safety authority's oversight operations.

Under the Safety Directive, operators, i.e., railway undertakings and infrastructure managers, are to submit a safety report each year to the national safety authority no later than 30 June[4]. The report should contain information on how the organisation's overall safety targets are met, information on common safety indicators (CSIs), results of internal safety auditing, and observations on deficiencies and malfunctions in the railway system that might be relevant to safety.

Swedish railways are governed by the Railway Act[5]. In the Railway Ordinance[6], the government has authorised the Swedish Transport Agency to issue detailed regulations covering the railways field. The Swedish Transport Agency publishes such regulations in the Swedish Transport Agency Statutes (TSFS).

Report templates and guidance 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 contributed their points of view on the Swedish Transport Agency guidelines[7] that contain instructions and definitions for the safety reports of operators.

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

Sweden has adjusted the year's report on the CSIs to conform to the revised annex as far as was possible. The new data reported are somewhat uncertain because it is the first time they have been reported. This year the new data on minutes delayed due to accidents, also include incidents because the largest infrastructure manager (who produces the data) has not been able to distinguish which minutes delayed were due to accidents and which were due to incidents.

In order to simplify and reduce the administrative burden on operators who are subject to reporting, the Transport Agency has collected safety reports together with other accident data collected and reported to Transport Analysis since 2008 (which reports these data to the EU

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

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

[5] The Swedish Railway Act (2004:519).

[6] Railway Ordinance (2004:526).

[7] The guidelines will be updated when the Swedish Transport Agency's new regulations are issued in the fall.

statistical office; Eurostat, before publishing them as official accident statistics). However, there are certain differences in definitions, which mean that the figures vary somewhat. For example, accidents on independent networks are included in Transport Analysis statistics but excluded from statistics for ERA, see sections D.2 and J. Operators that submit reports are invited to choose between reporting via web-based forms on the Swedish Transport Agency's website, via e-mail, or by traditional mail.

Starting this year, another collaboration with Transport Analysis is that the Swedish Transport Agency will use traffic and track data collected by the Swedish Transport Administration / Transport Analysis. Undertakings will thus not need to report that type of data to both Transport Analysis and the Swedish Transport Administration[8].

B. 2 Operators

The operators are the main actors in the railway sector, acting as railway undertakings and infrastructure managers. Those who wish to conduct rail operations in Sweden must apply for a permit to that effect from the Transport Agency. Permits are reviewed in accordance with the terms of the Swedish Railway Act and are granted to railway undertakings and infrastructure managers separately. An organisation may therefore have one or more permits; an infrastructure manager may, for example, in certain cases also be authorised to carry out rail transport services. In Swedish legislation, infrastructure managers and railway undertakings are defined as follows[9]:

Railway undertakings: any undertaking that, in accordance with a licence or special permit, provides traction and conducts rail transport.

Infrastructure manager: any undertaking that manages railway infrastructure and operates installations which form part of that infrastructure.

Using these definitions, Sweden had 523 operators licensed to conduct railway operations in 2010.

Permit holders	**2010**
Railway undertakings	103
Infrastructure managers	420
Total	**523**

Table 1: Number of operators in 2010. The figures do not include transport operators and track owners that operate trams or metros unless they also are a railway undertaking or infrastructure manager

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

[8] The Swedish Transport Agency has also asked Transport Analysis / the Swedish Transport Administration for data from previous reporting years in order for the compiling method to be the same for all years. The Swedish Transport Agency will make any necessary adjustments when the data becomes available.

[9] The Swedish Railway Act(2004:519), Chapter 1(4).

Railway undertakings operate on the rail market, upon which the transport of passengers and goods is conducted. The largest actor 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 freight services 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.

During 2009, the Swedish Parliament approved the "Competition on the railways" proposal (2008/09:176), which entails a gradual opening-up of the rail passenger transport market. The first step in this process was taken on 1 July 2009 when the market was opened up for weekend and holiday services. On 1 October 2009, the international passenger transport market was opened up. Parliament's decision also meant that the market would be fully open from 1 October 2010. Freight traffic was already open to competition but is still dominated by the company that was formerly a part of the state railway administration.

The infrastructure market is strongly dominated by the state, which means that the dominant actor is the infrastructure manager of the state track system. The rail network in Annex A.1 shows the geographical distribution of the state-owned rail network.
In 2010, there were 420 infrastructure managers. Of these, only 20 or so were major actors in terms of the number of track kilometres. 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

In this report and on the basis of the Swedish Railway Act (2004:519) the Swedish Transport Agency has 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, and

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; one of the consequences of this has been that most infrastructure managers have not needed to submit safety reports. A large group not granted exemptions is comprised of the municipalities and ports licensed to conduct railway operations.

This report is based on 127 safety reports from operators. A few (smaller) non-exempted operators, including some municipalities, did not submit safety reports in good time.

B.3 Summary and general trend analysis

After a number of years with an unchanged number of accidents, 2010 was a dark year. For the first time in many years, a passenger died in a collision. The train on which the passenger was travelling collided with a backhoe on an adjacent track. Several passengers were seriously injured in the accident. During the year, there have also been accidents in which employees have been killed after being hit while working in the track environment. In response, the Swedish Transport

Agency has put considerable effort into using their oversight activities to check the operators' track work procedures and the measures being taken to prevent this from happening again.

Another accident type that has increased is the death of unauthorised persons on railway premises. A large proportion of these involved incidents in which the police have not ruled whether they were accidents or suicides. The Swedish Transport Agency's Director-General has charged the Road and Rail Department with producing an action plan to reduce the number of suicides in railway traffic.

In contrast to the accident data, it is still a relatively new practice for the operators to report the deviations in their safety reports. As a result, for example, some operators still report all SPADs instead of only reporting those that have to be reported. When the number of deviations became too great in comparison to the preceding year, the Swedish Transport Agency asked follow up questions and corrected the figures. The state infrastructure manager has reported significantly fewer deviations than in the preceding year. They explained this with the example that a lot of manual work is required to sort out which broken rails have to be reported out of all the broken rails registered in their computer system. Manual handling makes the figures uncertain and sensitive to personnel changes.

The Swedish Transport Agency has issued safety certificates and safety authorisations and exercised oversight chiefly through audits in accordance with the Safety Directive. The Transport Agency oversight resulted in 42 orders and one ban in 2010. Railway undertakings' and infrastructure managers' safety management systems essentially work well. The most common deficiency uncovered by oversight activities concerning infrastructure managers is that measures are still not taken in good time following an inspection of the track system. Another common deficiency is that the undertakings' traffic safety instructions have not been updated since the Swedish Rail Agency traffic regulations were adopted in 2008. One reason that these shortcomings are still being discovered is that the number operators who obtained authorisation before the Swedish Rail Agency traffic regulations were adopted is considerably greater than the Swedish Transport Agency has time to review each year.

As regards railway undertakings, the audits often resulted in a large number of deviations that originate in an inability to deal with their own safety management and internal follow-ups. The Swedish Transport Agency is involved in ongoing activities to overcome this problem. One such activity is oversight directed particularly at internal system auditing.

In 2010, the Swedish Transport Agency addressed a number of recommendations from the Swedish Accident Investigation Board. The Swedish Transport Agency and the Swedish Accident Investigation Board have exchanged communications regarding cases in which the Swedish Accident Investigation Board felt that the Swedish Transport Agency had not addressed the recommendations.

An area under development by the Swedish Transport Agency is a pilot project to gain access to hospital records of persons who have been injured in boating and rail-related accidents. The Swedish Transport Agency already collaborates with hospitals regarding road traffic accidents. Another area is the development of an IT system that facilitates the authorisation application

procedure. The Swedish Transport Agency has also created intermodal centres of competence for oversight activities, processing of applications, and HF/PTO[10]-related information.

On 3 June 2010, the Swedish Transport Agency was tasked with presenting how the activities of authorisation, oversight and record keeping could be primarily financed by direct charges as of 1 January 2011. Since January 2011, the Road and Rail Department has charged for its record keeping of railway vehicles and for the examination of technical system approval applications. The Transport Agency proposal deemed it inappropriate to introduce a system for rail sector activities entirely financed by direct charges by 2011 and therefore decided that the charges should be introduced in three stages: 2011, 2012, and 2013. The next step will be in 2012 and will include charges for safety oversight, market oversight, and the issuing of authorisations. It is still too early to say if the financing by direct charges will affect the number of applications.

The next chapter contains more detailed descriptions of the developments regarding accidents, indicators, legislation, authorisation, and oversight.

[10] Human factors / People, technology, and organisation

C ORGANISATION

C.1 The Swedish Transport Agency's organisation

The Swedish Transport Agency has overall responsibility for standardisation, oversight, issuing authorisations, and record keeping for transport by rail, air, sea and road. It also has a normative role and carries out oversight of the railway system. In this respect, Sweden has met the requirements of the Safety Directive that states that each Member State must have a safety authority which, independently of infrastructure managers and railway undertakings, has responsibilities which include granting safety certifications and safety authorisations, deciding on authorisations for placing technical subsystems and constituents into service, and ensuring registration of items 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 responsibilities of the Swedish Transport Agency under the Safety Directive.

The Agency's responsibilities are specified in the ordinance[12] with instructions for the Swedish Transport Agency. In its annual appropriation directions, the government states the terms for the Swedish Transport Agency's operations over the next fiscal year. The appropriation directions contain, among other things, targets for transport policy, requirements for the Swedish Transport Agency to report to the government on what targets it has achieved, and budgetary constraints.

The Agency is a board authority, which means that it is headed by a board responsible for the operations being conducted efficiently, with good internal management, and for reporting to the government. The Director-General is on the board and is responsible for operational activities.

The Swedish Transport Agency has 15 locations throughout the country and approximately 1 500 employees. The majority of operations are based in Borlänge, Norrköping and Örebro. The Director-General works at the head office in Norrköping where the following are also located: Office of the Director-General, Legal Division of the Director-General, Registry of the Director-General, as well as Finance and Administration, IT Strategy, Communications, and Human Resources Departments. In addition to the departments at head office, the Swedish Transport Agency also has four other departments; the Road and Rail Department, the Civil Aviation Department, the Maritime Department and the Traffic Registry Department. Development of the organisation is ongoing and the IT Strategy Department and Traffic Registry Department are currently being overhauled.

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[11] The Swedish Transport Agency has the task of monitoring whether the railway services market functions effectively from a competition perspective and reporting any shortcomings to the Swedish Competition Authority. As part of its oversight, the Agency must, among other things, monitor whether capacity allocation of rail infrastructure and certain rail-bound services take place in a competition-neutral and non-discriminatory manner, and whether charges for use of the rail infrastructure are competition-neutral and non-discriminatory. The Agency must consult with the Swedish Competition Authority on competition matters. In addition, it must settle disputes between railway undertakings and infrastructure managers if they disagree on whether a decision by the infrastructure manager is lawful. The Agency is also required to monitor whether railway undertakings and infrastructure managers meet the specific requirements imposed on the financial accounting of such operators.

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

The Road and Rail Department was established on 1 April 2011 and consists of eight units: Authorisations, Vehicles and Technology, Legal, Market Oversight, Strategy and Analysis, Support, Transport and Infrastructure, and Carriers. The railway issues that each unit is responsible for are presented briefly below. In addition, each unit is responsible for road issues. Both the Transport and Infrastructure and Carriers units issue permits and play supervisory roles. In order to obtain a permit, the safety management systems of both the infrastructure manager and the railway undertaking are assessed. The Vehicles and Technology unit issues subsystem approvals. To obtain subsystem approval prior to the subsystem being put into use, the applicant must show that the subsystem is safe and interoperable. The Legal unit's responsibilities include the development of regulations. Responsibilities of the Strategy and Analysis unit include dealing with recommendations from the Swedish Accident Investigation Board and preparing this report.

The Swedish Transport Agency's Road and Rail Department has about 294 employees, consisting of 160 men and 134 women. Approximately 60 of these work mainly with 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 Relations between the Swedish Transport Agency's Road and Rail Department and other agencies

This section describes the relations of the Swedish Transport Agency's Road and Rail Department with other agencies. The focus is on relationships within the railway sector. Because the Swedish Transport Agency also has responsibility for maritime, aviation, and road transport, there are a number of other relationships not covered in this report.

The Swedish Transport Agency is not a solitary authority with exclusive responsibility for regulation of the entire rail system. There are several other national authorities that are responsible for their respective areas, such as the Swedish National Electrical Safety Board, the Swedish Board of Housing, Building and Planning, and the Swedish Civil Contingencies Agency (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 2[*]) shows some of the national authorities that have an impact on the Swedish Transport Agency and other actors in the rail system, for example, by having normative tasks in certain safety-related areas.

The Swedish Board for Accreditation and Conformity Assessment (Swedac) accredits companies that confirm that technical subsystems meet the relevant technical specifications for interoperability (TSIs). MSB has an overarching and coordinating responsibility in their work for a safer society. The Swedish Transport Agency cooperates with MSB on, for example, oversight of the transport of dangerous goods.

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

[*] Translator's note: [sic] – should probably be figure 1.

to the Swedish Accident Investigation Board on how its recommendations have been dealt with and the measures taken in response to them (see Section D.3 of this report).

The Swedish Transport Agency also cooperates with Transport Analysis by submitting statistical data which Transport Analysis in turn submits as accident statistics to Eurostat. Traffic Analysis also publishes national statistics.

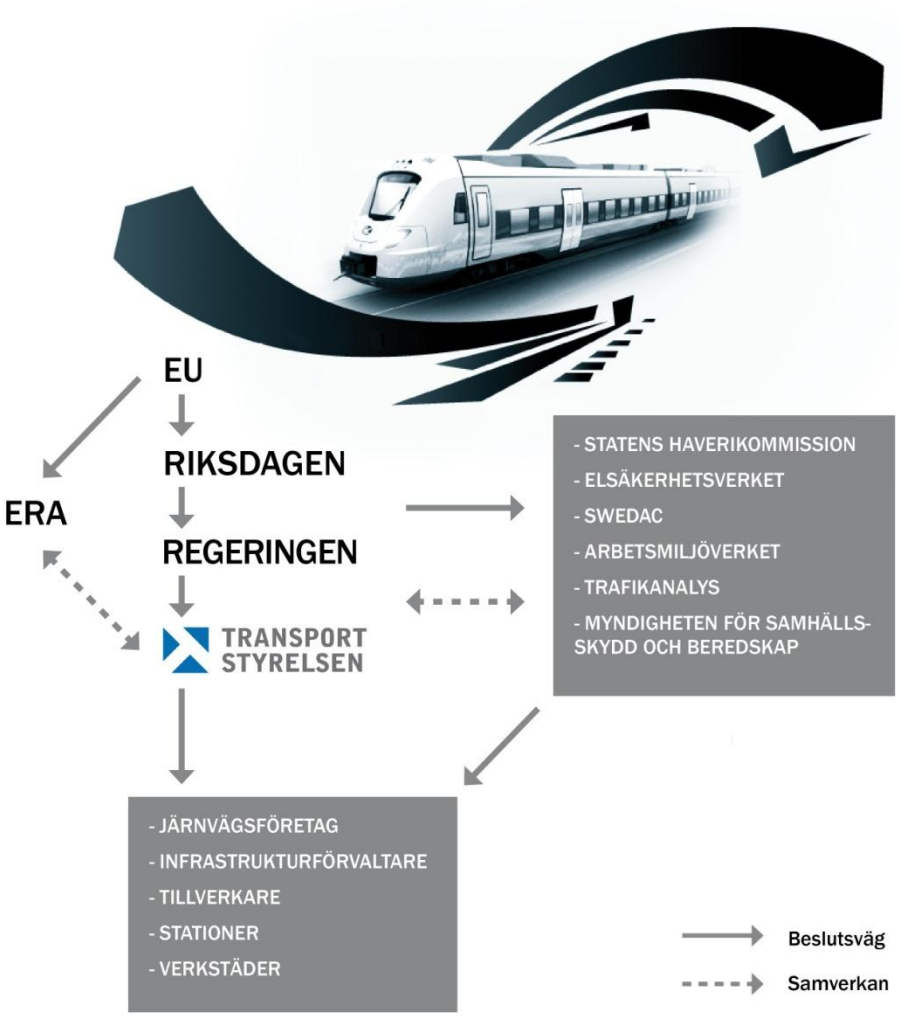

Figure 1: The Swedish Transport Agency's (Road and) Rail Department's national relationships.

RIKSDAGEN REGERINGEN TRANSPORTSTYRELSEN	PARLIAMENT GOVERNMENT SWEDISH TRANSPORT AGENCY
- Järnvägsföretag	Railway undertakings
- Infrastrukturförvaltare	Infrastructure manager
- Tillverkare	Manufacturer
- Stationer	Stations
- Verkstäder -	Workshops
- Statens haverikommission -	Swedish Accident Investigation Board
- Elsäkerhetsverket -	National Electrical Safety Board
- Swedac -	Swedish Board for Accreditation and Conformity Assessment
- Arbetsmiliöverket -	Swedish Work Environment Authority
- Trafikanalys -	Transport Analysis
- Myndigheten för samhällsskydd och beredskap -	Swedish Civil Contingencies Agency (MSB)
- Beslutsväg	Decision Path
- Samverkan	Cooperation

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 stakeholders in the rail system, so are 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 is responsible for authorising subsystems to be brought into service. Similarly, the operations of the workshops are not regulated in railway legislation, although there are rules that affect the workshops' maintenance work, e.g. the requirement that the safety management systems of infrastructure managers and railway undertakings also cover maintenance of vehicles and railway infrastructure.

D DEVELOPMENT OF RAILWAY SAFETY

The work 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 stated by the government. The Agency does this through safety oversight and regulations, among other things. The operators, in turn, follow the prescribed regulations and implement measures where necessary.

Hence, the national safety level is dependent on the whole chain, from the government through the Swedish Transport Agency to the operators, being strong and operating well. For this reason, the national safety level is described in the form of objectives and safety-enhancing activities that are implemented by both the Swedish Transport Agency and the operators.

D.1 Initiatives to maintain / enhance safety

D.1.1 The Swedish Transport Agency's safety-enhancing activities

Since 1996, the oversight of the various actors in the Swedish railway sector has been aimed at verifying that the operators have a functioning self-regulation system, now called a safety management system, and are able to respond appropriately when a deviation occurs. Hence, as part of its oversight activities, the Swedish Transport Agency verifies that the operators' safety management system is in compliance with the current regulatory framework and that they have the organisation, routines, delegation of responsibility, finances, etc., to ensure that they can continue to meet the requirements of their permits.

The measures/actions that the Swedish Transport Agency has a mandate to take include bans with or without fine, orders with or without fine, and ultimately the suspension of permits. It is the operators who take the actual measures to reduce the number of unwanted events (accidents, incidents, and other deviations). The Agency monitors whether the operators take appropriate action.

The Agency is currently mapping out how oversight is exercised within Roads and Railways, Maritime, and Aviation and this may result in new methods. The first result of the project was common core training and in 2010 an oversight centre of competence (CoC) was also established. Since 1 January 2011 the Swedish Transport Agency has had three CoCs. In addition to the oversight CoC, there is also one for the processing of applications and one for HF/PTO[13]-related information. All CoCs have an intermodal perspective, whereby the work they do benefits the whole agency.

A number of accidents and incidents occurred in 2010 during work in the track environment. Because of this, considerable effort has been put into using oversight activities to check the operators' track work procedures and the measures being taken to prevent such things happening again.

Section D.3 also contains data on the measures taken by the Swedish Transport Agency, and by operators, based on recommendations from the Swedish Accident Investigation Board.

Accident/incident or other deviation that triggered the activity			**Safety-enhancing activities decided upon**
Date	**Place**	**Description of event**	
01/02/2010 09/06/2010 12/09/2010	Linghem Tomteboda Kimstad	Fatal accidents involving track work.	An oversight has been conducted in which the Transport Agency has urged the Transport Administration to improve attitudes towards safety and preventative planning.

Table 2: Examples of safety-enhancing activities on the part of the Swedish Transport Agency triggered by an accident or incident

[13] Human factors / People, technology, and organisation

Safety-enhancing activity	Description of trigger	Description of the problem area
Oversight of the Swedish Transport Administration regarding implementation and compliance with the regulatory framework on work in the track environment, such as safety and preventative planning and reduced speed past work sites.	Inspection revealed non-compliance with information and new regulations on this within the Swedish Transport Administration's own organisation.	Contractors are exposed to considerable risks when working in the track environment.
Oversight of five railway undertakings regarding their own safety provisions supplementary to the Swedish Transport Agency's traffic rules.	Inspections revealed that companies themselves have not fully implemented new traffic rules.	It is important that all railway undertakings use the same rules and have implemented the amendments required for safe traffic.

Table 3: Examples of safety-enhancing activities by the Swedish Transport Agency with triggers other than one specific event.

D.1.1 Operators' safety-enhancing activities

The majority, approximately 90%, of the operators who submitted a safety report have not experienced any serious events that led to anyone being killed or seriously injured. In addition to the CSIs, the safety reports include information on the operator's safety targets and undertaken activities undertaken to increase safety

D.1.1.1. Safety Targets

The operators that have railway operations as their main activity all specified their safety targets. Of all the safety reports received, 88 operators out of 127 specified their safety targets (69 %). Some of the reporting companies specified a number of different safety targets while others specified one single target. Municipalities often have general targets for their operations but not targets broken down for the infrastructure they manage; the majority of them have therefore not reported safety targets.

The targets provided are often expressed in terms of no deaths or serious injuries as a result of the organisation’s own activities. For example, the formulation might be that taking the train should be safe and secure. The answers 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 objectives, for example to find measures to prevent unauthorised persons accessing railway premises or measures relating to the safety of children and young people.

D.1.1.2 Action plans with safety-enhancing activities

Of the safety reports received, 46 % of operators indicated that they have taken safety-enhancing measures in response to an event or incident or as preventive measures, which is an increase over the previous year. Most operators reported more than one safety-enhancing activity. There need not be a serious consequence associated with the event. Less serious events, such as incidents and events with an effect that was not as serious as it could have been, have also led to implementation of safety-enhancing activities. Several of the operators have implemented safety-enhancing activities as preventive measures, such as improved deviation reporting. Table 4 below gives some examples of safety-enhancing activities carried out by operators and the reason for doing so.

Reason for the activity	Consequence or potential consequence	Safety-enhancing activity
A number of accidents in which timber has fallen off wagons in motion.	Risk of serious injury to persons. Risk of significant material damage to oncoming trains and to the surroundings.	Industry collaboration for safe transportation of timber. The Association of Swedish Train Operating Companies (ASTOC), the Swedish Forest Industries Federation and the Swedish Association of Road Haulage Companies have commenced coordinated training of timber loaders at timber terminals. The collaboration has resulted in significantly fewer incidents during rail transport of timber.
The theoretical training given during the annual refresher training course has proved insufficient for breaking certain incorrect patterns of practice and behaviour in individual employees and groups.	Deviations from the applicable regulatory framework can result in everything from incidents to serious accidents.	Development of training methods for operations personnel in the so-called 'Kompetensåret' (Competence Year). An annual cycle of interactive training modules in computer environments, certification exams, and teacher-led lessons are supplemented with follow-ups and instructors following personnel through a shift at work, for on-the-job learning. Methods and plans have been produced for implementation in 2011.
The deregulated European markets for freight trains and vehicle maintenance has meant that no railway undertaking has been fully able to check the maintenance status of the wagons running in the operations of other undertakings. A new EU directive stipulates that an Entity in Charge of Maintenance (ECM) must be designated.	In the long term, the maintenance status of the European freight wagon fleet may deteriorate.	Adaptation to the new EU requirement of ECMs with responsibility for freight wagons. The railway undertakings have taken the first step towards a common EU system for vehicle maintenance throughout the EU. Systems and procedures have been developed to meet the new requirements for ECMs in accordance with the memorandum of understanding (MoU) concluded between a number of EU Member States.
Occurrence of passenger boarding accidents, injuries to passengers inside the train	Risk of serious injury to persons.	More in-depth causal analysis.
Overhead contact line burned following flash-over on	Burned off overhead line.	Complaint to the infrastructure manager and Stockholm city about the bird problem resulting from the nearby paper warehouse.

Reason for the activity	Consequence or potential consequence	Safety-enhancing activity
vehicle roof caused by a bird.		
Adverse weather conditions.	Accident risk.	Increased oversight.
A number of breaks in wheel axles of type 38Hx occurred at the beginning of the 2000s.	Risk of derailment with very significant material damage and risk of serious personal injury.	Information and customer follow-ups in order to counter the overload risk. The inspection interval has been reduced from the previous 600 000 km to 100 000 km for axles with >20 tonne axle loads.
Kimstad 20/9/2010, an X2000 train collides with a backhoe equipped with railway wheels. 1 passenger fatality and 17 injured.	Could have had very serious consequences.	Tighter rules.
A number of incidents with insufficient train braking performance due to incorrect brake testing and incorrect locomotive preparation.	Risk of collision with other trains.	Training material on brake testing and preparation procedures. The material describes the purpose of the brake tests, implementation, and the consequences of incorrect implementation. The training is carried out both interactively and on-the-job under the guidance of instructors.

Table 4: Examples of safety-enhancing activities reported by operators

The state infrastructure manager reported on its safety activities as follows:

The detector system was further expanded in 2010. 17 new wheel damage detectors with weighing functions were installed during the year and two were replaced. Six new hot-box / brake drag detectors were installed.

A project began in 2008 to increase the safety of level crossings with poor road profiles. About a dozen of the remaining alterations were completed during 2010 and 114 previously completed alterations were approved. Slightly more than 100 level crossings were equipped with new road signs.

As a result of accidents and incidents that occurred during work in the track, stricter rules have been decided upon which are to be adhered to during red zone working on a line or at a station.

During line work, train speeds must be reduced to 70 km/h past the work site and if this is not considered sufficient then green zone working must be organised on the adjacent tracks. Red zone working at stations with more than four tracks is normally not allowed.

In 2010, approximately 50 000 primary school pupils were visited at school by public information officers and directly informed about railway hazards. The Swedish Transport Administration has also produced films specifically aimed at children of different ages.

The Swedish Transport Administration and BTO (Association of Swedish Train Operating Companies) have developed a common approach for the handling and analysis of unauthorised signals passed at danger (SPAD). The long-term aim is to reduce the risk of serious accidents and to reduce the disruptions that arise after a SPAD event in the form of delays and possible damage to vehicles and infrastructure. Among other things, they have sought to identify the signals and routes that have experienced the most SPADs and where the errors can be traced to signals.

During the year, the Swedish Transport Administration has developed a camera concept (IRIS) for video surveillance that is used by traffic communicators and traffic control, for example. The cameras show what is happening in real time on platforms, a yard section, arranged wagons and trains, etc.

The research project "Självmord och självmordsprevention i samband med järnvägstrafik" (Suicide and suicide prevention in the context of rail transport), carried out by Karlstad University, was completed during the year. The project culminated in the report "Personpåkörningar med tåg inom Stockholmsområdet 2005-2008; kartläggning och analys" (Human-train collisions within the Stockholm area 2005-2008: survey and analysis). The report will form part of the basis for the Swedish Transport Administration's continued work with the issue of suicide on railways.

The Swedish Transport Administration has carried out a project together with Linköping University, “Samtal i säkerhetstjänst" (Discussions on safety service) to examine the forms of communication between traffic controllers, engine drivers, and maintenance personnel, and to propose possible improvements. The work has been completed and will be distributed within the Administration.

The formation of the Swedish Transport Administration required a new safety permit from the Swedish Transport Agency. This led to the revision of a great number of governing documents in order to meet the requirements.

The Swedish Transport Administration has continued its efforts during 2010 to reduce the number and risk of sun kink incidents. The number has declined each year since 2008. Work carried out during the year includes addressing deficiencies in the track superstructure (track and ballast), revision of standards and procedures, measures to improve the standards of sun kink reporting, implementation of the new mandatory training (BASTAB), publication of information materials to raise awareness, and discussion forums on sun kink.

The rails and rail components are checked through non-destructive testing, mainly ultrasonic, in order to maintain rail safety. The checks are both automated (with a special train) and manual. In addition to the testing, visual inspections are also performed, which are particularly important for certain parts of points. Any significant cracks or fractures are entered into Bessy (safety and

maintenance inspection system) in order to plan for them to be addressed in good time and to monitor any continued growth. Statistics produced in 2010 show that the number of cracks/fractures detected by ultrasonic testing has increased by 37% from 2005 to 2009, which demonstrates that the measuring method has improved. Future efforts will focus on improving broken rails reporting, eddy-current testing to detect surface defects, and clarification of exemption handling (for extended rectification deadlines).

Work to ensure the condition of tracks in level crossings has resulted in a proposal for new inspection procedures. These will be adopted / determined in 2011.

The Swedish Transport Administration has deepened its cooperation with the emergency services in order to facilitate emergency decoupling and evacuation of trains on the line. Priority is to be given to evacuation over fault correction measures in cases where the stop is estimated to last more than two hours.

Work continues on the development of the new unified control-command and signalling system for Europe, ERTMS. ERTMS has been implemented on the Bothnia line this year and efforts are under way to also implement it on the Västerdal line.

A risk analysis was conducted in conjunction with the formation of the new Swedish Transport Administration. In the short-term perspective, no increased traffic risks were identified.

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 the values of five years. Because 2011 is the fifth year that information has been collected in this way, the indicators for 2011 are presented as an average based on the values for 2010, 2009, 2008, 2007 and 2006. Certain indicators have been added since 2006 and these are presented for the years for which the values are available. The CSIs consist of data on accidents and deviations which have occurred set against the number of train kilometres or, in certain cases, passenger kilometres. Definitions used for the collected data are presented in Chapter J. All collected data are presented in Annex C.

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 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 Transport Analysis's official statistics publication, "Bantrafikskador[14]."

D.2.1 Accidents

There were 69 (46, 46, 56, and 46) accidents to be reported in 2011 in accordance with Safety Directive Annex 1[15]. Figures in parentheses refer to 2009, 2008, 2007, and 2006, respectively.

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

[15] Accidents in which at least one rail-borne vehicle in motion was involved and in which at least one person was killed or seriously injured, or in which damage to material, tracks or other installations resulted in costs of at least one hundred

The average for the latest five years is 0.38 accidents per million train kilometres per year. In short, accidents involving railway vehicles in motion resulting in the death or serious injury of at least one person, a cost of more than SEK 1.4 million, or in the complete blockage of traffic for at least six hours are included in these figures.

and fifty thousand euro. Accidents that cause environmental damage or which significantly delay traffic are also accidents that must be reported. Incidents of suicide are excluded. Events in which the police have not ruled whether the cause was an accident or a suicide are included as accidents. See definitions, Annex F.

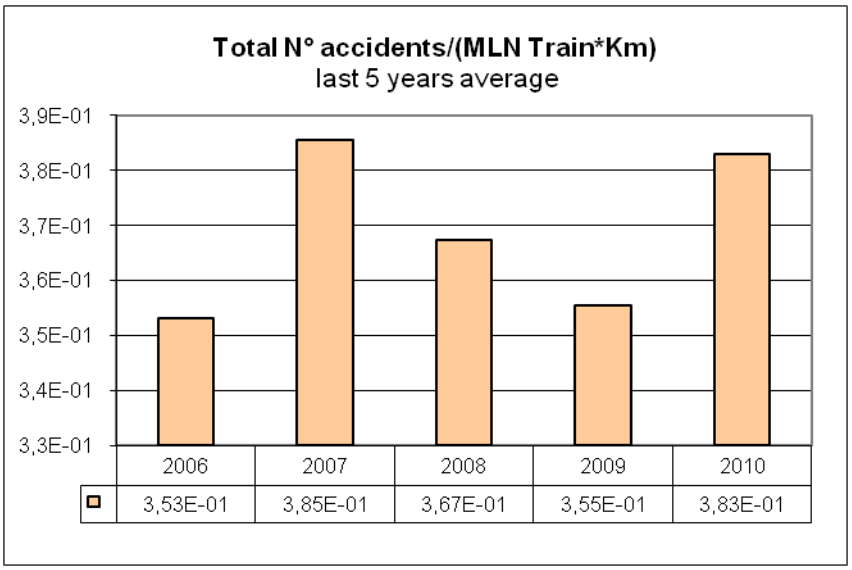

Figure 2: Diagram of number of accidents per million train-km.

These accidents are in turn 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.

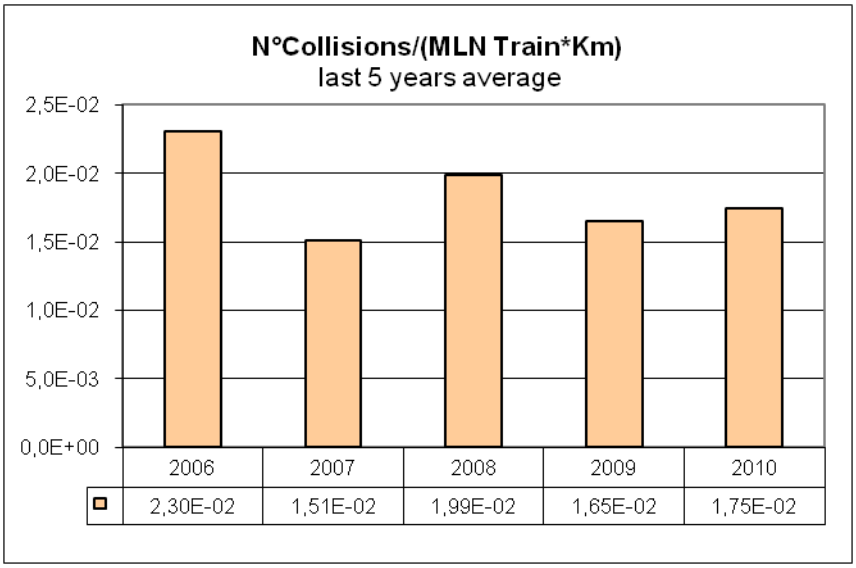

Figure 3: Diagram of number of collisions per million train-km.

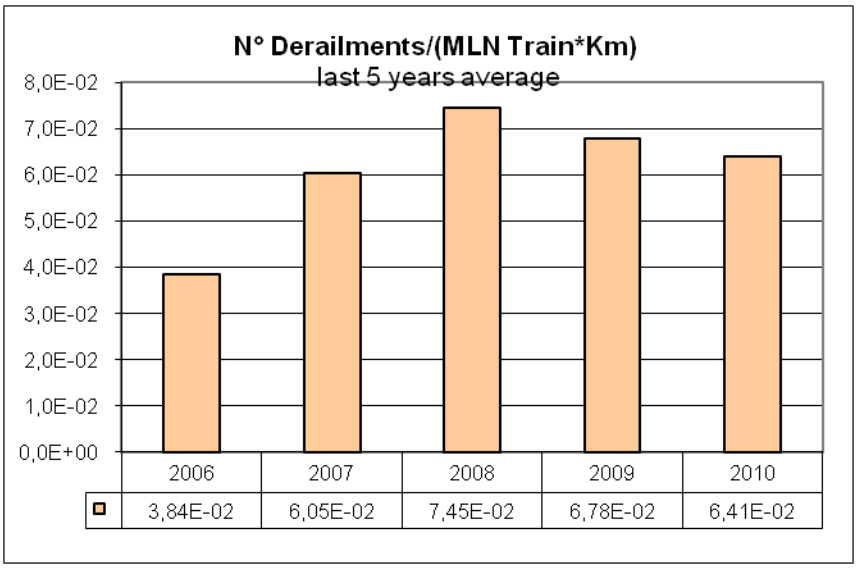

Figure 4: Diagram of number of train derailments per million train-km.

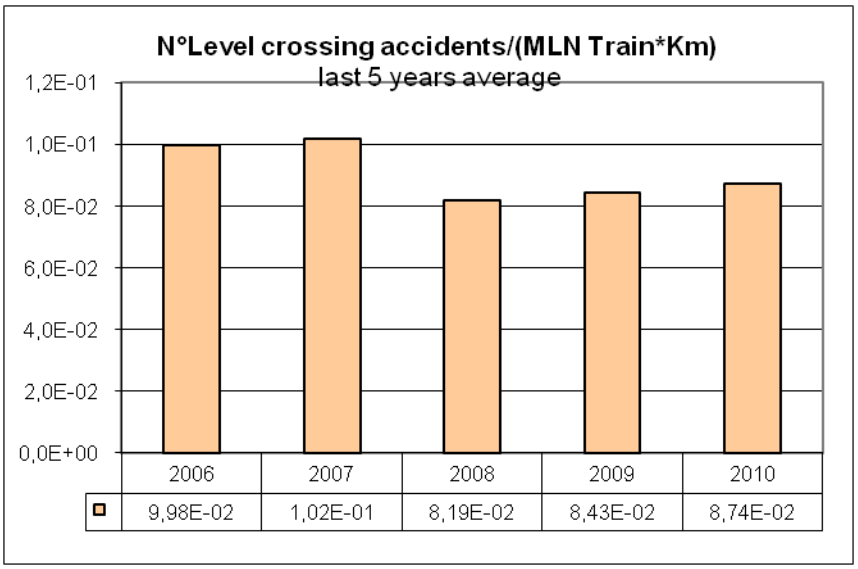

Figure 5: Diagram of number of level crossing accidents per million train-km.

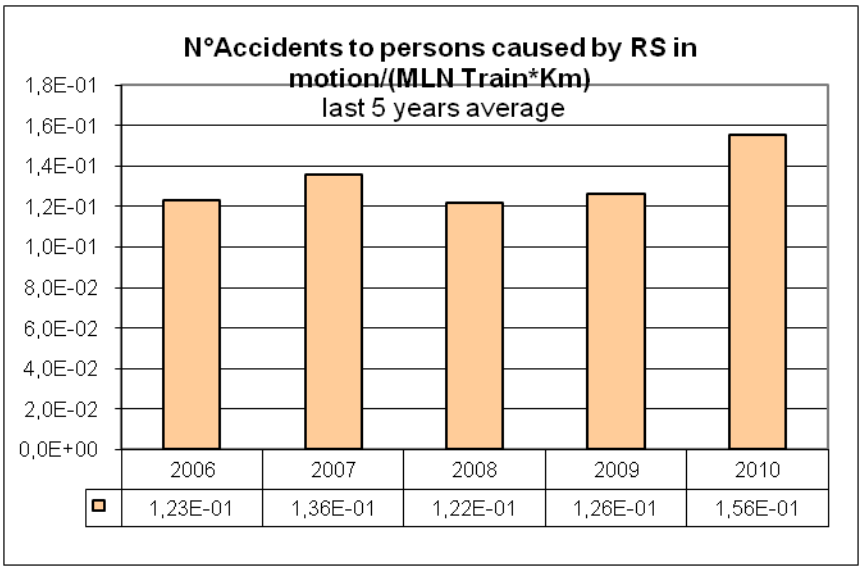

Figure 6: Number of accidents to persons caused by rolling stock in motion per million train-km.

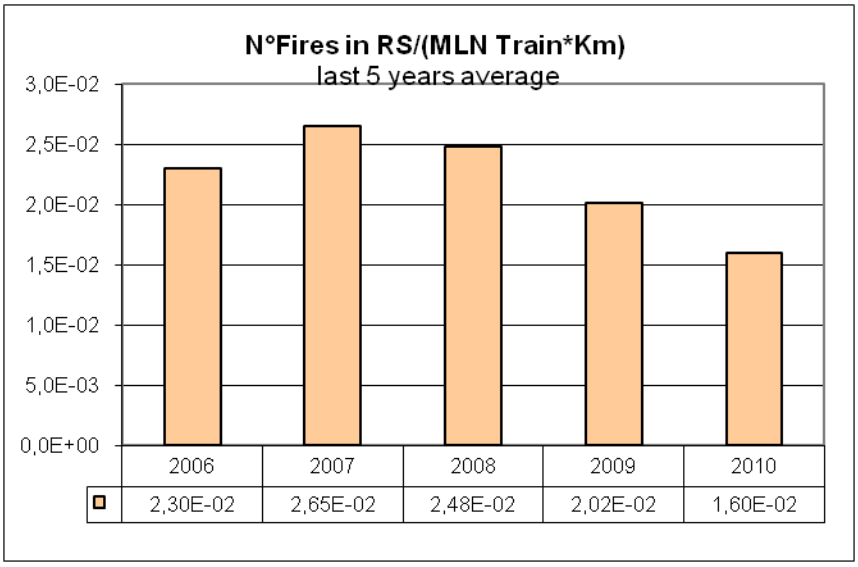

Figure 7: Number of fires caused by rolling stock in motion per million train-km.

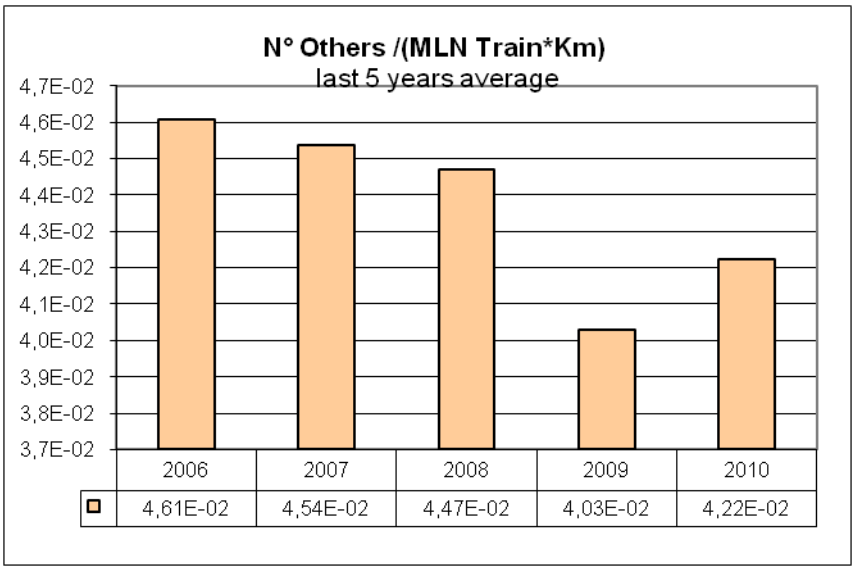

Figure 7: Diagram of number of other accidents per million train-km.

The accident categories in which the most accidents were reported in 2010 were accidents to persons caused by rolling stock in motion (38, 20, 13, 20, 16) and level crossing accidents (14, 13, 6, 14, 13). The greatest increase was among events involving unauthorised persons on railway premises. Suicides are excluded from the figures but it is never completely certain whether an event was a suicide or not. Events that the police, as the competent authority, have not ruled to be either an accident or a suicide are reported as accidents. The majority of the 38 accidents to persons in 2010 involved such uncertain cases. During 2010, there were also accidents in which employees were killed after being hit while working in the track area. In addition to the accidents presented in this report, there were also 68 (67, 71, 78, 68) suicide attempts which resulted in death or serious injury during 2010.

For the first time since this reporting began in 2006, a passenger was killed in a collision. The other 3 (1, 4, 1, 3) collisions and 7 (7, 14, 11, 5) train derailments reported for 2010 were reported on account of the costs and/or significant traffic disruption. Several of the accidents classified as other accidents were also collisions and derailments, but with shunting movements, and in most cases reported because they led to significant consequences in terms of costs of damage and/or major traffic disruptions. However, they did not lead to any fatalities. No major fires (0,3,4,3) were reported in 2010.

D.2.2 Fatalities and serious injuries

This group of indicators includes the number of fatalities and seriously injured. In 2010, there were 42 (19, 13, 23,16) fatalities and 25 (15, 6, 14,13) serious injuries. Using the mean of the last five years, the indicator for the number of deaths per million train-km is 0.16. This means that 1.6 people were killed per 10 million train-km travelled.

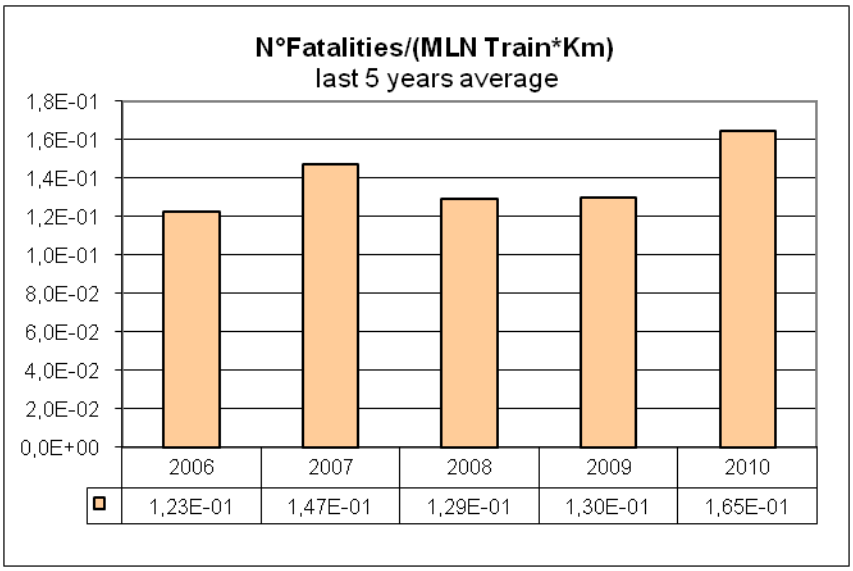

Figure 8: Indicator for fatalities per million train kilometres.

The indicator for the number of serious injuries per million train kilometres is 0.07 per million train kilometres, as shown by the graph below.

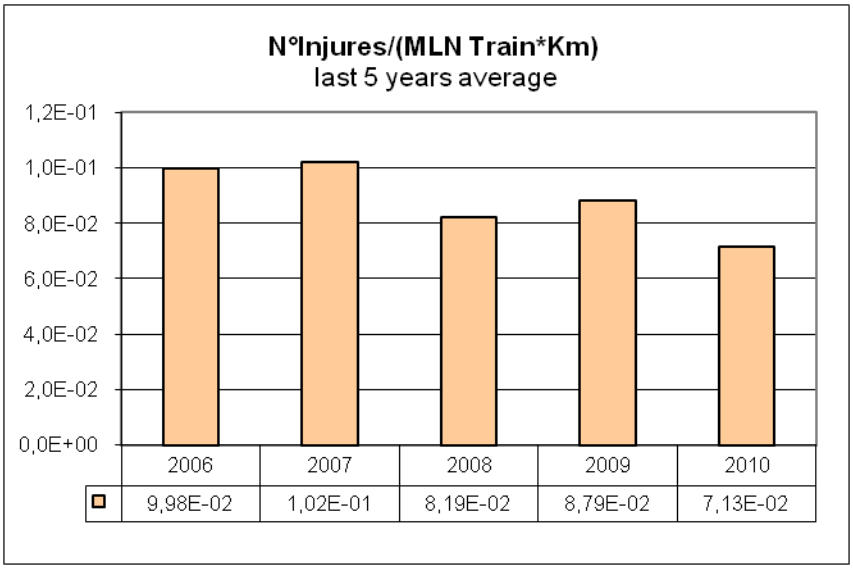

Figure 9: Indicator for number of serious injuries per million train kilometres.

In 2010, 25 (15,6,14,13) people were seriously injured. Eight passengers were seriously injured in the collision in which a passenger also died.

A degree of uncertainty exists as regards the number serious injuries as it is sometimes difficult to obtain information on the length of hospital stays. Data for the extent of bodily injury is currently collected from the police or the companies concerned. It can be difficult to obtain the exact duration of hospital care for cases concerning unauthorised persons on railway premises.

The Swedish Transport Agency has initiated a pilot project to examine whether it is possible to obtain such information via the hospital contacts that are currently used in the road sector.

In level-crossing accidents, it was mainly the users of the level crossing, i.e. road users, that were killed (7, 6, 4, 9, 7) or seriously injured 9 (6, 7, 1, 8, 5). One employee was seriously injured in a level-crossing accident while shunting. Accidents involving persons mainly involved unauthorised persons on the track being struck or run over. In these accidents, 34 (13, 9, 14, 9) persons were killed and 7 (4, 6, 7) were seriously injured. It should be noted that an accident involving a person being struck or run over by a train is often fatal. However, in level-crossing accidents it is often a matter of chance whether these do or do not result in some degree of personal injury (for example whether a vehicle's interior is left undamaged in the accident).

One passenger was killed in a collision and one person died after having fallen in an attempt to board a train in motion. Two track workers died after being hit by trains.

D.2.3. Technical safety of infrastructure

This group of indicators includes 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. Approximately 65% of tracks have ATP/ATC in use and about 97% of train kilometres are run on tracks with ATP/ATC. The majority of traffic is thus on tracks that are extremely safe in technical terms.

The state-owned infrastructure manager 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 was to remove level crossings that did not have an active safety installation and replace them with level crossings safety installations. Submission of information on level crossings divided into eight types of level crossing safety installations is new to the reports, thus there are still uncertainties in the figures. The Swedish Transport Agency will review whether it is possible to clarify the forms used for the reports as this year's reporting has shown that some information has been reported twice. The Agency will also examine whether level crossings should really be reported for group 2. Level crossing safety installations that consist only of a barrier are rare in Sweden. The data for 2009 and 2010 may therefore be adjusted.

Type of level crossing	Number
Number of level crossings with automatic acoustic and/or visual systems that warn level-crossing users (1)	918(900)
Number of level crossings with automatic barrier systems (whole or half barriers, including gates or similar) that warn/protect level-crossing users (2)	31(22)
Number of level crossings with automatic systems comprising both 1 and 2	2280(2259)
Number of level crossings with both 1 and 2 that are also equipped with obstacle detectors	19(79)
Number of level crossings with manually controlled acoustic and/or visual systems that warn level-crossing users (3)	62(83)
Number of level crossings with manually controlled barrier systems, including gates or similar that warn/protect level-crossing users (4)	5(5)
Number of level crossings with manually controlled systems comprising both 3 and 4	19(41)
Number of passive level crossings	8036(8012)
Total:	11370(11371)

Table 6: Breakdown of level crossings according to type of level crossing safety installation. The figures in parentheses refer to 2009.

Type of level crossing	Number
Number of level crossings with automatic acoustic and/or visual systems that warn level-crossing users (1)	780(757)
Number of level crossings with automatic barrier systems (whole or half barriers, including gates or similar) that warn/protect level-crossing users (2)	0(0)
Number of level crossings with automatic systems comprising both 1 and 2	2203(2148)
Number of level crossings with both 1 and 2 that are also equipped with obstacle detectors	19(79)
Number of level crossings with manually controlled acoustic and/or visual systems that warn level-crossing users (3)	0(20)
Number of level crossings with manually controlled barrier systems, including gates or similar that warn/protect level-crossing users (4)	0(0)
Number of level crossings with manually controlled systems comprising both 3 and 4	0(0)
Number of passive level crossings	5762(8731)
Total:	

Table 7: Breakdown of level crossings on the state-owned infrastructure according to type of level crossing safety installation. The figures in parentheses refer to 2009.

D.2.4 Deviations

This indicator combines all reported deviations relating to broken rails, track geometry faults, broken axles and wheels, unauthorised SPADs (signals passed at danger), and wrong-side signalling failures. In 2010, 477 (723, 594, 516, 523) deviations were reported and the indicator gives a value of 4.1 deviations per million train kilometres as a five year average. The state-owned infrastructure manager reported significantly fewer deviations than in the preceding year, giving the following explanation:

"The information on broken rails was retrieved from our fault reporting system, OFELIA. Extensive manual evaluation of the registered information is required to obtain the requested number. This evaluation was performed by different people for the different years. The evaluation to produce the data for 2010 was much more precise than that of 2009."

The Swedish Transport Agency has asked the Swedish Transport Administration to revise the previous years' data using the new method. The previous year's data may therefore be adjusted and no conclusions should be drawn on an actual reduction in the numbers reflected in the indicators.

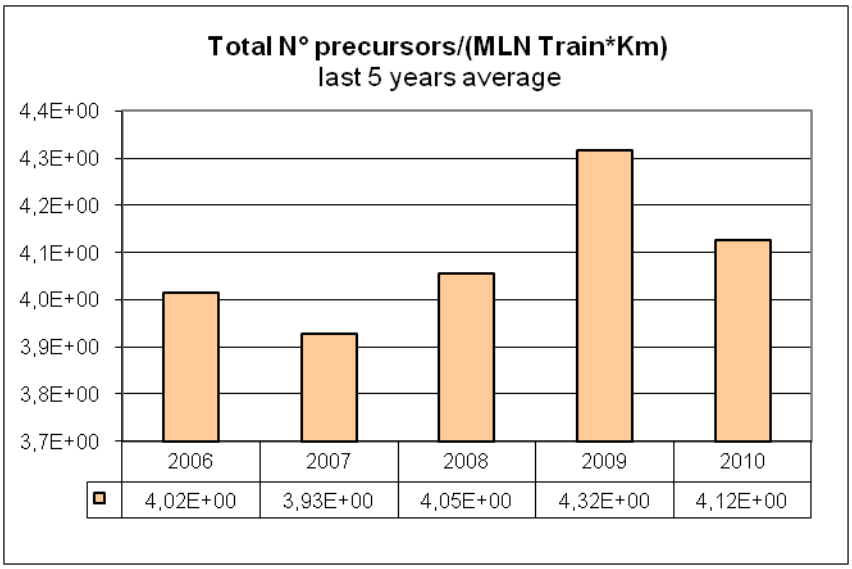

Figure 10: Indicator of number of deviations per million train-km.

The category of indicators that clearly dominates is unauthorised signals passed at danger (341.362 275,217,187). Significantly, the number of reported unauthorised SPADs has increased every year since reporting began. When asked in 2010, the operators gave numerous explanations for the increase, such as an improved ability to report and an actual increase due to severe winter conditions.

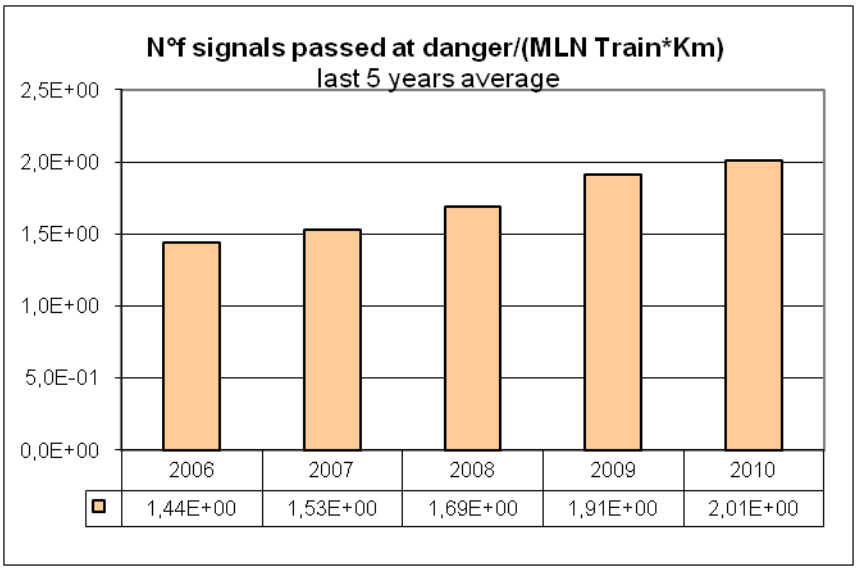

Figure 11: Indicator for number of unauthorised SPADs per million train kilometres.

With the exception of broken wheels, other deviations have decreased. However, note the comments above about uncertainties in the previous years' data.

Track geometry faults: 68,115,87,102,79

Broken rails: 62,235,218,187,241

Wrong-side signalling failures: 1,9,12,6,6

Broken wheels: 4,0,1,2,8

Broken axle: 2,1,2,2

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

This indicator is an attempt to measure the total costs arising in the rail system as a consequence of accidents. The costs are expressed in euro[16].

The ERA has introduced new methods for cost reporting. 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 experienced by railway undertakings and infrastructure managers.

- Experience has shown that railway undertakings and infrastructure managers bear the environmental costs of restoring the damaged area to the condition it was in before the

[16] To calculate costs in euro, an exchange rate of EUR 1 = SEK 9.5413 (Sveriges Riksbanks [The Swedish Central Bank] mean exchange rate for 2010) was used for 2010 where reporting railway undertakings and infrastructure managers quote their costs in SEK.

railway accident. The undertakings have not reported any environmental costs for 2010. The reasons provided were that they did not have any such costs or that they had no knowledge of any environmental costs. Approximately EUR 17 000 in environmental costs were reported in 2009.

- 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 of restoring rolling stock or infrastructure to the condition they were in before the accident. Undertakings reported costs of approximately EUR 8 million for 2010 and approximately EUR 16 million for 2009. The undertakings have stated that there is considerable uncertainty in this data.

The following costs are to be based on societal costs:

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

- Costs of delays on account of accidents: approximately EUR 72 000.

The information on costs of 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 *2005:16* (Samhällsekonomiska principer och kalkylvärden för transportsektorn). The calculated values are then multiplied by the number of fatalities and serious injuries.

Costs of delays on account of accidents are reported this year for the first time. Data on minutes delayed also contains the minutes delayed on account of incidents and only covers the state owned infrastructure.

D.2.6 Safety management

For 2010, the key figure used is the ratio of system audits that operators planned, 214 (221, 177, 194), and the number they performed, 187 (164, 156, 188). 56 of 126 operators indicated that they had planned and performed at least one system audit in 2010. A number of operators indicated that they planned but did not carry out system audits in 2010. One area in which audits were reported concerned the fact that emergency preparedness exercises had demonstrated the need for clearer instructions / checklists for managing emergencies. The more general shortcomings that were found include compliance with regulatory requirements, skills management, and safety management.

D.3 Result of safety recommendations

The Swedish Transport Agency receives safety rail transport recommendations from the independent investigative authority, the Swedish Accident Investigation Board (Statens haverikommission (SHK)). In 2010, the Agency addressed all 26 of the safety recommendations made in the following investigation reports:

RJ 2009:06 Near-collision of trains in Västerhaninge on 19 January 2006 (SHK case J-01/06),

RJ 2009:07 Near-collision between a short haul train and a train on the route Umeå–Brännland on 17 June 2008 (J-27/08),

RJ 2009:08 Near-collision between a short haul train and a train in Torneträsk on 29 July 2008 (J-34/08),

RJ 2009:09 Derailment of a short haul train in Kimstad on 21 December 2008 (J-53/08),

RJ 2009:11 Derailment of a train in Gnesta on 26 July 2007 (J-08/07),

RJ 2010:01 Fire on tamping machine on the route Bäckefors–Ed on 20 July 2007 (J-06/07),

RJ 2010:02 Fire on rail maintenance vehicle in Grötingen on 24 November 2007 (J-20/07).

The safety recommendations provided by SHK are presented in italics below together with the Swedish Transport Agency's response to the investigating board on how the recommendations were addressed.

SHK provided feedback to the Swedish Transport Agency to the effect that SHK did not consider certain of their safety recommendations to have been addressed by the safety authority. SHK's comments and the Agency's response are presented under the relevant recommendations.

In 2010, SHK also provided feedback on a safety recommendation submitted in report RJ 2009: 05 concerning a near-collision on the route Hillared–Limmared on 9 June 2008, which the investigating board did not consider had been addressed. The Swedish Transport Agency had responded to the recommendation in 2009 and it was thus presented in the safety report for 2009 (PJ 10 027). The Agency is reporting the earlier safety recommendation again, but now together with SHK's feedback and the safety authority's response.

Recommendation RJ 2009:06 R1

- *Take steps to ensure that a risk analysis is carried out which analyses the consequences of the altered maintenance routines for commuter trains (series X1) in Stockholm, and take steps to ensure that measures are taken to reduce any remaining risks suggested by such an analysis*

In the application procedure concerning the railway undertaking Stockholmståg KB, the company demonstrated procedures for the implementation of risk analyses in its operations, in accordance with the regulations on safety management systems, etc. (JvSFS 2007:1).

The Swedish Transport Agency plans to contact Stockholmståg KB, which is currently the commuter train operator for Stockholm, and ask them to demonstrate how they check for any remaining risks on vehicle series X1 on the basis of the X1 maintenance documentation that was earlier amended by Citypendeln Sverige AB, the previous railway undertaking. The maintenance documentation is provided to the operator by vehicle owner AB Storstockholms Lokaltrafik (SL).

Recommendation RJ 2009:06 R2

- *Introduce procedures to allow the Swedish Transport Agency, in the course of its work, to detect changes to rules and routines among operatives which ought to give rise to risk analyses and supplementary measures*

When a railway undertaking applies for authorisation to operate railway services, the vehicle types intended to be used in the operation are to be stated. These vehicle types have to be approved by the Agency. In accordance with the legislation, the vehicle documentation presented during the authorisation procedure must be the same documentation upon which the approval of the vehicle type was based. In other cases, the Swedish Railway Act (Chapter 3, §9, 2004: 519) and additional regulations (JvSFS 2006:1) state that the railway undertaking, prospective or operational, is required to notify any material change to the Swedish Transport Agency. For example, a change in the interval for vehicle component maintenance may have significant safety implications, thus an existing approval decision may be re-examined. For this reason and in accordance with the regulations, the railway undertaking must submit a risk analysis to the Swedish Transport Agency and this forms the basis for a ruling on whether or not a renewal of the vehicle authorisation is required.

The Swedish Transport Agency has the task of monitoring whether operators' safety management systems are operational and therefore the Agency should in no way be seen as an integral part of their safety management systems. The Agency does not consider it the role of the supervisory authority to detect and examine all changes that an operator can implement. This must be based on the operator's self-monitoring and commitments to detect and report changes on the basis of their responsibilities for safe railway transport under the Swedish Railway Act (2004:519). The Agency monitors whether a safety management system is in place and is functioning as intended both when applications are examined and during inspections. However, this monitoring does not absolve the company of its responsibility to comply with the legislation.

Finally, the Swedish Transport Agency would state that the European Commission Regulation No 352/2009 on the adoption of a common safety method on risk evaluation and assessment was adopted on 24 April 2009. The regulation is addressed at infrastructure managers and railway undertakings and directs special attention to risk management at the interface between different stakeholders, whenever a change in operating conditions or new materials entails new risks for railway infrastructures or rail transport. For example, changes in the maintenance of vehicle components are to be registered and follow the vehicle even when the vehicle is taken over by another operator, as is the case with service records of passenger cars. The new common approach will be applied to all significant technical changes that affect the vehicles with effect from 19 July 2010.

There are also two other, pending changes in EU legislation affecting vehicle maintenance:

- Every vehicle is to have an "entity in charge of maintenance". This entity shall ensure that the vehicles for whose maintenance it is responsible are in a safe condition through a system of maintenance. To this end, the entity in charge of maintenance shall ensure that the vehicles are maintained in accordance with the maintenance file for each vehicle, and with the applicable requirements, including maintenance rules and provisions in the TSI (Technical Specification for Interoperability). Directive 2008/110/EC is to be introduced into Swedish law in 2011.

- A second set of common safety methods (CSM) for operators' safety control / monitoring in the operating and maintenance phases of subsystems is currently being drafted by the European Railway Agency (new EU regulation in 2011).

Recommendation RJ 2009:07 R1

- *Update BV-FS 2000:4 so that both physical and mental ability is assessed before the return to safety services*

The Swedish Transport Agency is working to develop new health regulations. As does §9 BV-FS 2000:4, the new health regulations will include rules stating that both physical and mental abilities have to be assessed before staff return to safety services after involvement in an accident or incident. In working on the new health regulations, the Agency is also doing all it can to ensure that the rules in this regard are clearer.

The new health regulations are partly based on the "Train Drivers Directive" (2007/59/EC), the resulting and forthcoming Swedish legislation, and the provisions of the technical specification for interoperability (TSI) for the subsystem, "Traffic Operation and Management" (2006/920/EC).

The Swedish Transport Agency believes that the new health regulations can be expected to take effect in late 2010.

Recommendation RJ 2009:07 R2

- *Review the regulations for passing signals that do not show "clear" in order to introduce safer barriers*

The Swedish Transport Agency's administration group for the Swedish Rail Agency's traffic regulations (JTF) has taken note of the recommendation and has included it as a basis for assessment in future revisions of the regulatory framework.

The Swedish Transport Agency also elects to follow the Swedish Rail Administration's test and evaluation of a checklist for train dispatchers.

Recommendations RJ 2009:07 R3 and RJ 2009:05 R6

Recommendation 2009:05 R5 was made by SHK in investigation report RJ 2009:5 concerning a near-collision on the Hillared–Limmared line on 9 June 2008, which the Swedish Transport Agency responded to on 18/12/2009, choosing, however, to respond in full later, together with its response to the identical RJ 2009:07 R3.

- *The Swedish Rail Administration should review and improve practices and provisions to meet the requirements of BV-FS 2000:4, and ensure that their own regulations and procedures are followed*

The Swedish Transport Administration, where the current Swedish Rail Administration has been placed, has submitted a safety authorisation application to operate and manage railway infrastructure in accordance with the Swedish Railway Act (2004: 519). In order to obtain a safety authorisation, a company is required to demonstrate that it has a safety management system in accordance with the Swedish Rail Agency regulations (JvSFS 2008: 2) on safety management systems and other safety provisions for infrastructure managers. The safety management system must include procedures for health checks on personnel in safety services in accordance with Swedish Railway Inspectorate regulations (BV-FS 2000:4) on medical examinations and state of health.

The authorisation procedure for the future Swedish Transport Administration examined the governing documentation required by BV-FS 2000:4 against the checklists used by the authority to check that companies have such a system. The checklists are used to help find any shortcomings in the system for monitoring personnel in safety services and their state of health. The Swedish Transport Agency has also verified that the authority's own checklist does not contain errors.

The Swedish Transport Agency considers, on the basis of the reply from the future Swedish Transport Administration, that the Administration will conduct internal compliance audits of their internal procedures for personnel in safety services and their state of health.
The Agency has chosen to follow the steps taken, regarding the infrastructure managers' planned health check audits, by including the matter on the agenda of the "corporate meeting" that is regularly conducted with the Swedish Rail Administration (in future; the Swedish Transport Administration).

Recommendation RJ 2009:07 R4

- *The Swedish Rail Administration to adapt support system and rules to harmonise with each other*

The Swedish Rail Administration responded to the Swedish Transport Agency to the effect that in the specific case raised in the report in question the deviation problem identified between the support system and the Swedish Rail Administration's internal regulatory framework had been eliminated with the introduction of the JTF, the Swedish Rail Agency Traffic Regulations (JvSFS 2008:7), when the former movement in Safety Regulation (BVF 900.3) "short haul train for transport" was abolished; no similar movement exists in JTF.

On the basis of the Swedish Rail Administration's response, the Swedish Transport Agency considers that the dispatcher printout of the "graphic setup" still does not match the internal governing document, but that the earlier risk of confusion between the various pre-planned trips has not been a problem for the dispatcher since 31 May 2009. The introduction of the JTF in the late spring of 2009 meant that other traffic safety related support systems of the Swedish Rail Administration were also in need of harmonisation. The Swedish Rail Administration has informed the Agency that they are working continuously to adapt their support systems to the current regulatory framework.

In a letter dated 14/05/2009 and titled JTF påverkan på Banverket Leveransdivisionens IT-tillämpningar (Effect of JTF on the Swedish Rail Administration Supply Division's IT applications), the Swedish Rail Administration proposes that approximately 50 support systems are affected by the harmonisation with the JTF and that an action plan and a timetable is to be produced to this end. At the next corporate meeting with the Swedish Rail Administration (in future; the Swedish Transport Administration), the Swedish Transport Agency intends to add a request to the agenda for a presentation of when each affected support system and its administration is to be adapted to the operational rules in JTF.

Recommendation RJ 2009:07 R5

- *The Swedish Rail Administration to monitor the system of follow-ups so that shortcomings and weaknesses of dispatchers can be better addressed, for example through simulations and training for various scenarios*

The Swedish Rail Administration announced that during the coming years it plans to assess and evaluate the utility value of the results and experiences from the use of the simulation facilities for dispatchers that are available and in use at the operations control centres in Malmö and Stockholm

In conjunction with the examination of the future Swedish Transport Administration's application for safety authorisation, the future infrastructure manager has demonstrated a system to manage shortcomings and weaknesses in operations.

Recommendations RJ 2009:08 R1 and R3

- *The Swedish Rail Administration's safety management system also to cover in full the design of safety-critical systems and to meet the relevant requirements of the Swedish Transport Agency regulations*

- *In conjunction with the processing of infrastructure managers' safety authorisations, investigate whether they have a safety management system which covers the design of safety-critical components and subsystems and that the safety management system meets the requirements of the Swedish Transport Agency regulations*

SHK points out in the report that the supervisory authority does not examine document BVF 544.94001: *Technical safety management - Work with signal installations* when processing the safety authorisation application, which is correct. The document is designed to govern the process of designing safety-critical systems and subsystems and is used by the Swedish Transport Administration to achieve what is set out in the bullet points below. The document is not examined as part of the authorisation process because assessment of technical safety management is included in the procedure for *approval of subsystems in railways, etc.* as laid down in the regulations (JvSFS 2006:1). This applies to all applicants, who may be railway undertakings, infrastructure managers, or others. Such oversight needs to be documented only when a significant change may affect traffic safety and an approval is required from the supervisory authority.

The Swedish Transport Agency cannot require the Swedish Transport Administration's documents to comply with a fixed standard as that would hinder technological development - not all technical changes are verified and validated according to the same standard.

In the Swedish Rail Agency regulations (JvSFS 2006:1) *on the approval of subsystems in railways* etc., chapter 5 is based on a CENELEC standard. This does not mean that the supervisory authority requires the operators to use only that specific standard in making their safety case. The operator may make use of a different standard provided that it can, when there is a change in components and subsystems, prove to the supervisory authority that:

- a new subsystem is at least as safe as the current subsystem if used in the same way.
- the failure of any single component will not cause serious damage or injuries to passengers, personnel, equipment, or the environment.
- vehicles, control-command and signalling systems, and infrastructure will be at least as safe after modification as before.

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

The Swedish Transport Administration's safety management includes document BVS 544.92100 *commissioning inspection of signal installations.* The aim of the commissioning inspection is to verify that the installation is as described in the supporting documents, and to validate its function. The Swedish Transport Agency examined the document in connection with the Swedish Transport Administration's application for safety authorisation. In 2008, the supervisory authority conducted an oversight of the Swedish Rail Administration in order to investigate whether the latter (now the Swedish Transport Administration) had a functioning system for the inspection and performance testing of signal installations. The safety audit resulted in an order that was complied with, at which point the supervisory authority concluded the matter.

The Swedish Transport Administration has announced that it has introduced additional governance for planned changes in safety-critical systems such as: BVS 1544.94006 Risk analysis for signalling technology construction projects, BVS 1544.94020 Safety plan and safety case for signalling technology construction projects, and the documented procedures in BVR 1213 Start-up planning, roles and responsibilities of the start-up manager and project manager.

The Swedish Transport Agency would also stress that Commission Regulation 352/2009 on the adoption of common safety method on risk evaluation and assessment will soon enter into force as Swedish legislation. The method is used to manage risks associated with significant changes to subsystems, organisation, or operations. The target groups are railway undertakings, infrastructure managers, manufacturers and others. In addition, it is a supporting document for the supervisory authority in connection with subsystem approvals and the issuing or reviewing of authorisations. The Regulation will enter into force in two stages, first for changes to vehicles and subsystems from 19 July 2010 and then for organisational and operational changes from 1 July 2012. Beginning in 2012, it will be compulsory for operators to report annually their implementation of the Regulation to the supervisory authority. An accompanying guide[17] to the regulation has also been prepared..

The Swedish Transport Agency therefore considers that recommendations R1 and R3 have been complied with.

[17] http://www.era.europa.eu/Document-Register/Documents/Guide-for-application-of-CSM-1-1-SE.pdf (1/6/2010)

Recommendation RJ 2009:08 R2

- *The Swedish Rail Administration's safety management system also to include project management and planning and capacity to pick up shortcomings and deviations of the contractor*

According to the provisions of §6 of the Swedish Rail Agency regulations (JvSFS 2007:02) safety management systems and other safety provisions for infrastructure managers, the safety management system of infrastructure managers must be capable of managing the risks to which the operation gives rise, including those associated with contractors. A system for managing identified deviations is required by the provisions of §7j, which also applies to contractors pursuant to §6. The Agency checks that such a system is in place when examining a safety authorisation application. The Swedish Transport Administration was granted a safety authorisation as a infrastructure manager under the Swedish Railway Act (2004:519) as of 1 April 2010.

The Swedish Transport Administration has informed the Agency that a new procedure, Ek TDOK 2010:15, has been developed for auditing. The procedure covers the audit activities included in the Swedish Transport Administration's audit programme and is to apply to internal audits and audits of the Administration's suppliers. The procedures in BVR 1213 have been revised and the role and responsibilities of the project manager during start-up have been clarified.

In 2009, the Swedish Transport Agency conducted a safety review of the Swedish Rail Administration in order to investigate whether the Administration (now the Swedish Transport Administration) had a system for ensuring that contractors met safety requirements as part of the procurement of contractor services. The supervisory authority had some comments on the submitted material, the Swedish Rail Administration addressed the comments, the supervisory authority deemed the requirements to be met, and the case was closed.

The Swedish Transport Agency therefore considers the recommendation to have been complied with.

The Swedish Transport Agency's overall assessment is that the shortcomings do not lie in the Swedish Transport Administration's documented procedures, but rather in its ability to follow procedures. The Agency is therefore considering conducting a safety audit of the Swedish Transport Administration.

Feedback on recommendations RJ 2008:8 R1-R3

SHK refers to the meeting with the Swedish Transport Agency on 8 December 2010 where SHK explained its view that the Swedish Transport Administration's internal rules for interfering with safety signalling systems do not comply with CENELEC standards.

It is true that the safety case pursuant to BVF 544.94001 does not contain the same document as the safety case pursuant to EN 50129. Consequently, it is also true that the assessor's role pursuant to EN 50126 is not completely comparable to the role of the assessor pursuant to BVF 544.94001. The assessors are quite simply reviewing completely different documentation. However, there are also several similarities between the CENELEC standards and BVF 544.04001; for example, the assessor must perform his/her tasks on three occasions in the development chain and the assessor and those who carry out the task must be independent of one another.

As the Swedish Transport Agency has written in response to SHK on 3/12/2009, the Agency does not require operators to comply with this EN standard. If operators have internal rules for working with signalling installations then they must be comparable to the EN standards. Furthermore, in the final paragraph the Agency pointed out that it did not consider the incident in Torneträsk to be have been caused by shortcomings in the internal procedures of the Swedish Transport Administration, but rather in shortcomings in the ability of the Swedish Transport Administration to follow procedures. The Agency's response was that it was therefore "considering conducting a safety audit of the Swedish Transport Administration". Since the response letter in December 2009, the Agency had an internal meeting on 18 June 2010, at which the arrangements for an oversight measure were discussed. The conclusion was that the Agency would question a number of commissioning managers on how they viewed their powers and options when serious safety deficiencies were found during the start-up phase. Just how reasonable was it to make safety-critical changes during the start-up phase? How much did the traffic pressure influence the inspector's decision? The commissioning manager was aware that an interrupted start-up could potentially delay the commission by several months. It was also decided at the meeting that the Agency would request information from the Swedish Transport Administration, specifically concerning the measures taken after the event in Torneträsk.

The Swedish Transport Agency planned to implement the above measures in February 2011.

Recommendation RJ 2007:02 R1

SHK made the same recommendation as in its earlier report, RJ 2007:02 Accident with train 5525 – collision with buffer stop and subsequent derailment in Ledsgård, N county on 28 February 2005, which the Swedish Rail Agency (as it was then) responded to on 24/6/2008.

- *the risk of single faults in connection with the establishment of a train's braking capacity should be minimised, for example, with the introduction of checklists, etc.*

When the supervisory authority, at the time the Swedish Rail Agency, was given the same recommendation in report RJ 2007:02, the Agency chose to order all railway undertakings to introduce a mandatory deceleration test with ATC into their own rules. The deceleration test requirement has since been included in the Swedish Rail Agency's Traffic Regulations, (JvSFS 2008:7) JTF.

In addition to the above measure, the Swedish Transport Agency has taken the recommendation into consideration and will use it as an assessment basis in future revisions of the traffic regulations and associated handbook.

Feedback on recommendation RJ 2007:02 R1

SHK believes that the response to the recommendation refers to action taken when the train has departed from an interlocking area where the train composition was changed. SHK believes it important to detect a train's deficient braking performance before a train departs from the interlocking area.

The Swedish Transport Agency's administration group for the Swedish Rail Agency's Traffic Regulations (JTF) is tasked with evaluating the recommendation and determining whether the proposal could / should be introduced into the Regulations.

The Swedish Transport Agency therefore considers the recommendation to have been addressed.

Recommendation RJ 2007:02 R5

SHK submitted the same recommendation as in its earlier report, RJ 2007:02 Accident with train 5525 – collision with buffer stop and subsequent derailment in Ledsgård, N county on 28 February 2005, which the Swedish Rail Agency (as it was then) responded to on 24/6/2008.

- *consider whether overarching principles and standards need to be formulated for safety tracks, focussing on how vehicles should brake safely in view of the risk of damage to both vehicles and the environment beyond the end of the track*

Upgrades, modernisations, and new construction of railway infrastructure are subject to the European regulatory framework, technical specifications for interoperability (TSI). Today there is a TSI for the subsystem infrastructure for high-speed trains (2008/217/EC) and additional regulations issued by the Swedish Rail Agency, JvSFS 2008:3. The regulatory framework is intended for infrastructure systems of the trans-European high-speed rail network (speeds above 190km/h) for passenger transport. On 1 January 2011, the TSI for the subsystem infrastructure for conventional trains, will take effect. The regulatory framework is intended for infrastructure systems of the trans-European rail network for conventional trains (speeds up to 200km/h). The railway network consists of lines intended for passenger, freight, and mixed traffic as well as freight hubs (including intermodal terminals) with intermediate lines. The TSI includes design of track-end protection.

The Swedish Transport Agency has an ongoing project that aims to develop rules and standards for areas of the railroad sector that are currently unregulated at the Agency level or where the TSI refers to national technical specifications (NTS). The Agency believes that the regulatory framework of standards and requirements for infrastructure and associated signal installations is based upon the fact that all vehicle movements have some degree of braking ability in accordance with the required standards. The driver has to check the braking ability by conducting a deceleration test in which deficient braking ability will lead to a lower speed. The Swedish Transport Agency assumes it likely that any future NTS for track-end protection and train route protection distances will not regulate on the basis that the movements are assumed to take place without braking ability.

Infrastructure managers that upgrade, modernise, or build new railway infrastructure must conduct risk analyses and manage the risks that may thereby emerge. The Swedish Transport Agency requires risk analyses as part of the infrastructure approval process.

The Swedish Transport Agency therefore considers that recommendation RJ 2007:02 R5 has been addressed.

Feedback on recommendation RJ 2007:02 R5

SHK considers the answer to be that the movement is considered to be without braking ability. It believes that a safety track should not lead onto the track that the safety track is intended to protect and that the safety track should be designed accordingly.

The Swedish Transport Agency views the purpose of a protective point and subsequent safety track with final buffer stop to be that the point is intended to prevent a movement from coming into direct danger of a frontal collision with another movement. The safety track provides the possibility of extended stopping distance and the final buffer stop can absorb a decelerated movement. The protective point served this purpose well in the incidents in both Ledsgård (RJ 2007:05) and Kimstad (RJ 2009:09). The safety track's purpose of providing extended stopping distance did not work because the braking abilities of the two movements were far too weak in relation to the speed. The buffer stop's purpose of stopping a rolling movement did not work because the movements' speed (about 40km/h) in relation to vehicle weight was too high. The Swedish Transport Agency considers that the purpose of protective points and safety tracks is not to prevent brakeless movements from derailing so near to adjacent tracks as to constitute a danger.

The railway system is built for movements that have brakes and do not travel at speeds faster than those at which the vehicle braking system is able stop the vehicle before it reaches a critical point. The worse the braking performance of a vehicle set, the lower the speed permitted. The railway system has, in certain respects, been designed to absorb certain individual mistakes during movements and resulting from external circumstances (slip). These mistakes are compensated for by, for example, train protection systems, protection distance with or without protective points, but always on the condition that the movement is not travelling faster than the established braking effect.

The Swedish Transport Agency believes that the railway system cannot be designed on the principle that movements have no or very little braking effect in relation to their operating weight and speed. The investigation report states that the governing document contains guidelines to the effect that the distance between the safety track and the main line should be no less than 4.5 m. To require the safety track to have a greater distance to the main line in order to reduce the risk of derailed vehicles from encroaching on adjacent tracks should be seen in relation to the fact that the distance between the up line and down line is 4.5 m on many lines with double tracks. There is always a risk that a vehicle may derail from a double track and encroach upon adjacent tracks. The Swedish Transport Agency believes that the problem should not be remedied by laying tracks further apart, but rather that the risk should be minimised by preventing derailments through maintenance of rail vehicles and critical infrastructure components and by placing defect detectors along the track. The comparison can be made with the safety track recommendation in which the Swedish Transport Agency stated that it believed that measures should instead be directed towards minimising the risk of movements ending up in situations with no or virtually no braking effect.

The Swedish Transport Agency's assessment is that the consequences of SHK's recommendation would be longer and wider yards and wider embankments on double or multi-tracks. This would mean more land being taken up for railroad construction. The Agency considers the likelihood of this type of accident to be small and has accordingly determined it not to be economically feasible to implement the proposed recommendation.

The Swedish Transport Agency has therefore decided not to comply with the recommendation.

Recommendation RJ 2009:09 R1

- *Lessons to be leant from the experience with selection tests in order to establish which characteristics should be assessed in the context of the psychological evaluation*

The Swedish Transport Agency is working to develop new health regulations. The new health regulations will ensure that both physical and mental capacity is assessed for certain types of safety services. Just as they are today, the new health regulations will be of assistance in the hiring of train drivers, for example. The new regulations are partly based on the provisions of the "Train Drivers Directive" (2007/59/EC), the resulting and forthcoming Swedish legislation, and the provisions of the technical specification for interoperability (TSI) for the subsystem traffic operation and management (2006/920/EC).

On the basis of the Train Drivers Directive, the Swedish Transport Agency has determined that the train driver selection tests must be regulated by the Agency.

The Swedish Transport Agency therefore considers that recommendation RJ 2009:09 R1 will be fully addressed.

Recommendation RJ 2009:09 R2

- *Review the implementation of meausres proposed in the Swedish Rail Agency report, 2007:6 Advanced Vocational Education, Periodic Training and Skills*

The Swedish Rail Agency conducted a thematic inspection in September 2006 regarding drivers with advanced vocational education and their periodic training and skills. The results were set out in a report (Swedish Rail Agency Report 2007:6 Advanced Vocational Education, Periodic Training and Skills) in March 2007. The report proposed a number of measures. How these proposals have been addressed is presented below.

The thematic inspection visited a number railway undertakings in which certain shortcomings in governance were found. The Swedish Rail Agency issued orders to the railway undertakings concerned. All railway undertakings have taken and present measures in response to the shortcomings discovered in their operations during the thematic inspection.

- *Report 2007:6 proposed measures for the training centres concerned:*
    - *Design a certificate that clearly indicates whether the student has complete the general part, and that the students are not authorised train drivers before the operator part has been completed*

The supervisory authority currently does not have a mandate to prescribe measures for the training centres that voluntarily participated in the thematic inspection.

In conjunction with the introduction into Swedish legislation of Commission Directive (2007/59/EC), the Train Drivers Directive, there will be an authorisation requirement for providing training for train drivers. The Swedish Transport Agency recommends that the supervisory authority should have a mandate to issue these authorisations and conduct oversight of the permit holders. The Directive requires train drivers, in future, to hold both a driver's licence and a driver certificate that show authorisation to drive trains.

- *Report 2007:6 proposed measures for the Swedish Rail Agency (as was):*

    - *Consider introducing skill requirements, including administrator training, for administrators, instructors and teachers who work with advanced vocational students during the on the job training period and the operator part.*

The Train Drivers Directive requires the authorised training centres to ensure that the teaching staff is covered by skills requirements and that the staff maintains those requirements.

    - *Request the educational background of involved personnel to be included in the accident and incident reporting that is required of companies.*

The Swedish Transport Agency has chosen not to follow this recommendation. However, the Agency has produced guidelines and a template for creating personnel training plans for those who are to work in traffic safety services. The guidelines are published together with a training matrix on the Swedish Transport Agency website[18]. The training matrix contains the standard times that the Agency uses as a basis for the authorisation of personnel training plans for those who are to work in traffic safety services.

    - *Examine in greater detail the selection methods and selection criterion for train driver training.*

See reply to recommendation RJ 2009:09 R1

On the basis of the above the Swedish Transport Agency considers that recommendation RJ 2009:09 R2 has been addressed.

Recommendation RJ 2009:09 R3

- *Review whether the Swedish Rail Agency's traffic regulations need to be changed so that a brake test inspection may only be used when it is not possible to conduct another type of brake test and so that no operations may be planned in such a way that a brake test inspection is required.*

The Swedish Transport Agency does not consider the text of JTF Handbook 11 Section 5.3, *Brake test inspections,* to need changing on the basis of the accident in Kimstad, for the following reasons:

Section 5.3 of Handbook 11. A prerequisite for a brake test inspection to be allowed is that all vehicles (with connected brakes) in the train have been previously brake-tested using a basic test. The occasions described in the Brake test inspection section are times when the main brake pipe in an already tested train has been disconnected at only one location, or if the driver has been away from the traction unit or the vicinity of the train itself for no more than 1 hour. Examples of such situations include after a broken hose has been repaired or the driver returns to the traction unit after his/her break. The driver must then check that the brakes are functioning as intended and as described in Section 5.7.

[18] http://www.transportstyrelsen.se/sv/Jarnvag/Godkannande/Utbildningsplaner/ (2010-05-12)

The Swedish Transport Agency considers recommendation RJ 2009:09 R3 to have been addressed.

Recommendation RJ 2009:11 R1

- *Lessons to be learned from the derailment and the running gear's significance for the consequences of a derailment when working on vehicle approval and in the European regulatory process*

The Swedish Transport Agency currently has a functional requirement for passenger vehicles to be designed so as to limit the consequences of a derailment. The requirement will be clarified in the guidelines (currently under revision) to the pending Regulations on the approval of subsystems in railways, etc., which the Swedish Transport Agency expects to publish in 2010.

The Swedish Transport Agency considers that a running gear requirement should not be imposed through the development of national technical specifications (NTS), but that the process should be international through the European Railway Agency (ERA). The Swedish Transport Agency has a representative in the ERA working group on locomotives and passenger vehicles in order to influence the European regulatory framework, that is to say the technical specifications for interoperability (TSI), in this field.

Recommendations RJ 2010:01 R1 and RJ 2010:02 R4

- *Review the need for certification of maintenance and repair personnel*

Through the Directive (2008/110/EC) amending the Railway Safety Directive, the Commission has introduced an Article 14a on Entities in Charge of Maintenance (ECM) for vehicle maintenance. Article 14a stipulates that all railway vehicles, including on-track machines (OTM), must have an appointed Entity in Charge of Maintenance who is also registered in the National Vehicle Register (NRV). The Entity in Charge of Maintenance is to ensure that vehicles are maintained in accordance with a maintenance system; that the vehicles periodically come to the workshop for inspection and repair and that vehicles are maintained in accordance with the maintenance records for each vehicle and other applicable requirements, including maintenance rules and the European regulatory framework on technical specifications for interoperability (TSIs).

Certification is also required for the Entity in Charge of Maintenance for freight wagons. The Commission has tasked the European Railway Agency with submitting a certification proposal to the Commission by 1 July 2010. The Commission is to make a decision on ECMs by 24 December 2010, which will then be incorporated in Swedish legislation.

The Swedish Transport Agency considers that the workshop personnel who perform maintenance tasks do not require personal certification. However, the ECM is responsible for maintenance tasks affecting safety being carried out in accordance with the prescribed requirements by trained personnel who are qualified for the task. The ECM requirement for on-track machines is planned to be incorporated in legislation by 2018.

The Swedish Transport Agency currently does not intend to develop national certification requirements for workshop personnel who work on vehicles of significance to safety. It would be anti-competitive and generate difficulties in cross-border traffic to require certification of personnel who maintain vehicles that will operate in Sweden. For example, for some passenger

transport over the Oresund Bridge the vehicles are used both in Sweden and in Denmark, but the vehicles are maintained in Denmark. Responsibility for maintenance measures rests on the respective railway undertakings that are authorised by the Swedish Railway Act (2004:519) to operate railway services in Sweden.

The Swedish Transport Agency therefore considers that recommendations RJ 2010:01 R1 and RJ 2010:02 R4 have been addressed.

Recommendations RJ 2010:01 R2-R5 and RJ 2010:02 R1-R3, R5

- *ascertain how Infranord ensures that documentation is produced for locomotive function and drawing follow-ups in the event of reconstructions or other changes*
- *ensure that Infranord reviews how locomotive function is to be assured in their own rebuilds, extensions, or when something is connected to a locomotive*
- *ensure that Infranord ensures that a risk analysis and impact assessment is carried out in connection with their own rebuilds, extensions, or connections to locomotives*
- *ensure that Infranord is sure how repair records should be maintained for annual follow-up, locomotive approval, and inspection*
- *ensure that Infranord reviews the safety management system for personnel training and procedures for the handover of locomotives between personnel*

After the two vehicle fires, Infranord AB has on two occasions applied for and been granted a license and safety certificate for railway undertakings in accordance with the Swedish Railway Act (2004:519). The first occasion was during the merger of Swedish Rail Administration Production and the then Swedish Rail Administration Industrial Division, the second was during the conversion of Swedish Rail Administration Production into an independent subsidiary, Infranord AB.

Infranord AB has sent documentation to the supervisory authority that shows that the deficiencies presented in the reports are being dealt with. The Swedish Transport Agency considers that the action taken meets the requirement of good safety management.

Recommendations RJ 2010:01 R2-R3 and RJ 2010:02 R1-R2 also have links with the Swedish Rail Agency regulations (JvSFS 2006:1) on the approval of subsystems in railways, etc. According to the provisions, a substantial modernisation or rebuild of an on-track machine, which has safety implications, must be authorised by the Agency before the vehicle may re-enter service. The Swedish Transport Agency inspects certain aspects of the process such as the updating of documentation/drawings and the testing and guaranteeing of locomotive function. In addition, a risk analysis has to have been conducted.

The Swedish Transport Agency planned to conduct a safety audit of Infranord AB during 2010, to include, among other things, verification of skills and training of personnel charged with determining the traffic safety condition of vehicles in accordance with Swedish Railway Inspectorate Regulation (BV-FS 2000:3) on training.

The Swedish Transport Agency therefore considers that recommendations RJ 2010:01 R2-R5 and RJ 2010:02 R1-R3, and R5 have been addressed.

Recommendation RJ 2009:05 R3

The recommendation was also published in the 2009 safety report

The Swedish Rail Administration has announced that a new planning and management tool for dispatchers has been developed and tested, on the basis of the results of the research project at Uppsala University, "Future Train Traffic Control," which was partially funded by the Swedish Rail Administration. A prototype facility is currently in place at the control centre in Norrköping and another prototype facility is planned for implementation in 2010 at the control centre in Boden. The results and experiences from these will serve as important input in work on a new "national train control system" and is expected to provide ideas for improvements in the existing technology and environment.

On the basis of the information the Swedish Transport Agency has noted from the project's website[19], the Agency believes that the ongoing work in the area will lead to changes for traffic control. While the current control system focuses on operating the infrastructure, the "Future Train Traffic Control" system provides support for making complex decisions in the event of disruptions. The Swedish Transport Agency is fully aware that this is ongoing research work, but because the prototype facilities have been introduced, the Swedish Transport Agency elects to take no action.

Feedback on recommendation RJ 2009:05 R3

SKH believes that the response to the recommendation considers that the future project concerns a decision support system and not building the capacity to maintain attentiveness.

The Swedish Transport Agency stands by its previous response. The Swedish Transport Administration (formerly the Swedish Rail Administration) has replied to the Agency, on the basis of the recommendation, that their "Future Train Traffic Control" project will also provide ideas and improvements for existing technology and the environment. The Swedish Transport Agency sees no reason to doubt the Swedish Transport Administration's response to the supervisory authority. The Agency considers that the response also includes measures to build capacity to maintain attentiveness, albeit in the longer term.

The Swedish Transport Agency therefore considers the recommendation to have been addressed.

[19] Uppsala University, Future Train Traffic Control FTTS: http://www.it.uu.se/research/project/ftts (2009-12-16)

E IMPORTANT CHANGES IN LEGISLATION AND REGULATORY FRAMEWORK

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 the accident costs has been implemented in Swedish law by amendments to the Railway Ordinance (2004: 526). The Swedish Transport Agency has just established new regulations in light of Directive 2009/149/EC. However, thanks to cooperative rapporteurs it has already been possible to implement much of the directive this year.

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 safety on the Community's railways have not yet been implemented in Swedish law. However, an investigation was set up which submitted an interim report in August 2010, entitled Driftskompatibilitet och enheter som ansvarar för underhåll inom EU:s järnvägssystem [Interoperability and entities in charge of maintenance within the EU's railway system], SOU 2010:61, and a final report in December 2010, entitled Ansvar för järnvägssäkerheten [Responsibility for railway safety], SOU 2010:100. The interim report proposed how the directives should be implemented in Swedish law, and the work on this is on-going.

During 2010, no major changes were made to the Swedish Railway Act (2004:519) with regard to rail safety. Under the amendment to Chapter 8 §11 of the Act made in SFS 2010:1568 that is to enter into force on 1 January 2011, the government, or the authority authorised by the government, may issue regulations on fees for oversight, registration, and case handling, in accordance with the Swedish Railway Act, in accordance with regulations issued under the Act, and under 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 §2a, has been added to the Railway Ordinance in SFS 2010:1605 and will enter into force on 1 January 2011. The Swedish Transport Agency is thus authorised to issue regulations on fees for oversight, registration, and case handling in accordance with the Swedish Railway Act, in accordance with regulations issued under the Act, and under Commission Regulation (EC) No 352/2009. These changes allow the Swedish Transport Agency to issue regulations regarding fees in certain cases.

Chapter 2, §3a, §3b of the Railway Ordinance have been updated in line with the amendments to the Railway Safety Directive made in Commission Directive 2009/149/EC (SFS 2010:1181). These amendments to the Railway Ordinance entered into force on 15 December 2010.

The Swedish Rail Agency's traffic regulations have been updated by Swedish Transport Agency regulations TSFS 2010:1 and TSFS 2010:163 amending the Swedish Rail Agency traffic regulations (JvSFS 2008:7). The amendments entered into force on 1 March and 12 December 2010 respectively. See also Annex D.

F DEVELOPMENT OF SAFETY CERTIFICATION 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 Railway Act, which came into force on 1 July 2007. The requirements can now be found in Chapter 3, §3 and Chapter 3, §7 respectively of the Swedish Railway Act.

During 2010, the Swedish Transport Agency has simplified the renewal procedure 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 start date for issuing safety certificates in accordance with Article 10 of Directive 2004/49/EC was 1 July 2007.

1.2. The start 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 website, in a rulebook for trackbound traffic that is available for purchase on the Swedish Transport Agency website, and in the Swedish Code of Statutes (SFS).

F.2 Numerical data

The Railway Safety Directive was implemented in Sweden on 1/7/2007. Annex E presents the 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. variation in type of service, extent of traffic, size of company).

3.1.2. Main reasons if the mean issuing time for Part A safety certificate applications exceeds the four months specified in Article 12(1) of the Safety Directive (restricted to those referred to in Annex E and after all the required information was received by the authority).

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

3.1.4. Summary of problems with the mutual acceptance of the Community wide valid Part A safety certificate.

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

3.1.6. Summary of the problems with using the harmonised rules for Part A safety certificates.

3.1.7. Summary of the common problems/difficulties for the NSA in application procedures for Part A safety certificates.

3.1.8. Summary of the problems mentioned by railway undertakings when applying for Part A safety certificates.

3.1.9. Is there a feedback procedure (questionnaire) that allows railway undertakings to express their opinion on issuing procedures/practices or to file complaints?

Replies

3.1.1 An amended Part A safety certificate due to an increase in the volume of hazardous materials.

3.1.2 No overrun occurred

3.1.3 - 3.1.4 Nothing to report

3.1.5 On 3 June 2010, the Swedish Transport Agency was tasked with presenting how the activities of authorisation, oversight, and record keeping could be financed primarily by direct charges as of 1 January 2011. Since January 2011, the Road and Rail Department has charged for record keeping for railway vehicles and for the examination of technical system approval applications. The Swedish Transport Agency proposal deemed it inappropriate to introduce a system for rail sector activities entirely financed by direct charges by 2011 and therefore decided that the charges should be introduced in three stages, in 2011, 2012, and 2013. The next stage will be in 2012 and will include charges for safety oversight, market oversight, and the issuing of authorisations.

3.1.6 - 3.1.8 The problem has been that few railway undertakings understand the differences between 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 respectively are found in one and the same document. It would be clearer to have separate documents for Parts A and B. The challenge is to make all the undertakings understand the purpose of a functioning safety management system, that it is not just about having the right documents. Small undertakings perceive certain requirements as bureaucratic.

3.1.9 No special structure for complaints or the submission of opinions on this has been introduced. During the authorisation process, communication between the Agency and the applicant is continuous, both by letter and by telephone, and applicants have the opportunity to express opinions and pose questions. For larger railway undertakings, there are frequent corporate meetings. Finally, there is always the possibility to lodge complaints on the Agency's decisions. The Swedish Transport Agency is developing an IT system that will facilitate the authorisation application process.

3.2 Queries, Part B safety certificates

3.2.1. Reasons for updating/amending Part B safety authorisations (e.g. variation in type of service, extent of traffic, type of vehicle, category of personnel, significant changes to operating procedures, etc.).

3.2.2. Main reasons if the mean issuing time for Part B safety certificate applications exceeds the four months specified in Article 12(1) of the Safety Directive (restricted to those referred to in Annex E and after 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. Summary of the problems with the using the harmonised formats for Part B safety certificates.

3.2.5. Summary of the common problems/difficulties for the NSA in application procedures for Part B safety certificates.

3.2.6. Summary of the problems mentioned by railway undertakings when applying for Part B safety certificates.

3.2.7. Is there a feedback procedure (questionnaire) that allows railway undertakings to express their opinion on issuing procedures/practices or to file complaints?

Replies

3.2.1 Two amended Part B authorisations; one amendment arose from increases in the volume of dangerous goods, and the other from the inclusion of passenger traffic.

3.2.2. No overrun occurred.

3.2.3 See reply to 3.1.5

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. (The reasons must be attributable to individual applications, e.g. new rail installations, new signalling systems, significant changes to operating procedures).

3.3.2. Main reasons if the mean issuing time for safety authorisation applications exceed the four months specified in Article 12(1) of the Safety Directive (restricted to those referred to in Annex E and after all the required information was received by the authority).

3.3.3 Summary of the regular difficulties in application procedures for safety authorisations.

3.3.4. Summary of the problems mentioned by infrastructure managers when applying for safety authorisations.

3.3.5. Is there a feedback procedure (questionnaire) that allows infrastructure managers to express their opinion on issuing 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 Amended organisation number (smaller IM), change in competence within management group (smaller IM).

3.3.2 No overrun occurred

3.3.3 Updates to the traffic safety instructions due to the introduction of the Swedish Transport Agency's regulation on traffic safety instructions.

3.3.4 Nothing in particular other than that the smaller infrastructure managers consider it bureaucratic.

3.3.5 Complaints can be filed in respect of all decisions. For the larger infrastructure managers, there are frequent corporate meetings.

3.3.6 See reply to 3.1.5.

G SAFETY OVERSIGHT

Oversight in the railway sector consists of safety oversight that includes railways, tramways, and metros. The oversight is aimed at operators' safety management systems and how they function in practice, to ensure that the operators detect any deficiencies themselves.

The selection of what/whom is to be inspected is risk-based. Inspections are intended to maintain and improve the current situation. The following two criteria are indicative of when oversight activities are conducted:

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

Furthermore, the aim is for the planning of oversight activities to be provisional. The planning is re-evaluated every quarter on the basis of events that have occurred. The planning also allows for the quick launch of a new inspection if an event so warrants. Oversight has thus become both

risk-based and event-based to enable a quick response to changes in the rail system. Both internal procedures and checklists have been prepared for oversight operations.

All audits are carried out by the Swedish Transport Agency's own personnel. Approximately six AWU (annual work units) are spent on safety oversight. This represents approximately 10% of the former Rail Department's total workforce. Oversight costs were approximately SEK 5 million (approximately EUR 538 000) in 2010.

The Swedish Transport Agency is currently mapping out how oversight is exercised within Roads and Railways, Maritime, and Aviation, which may result in new methods. One of the first results of the project is a common core training and in 2010 an oversight centre of competence (CoC) was also established.

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 (specified)**
3. Number of inspections of RU/IM in 2010	**Planned**	**0**	**6 (oversight of dangerous goods)**	**0**	**0**
	Unplanned (RU/IM not notified in advance)	**0**	**0**	**0**	**0**
	Carried out	**0**	**6 (oversight of dangerous goods)**	**0**	**0**

Table 8: Number of inspections: planned, unplanned and carried out in 2010.

A comparison between the number of inspections carried out and the number planned reveals that two were carried out and two were planned. That is a performance rate of 100%. Most of the Swedish Transport Agency's oversight consists of audits. The Agency uses four types of audit:

- A1 comprises a check by letter on part of the safety management system (SMS)
- A2 comprises interviews with management and verification with operational personnel focussing on one or more parts of the SMS
- A3 comprises interviews with management and verification with operational personnel focussing on the whole SMS
- FM is a meeting for exchanging information based on 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 2010	**Planned**	**76**	**76**	**61**	**0**
	Carried out	**113**	**113**	**104**	**0**

Table 9: Number of audits planned and carried out in 2010.

When an audit was performed regarding safety certificate A there was a simultaneous audit of safety certificate B. With regard to audits performed on safety authorisations issued, most were planned, but some were performed after an accident or incident or after the Swedish Transport Agency had in some other way obtained information that there might be a deficiency. 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.

		Quantity
RESULTS	Bans	1
	Orders	42
	Prosecutions	0

Table 10: Summary of results from oversight activities in 2010.

As can be seen in Table 10, oversight activities carried out in 2010 resulted in 43 bans and orders, with orders as the most typical outcome. Railway undertakings' and infrastructure managers' safety management systems essentially work well.

A number of accidents and incidents occurred in 2010 during work in the track environment. Because of this, great effort has gone into checking the operators' track work procedures and the measures being taken to prevent such things from happening again.

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.

As regards railway undertakings, the audits often revealed a large number of deviations that originate in the undertakings' inability to deal with their own safety management and internal follow-ups. The Swedish Transport Agency is continuing to work to overcome this problem, for example by focussing oversight on internal system audits.

The following A1 audits targeted at railway undertakings were carried out in 2010:

- 8 internal audits and investigations
- 1 on maintenance
- 2 on signalling failures
- 24 on valid insurance
- 1 on training status

H REPORTING OF THE APPLICATION OF COMMON SAFETY METHODS

Reporting was optional until the end of 2010. There is nothing is to report for 2010. The Swedish Transport Agency will pose questions to railway undertakings and infrastructure managers on their experiences with the implementation of common safety methods starting with next year's safety reports.

I CONCLUSIONS AND PRIORITIES

After a number of years with an unchanged number of accidents, 2010 was a dark year. For the first time in many years, a passenger died in a collision. The train on which the passenger was travelling collided with a backhoe on an adjacent track. Several passengers were seriously injured in the accident. During the year, there have also been accidents in which employees have been killed after being hit while working in the track environment. In response, the Swedish Transport Agency has put considerable effort into using their oversight activities to check the operators' track work procedures and the measures being taken to prevent this from happening again.

Another accident type that has increased is the death of unauthorised persons on railway premises. A large number of these consist of events in which the police have not ruled the cause to be either accident or suicide. The Swedish Transport Agency's Director-General has tasked the Road and Rail Department with producing an action plan to reduce the number of suicides in railway traffic.

The Swedish Transport Agency is currently mapping out how oversight is exercised within Roads and Railways, Maritime, and Aviation, which may result in new methods. The first result of the project was a common core training and in 2010 an oversight CoC was established. Since 1 January 2011, the Swedish Transport Agency has thus had three CoCs. In addition to the oversight CoC, there is also one for the processing of applications and one for HF/HTO[20]-related information. All CoCs operate from an intermodal perspective through which CoC work is intended to benefit the Agency as a whole.

Another area under development by the Swedish Transport Agency is a pilot project to gain access to the hospital records of persons who have been injured in marine and rail-related accidents. The Swedish Transport Agency already collaborates with hospitals with regard to road traffic accidents. Yet another area of development is an IT system to facilitate authorisation applications and other procedures.

The securing of timber transports was a problem reported in the previous year's report. The Swedish Transport Agency therefore started an intermodal project in 2010 that has now been completed. The project proposed that the Swedish Transport Agency should produce better (functional) and uniform rules for securing loads in maritime, road, and rail transport. This is to start in 2012. The issue of liability will be looked at in the autumn of 2011 and in December the Swedish Transport Agency is to submit proposals to the Swedish Ministry of Enterprise on how the liability issue should be handled. The project also found that the Swedish Transport Agency needs to know more about traffic accidents in which securing loads has been important so as to be able to assess how big the problem with deficient load securing actually is.

[20] Human factors / human, technology, and organisation

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 was made by the police. The category 'unauthorised persons on railway premises' includes events not yet classifiable as suicides or accidents. PM 2008:3, Socio-economic principles and calculation values for the transport sector: ASEK 4 *2005:16* of the former Statens institut för kommunikationsanalys [Institute for Communications Analysis] (SIKA) (now: Transport Analysis), has been used as the source for calculated values for lives – see below for further details. Data on Swedish Transport Agency operations in 2010 were acquired from unit managers of the Swedish Transport Agency's Railway Department's various units and internal records. Information on track and traffic data comes from the Swedish Transport Administration, which also compiles official statistics of this kind for Transport Analysis.

Definitions:
The definitions below are mostly taken from the Swedish Transport Agency's guidelines on the Swedish Rail Agency's regulations (JvSFS 2008:1) on accident and safety reporting for railways. The guidelines are also available on the Swedish Transport Agency's website at www.transportstyrelsen.se. The guidelines will be updated in and with the Swedish Transport Agency's newly adopted regulations on accident and safety reporting pursuant to 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 on the length of hospital stays are not always held by the police authorities.

- railway vehicles, the rail infrastructure, the environment, or property not being transported by the railway vehicle suffered damage to the tune of at least EUR 150 000 (approximately SEK 1.4 million)

- rail traffic on the track in question was completely stopped 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 compared with the accident statistics supplied to Eurostat

Because some infrastructure managers and railway undertakings are exempt from submitting safety reports (see Section B.2.1), the indicators are not a measure of 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 Transport Analysis's official statistics publication, "Bantrafikskador."

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 locomotive travelling on its own is considered to be a train.

Collision of trains, including collisions with obstacles within the clearance gauge - Collisions of trains are divided into two subgroups when the indicators are reported; collision of trains, 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 part of another train
- the rear part of another train
- the part of another train that is within the clearance gauge
- a vehicle involved in a shunting movement

Train impact refers to collisions between a train and

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

Note:
A train collision leading to derailment is reported as a train collision. The category "impact" also includes impacts with animals if this leads to a significant accident. A collision only between

vehicles, which are not being run as trains, is reported under the category of "other." 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 in which at least one wheel of a train leaves the rails.

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

Fire in rolling stock
Accidents involving fires or explosions occurring inside a moving railway vehicle (including the load). Fires or explosions that occur when a vehicle is stopped at an intermediate junction or during shunting at an intermediate junction are also to 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.

Note:
Fire also includes smoke 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 attached to, or that has become detached from, the 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 act to deliberately injure oneself resulting in death or serious injury; the Swedish Rail Agency verifies the information with the police authorities.

Level-crossing accident
An accident occurring at a level crossing involving at least one railway vehicle and one or more 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.

Note:
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.

Note:
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 being transported on and not fixed to the train and which fall from it, e.g. ballast, ice, etc.*

Definitions for death and serious injury

Passenger
A person travelling on the train who is not part of the train crew. For accident reporting purposes, persons trying to embark/disembark onto/from a moving train are included in the category of "passengers".

Note:
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, for example waiting for a train, are classified as "other".

Employee
A person who has a post associated with the railway and who is on duty when an accident occurs. This includes train crew and employees who work 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 present on railway premises where such presence is prohibited.

Others
A person who is not classified as a passenger, railway personnel, road user at a level crossing, or unauthorised person.

Definitions for deviations

If any of the deviations result 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 part or all of the train has, without authorisation, passed the reserved route’s end of movement.

Note:
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 uncontrollably 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 that gave rise to a risk of derailment or caused a derailment.

Broken axle
An axle fracture that gave rise to a risk of derailment or caused a derailment.

Broken rail
Any rail that is separated in two or more pieces, or any rail from which a piece of metal becomes detached, causing a gap of more than 50 mm in length and more than 10 mm in depth on the running surface.

Track geometry fault
All faults relating to track geometry requiring immediate shutdown or reduction of speed in order to maintain safety.

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

Note:
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

As regards CSIs which concern 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, as produced by SIKA in PM 2008:3 Socio-economic principles and calculation values for the transport sector: ASEK 4 *2005:16* (Samhällsekonomiska principer och kalkylvärden för transportsektorn). The calculated values are then multiplied by the number of fatalities and serious injuries. The annual mean exchange rate for 2010 of Sveriges Riksbank (the Swedish Central Bank) (9.5413) has been used: http://www.riksbank.se/templates/Page.aspx?id=43835, 2011-09-27.

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 actual costs. The reporting

operators have stated that this information is uncertain. Sveriges Riksbank's annual mean exchange rate for 2010 (9.5413) has been used: http://www.riksbank.se/templates/Page.aspx?id=43835, 2011-09-27.

Costs of delays due to accidents in 2010 have been reported for the state-owned infrastructure. The figure also includes accidents due to incidents as the Swedish Transport Administration has not been able to make a distinction between the two. The information on delay minutes, the value of time for travellers and the distribution of work commuters/leisure-time travellers comes from the Swedish Transport Administration. The Swedish Transport Administration has reported the values directly in euro.

Compensation for damage to the environment
The sum that in the operator's experience will have to be paid or was paid for restoring a damaged area to the condition it was in 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 existing equipment that cannot be repaired, and the costs for restoring damaged railway infrastructure or rolling stock to the same standards as before an accident. The costs are estimated by the operator on the basis of experience and include any costs for renting rolling stock during the period in which a vehicle is unavailable as the result of an accident.

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

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 kilometre
Unit of measure representing the movement of a train over one kilometre. The distance used is the distance actually run, if available, otherwise the standard network distance between the origin and destination are used. Only the distance travelled on Swedish territory is to 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/control system in service. An automatic train protection/control system is a technical system that monitors adherence to signalling information and speed restrictions by means of speed monitoring and automatic emergency stops at stop signals. The infrastructure manager must specify which such systems are in service. Examples of automatic train protection / control systems are ATC and ERTMS.

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

Track kilometres
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 track kilometres.

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

Level crossings
A level intersection between a railway and a road[21], designated by the infrastructure manager and open to public or private users.

Note: Passages between platforms within stations are excluded, as are passages over tracks for the sole use of employees.

Definitions related to safety management

Certain elements of the operator's safety management system[22] and the outcome of certain activities relating to the safety management system are to be described. The elements to be described are safety targets, action plans and system audits. The 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 the operation and the safety targets for the year to which the report 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 only partially met, the identified or suspected reason for this is indicated. 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 for safety-enhancing activities and the reason for deciding upon these safety-enhancing activities. Also describe the results of the action plans.

Describe the reason for developing the safety-enhancing activities in the action plans. If, for example, an event occurred that led to the safety-enhancing activities, give an overall description of the event or events, e.g. the type of accident, incident, major fault or major deficiency, the circumstances surrounding the event(s), the consequence(s) that could have resulted which are the reason(s) for the safety-enhancing measures.

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

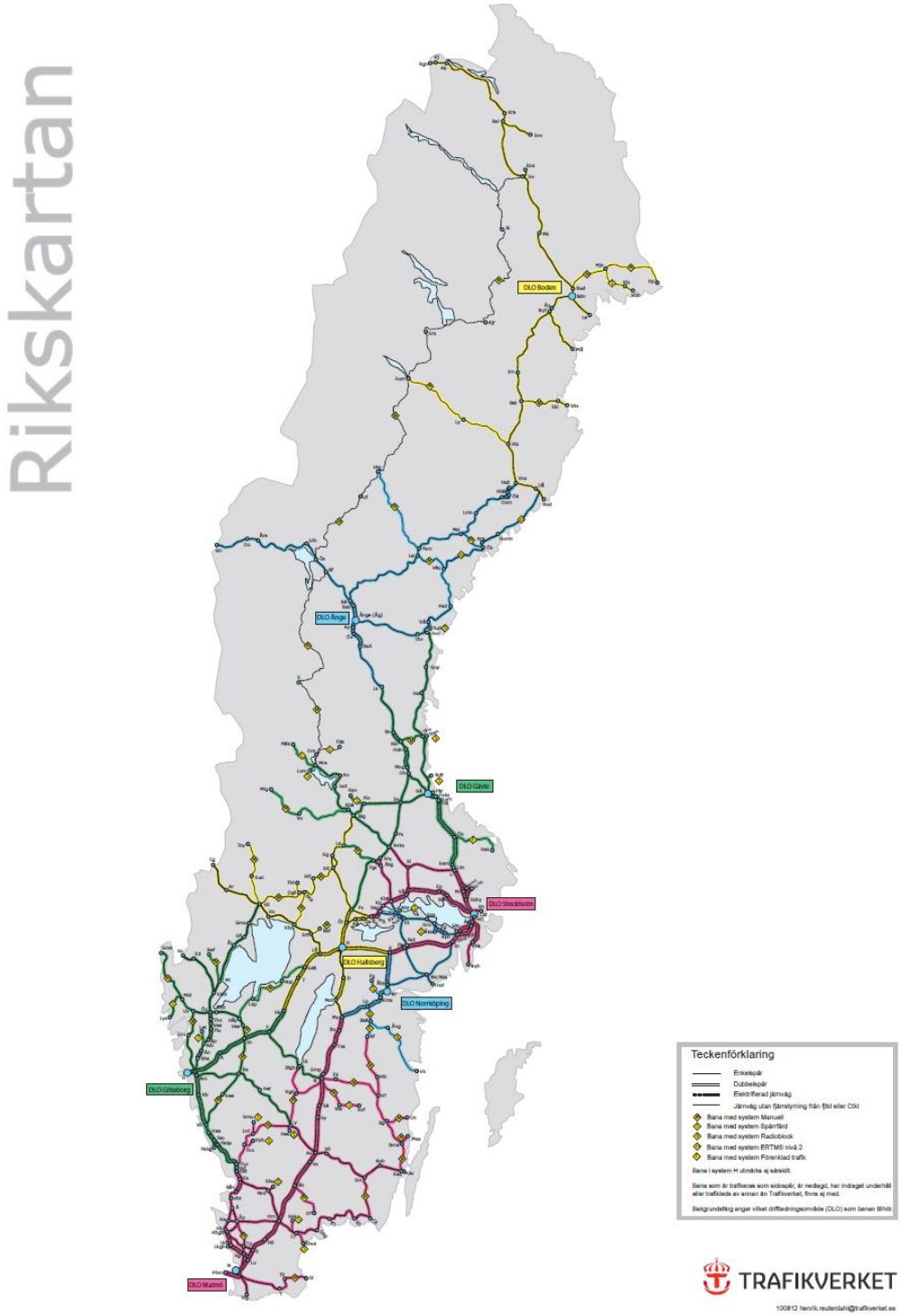
[22] Rules on safety management systems are stipulated in the Swedish Rail Agency regulations (JvSFS 2007:1) on safety management systems and other safety regulations for railway undertakings and in the Swedish Rail Agency regulations (JvSFS 2007:2) on safety management systems and other safety regulations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

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 the 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/Jarnvag/Trafikera/Driftsomradeskartor/ 2010-09-30.

Annex A.2: List of active infrastructure managers at the turn of 2010/2011

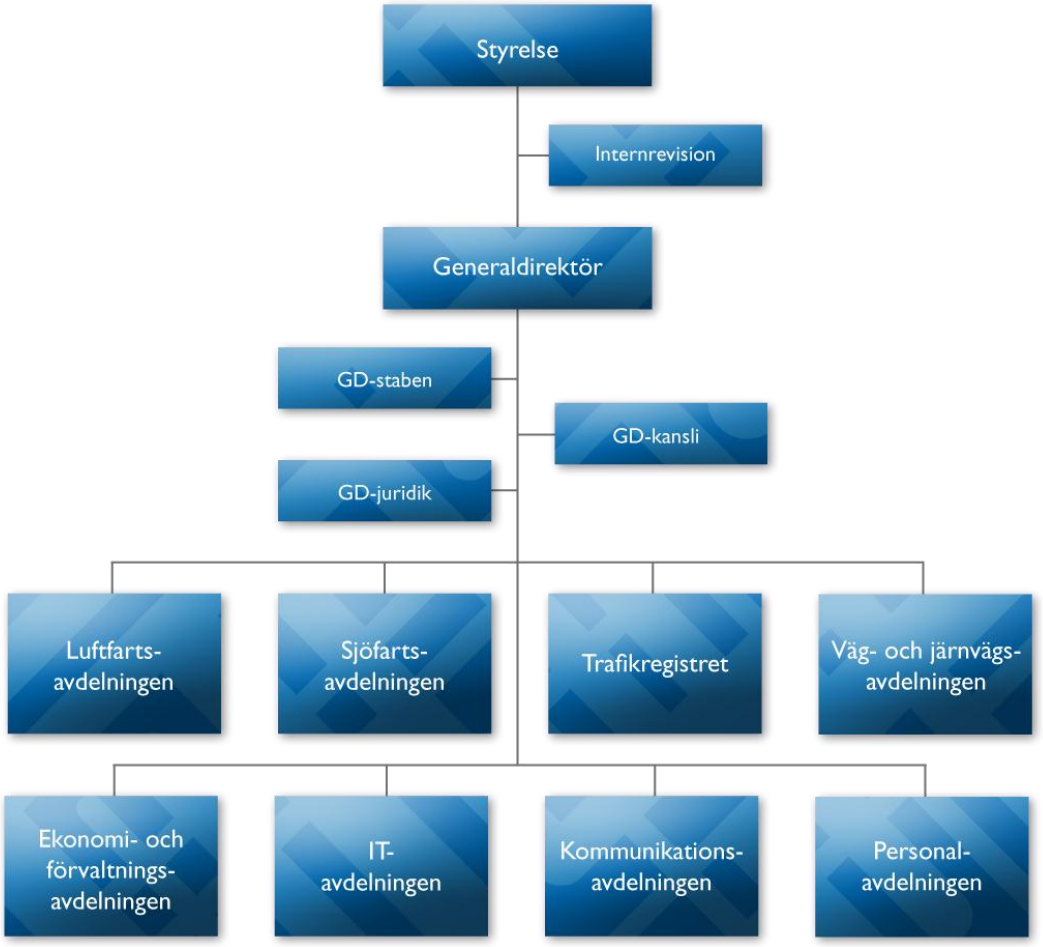
Because there are so many railway undertakings and infrastructure managers, the complete list is not attached to this report. However, contact us and we will prepare such a list.

Many of the infrastructure managers in the table below are exempted from reporting because 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 private goods.

Permit holders	**2010**
Railway undertakings	103
Infrastructure managers	420
Total	**523**

Table 1: Number of operators in 2010. The figures do not include transport operators and track owners that operate trams or metros unless they also are the railway undertaking or infrastructure manager.

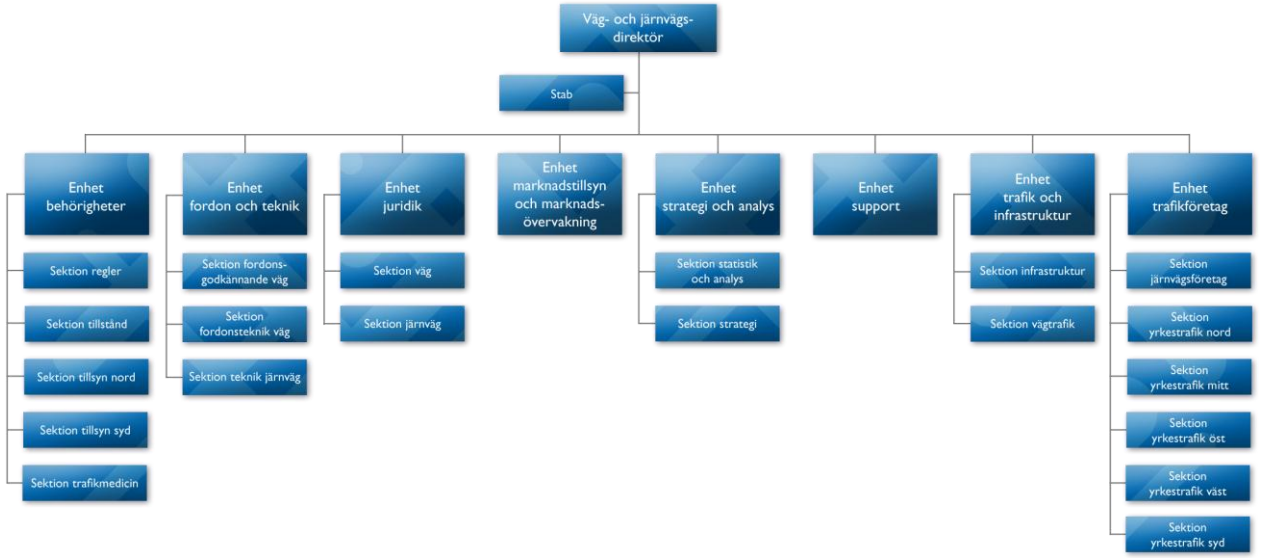
Annex B.1: Organisation Chart of the Transport Agency 2011



	Insert translation		*Insert translation*
Styrelse -	Board of Directors	Luftfartsavdelningen -	Civil Aviation Department

Internrevision -	Internal Audit	Sjöfartsavdelningen -	Maritime Department
Generaldirektör	Director-General	Trafikregistret	Traffic Registry
GD-staben	Office of the Director-General	Väg- och järnvägsavedelningen	Road and Rail Department
GD-juridik	Legal Division of the Director-General	Ekonomi- och förvaltningsavedelningen	Finance and Administration Department
GD-kansli	Registry of the Director-General	IT-avdelningen	IT Strategy Department
		Kommunikations-avdelningen	Communications Department
		Personal-avdelningen	Human Resources Department

Annex B.2: Organisation Chart of the Swedish Transport Agency's Road and Rail Department 2011



	Insert translation		*Insert translation*		*Insert translation*		*Insert translation*
Väg- och järnvägsdirektor	Road and Rail Director	Enhet fordon och teknik	Vehicle and technology unit	Enhet marknadstllsyn och marknads-övervakning	Market oversight and market surveillance unit	Enhet trafikföretag	Carriers unit
Stab	Staff	Sektion fordons-godkännande väg.	Road vehicle approval section	Enhet stragegi och analys	Strategy and analysis unit	Sektion järnvägsföretag	Railway undertakings section
Enhet behörigheter	Authorities unit	Sektion fordonsteknik väg	Road vehicle technology section	Sektion statistik och analys	Statistics and analysis section	Sektion yrkestrafik nord	Commercial traffic section - north
Sektion regler	Regulations section	Sektion teknik järnväg	Railway technology	Sektion strategi	Strategy section	Sektion yrkestrafik mitt	Commercial traffic section -

			section				center
Sektion tillstånd	Authorisation section	Enhet juridik	Legal unit	Enhet support	Support unit	Sektion yrkestrafik öst	Commercial traffic - east
		Sektion väg	Road section	Enhet trafik och infrastruktur	Traffic and infrastructure unit	Sektion yrkestrafik väst	Commercial traffic section - west
		Sektion järnväg	Railway section	Sektion infrastruktur	Infrastructure section	Sektion yrkestrafik syd	Commercial traffic section - south
Sektion tillsyn nord	Oversight section - north			Sektion vägtrafik	Road traffic section		
Sektion tillsyn syd	Oversight section - south						
Sektion trafikmedecin	Traffic medicine section						

Annex C: Statistical data, common safety indicators

See the Excel file "2011 Swedish CSI data form." The information has also been directly uploaded into 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	Chapter 2, § 3 a of the Railway Ordinance (2004:526) Chapter 2, § 1 b of the Railway Ordinance (2004:526)	15/12/2010 15/12/2010	2009/149/EC	The fact that Directive 2004/49/EC was last amended by Directive 2009/149/EC has been added to the ordinance text.
Legislation concerning notified body, assessor, third parties' bodies for registration, examination, etc.	The Swedish Transport Agency regulations (TSFS 2010:116) on the approval of railway subsystems	01/08/2010	The Swedish Rail Agency regulations (JvSFS 2006:1) on the approval of subsystems in railways, etc., were in need of an update. JvSFS 2006:1 was repealed on 1 August 2010.	In conjunction with the introduction of the new regulations, the term "independent reviewer" was chosen over "assessor".
National provisions concerning rail safety				
Provisions concerning national safety targets and safety practices	No change			

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
Provisions concerning requirements of safety management systems and the issuing of safety certificates to railway undertakings.	No change			
Provisions concerning requirements of safety management systems and the issuing of safety authorisations to infrastructure managers	No change			
Provisions concerning requirements of vehicle keepers.	No change			
Provisions concerning requirements of maintenance workshops.	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 authorisation to place into 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.	The Swedish Transport Agency regulations (TSFS 2010:116) on the approval of railway subsystems	01/08/2010	The Swedish Rail Agency regulations (JvSFS 2006:1) on the approval of subsystems in railways, etc., were in need of an update. JvSFS 2006:1 was repealed on 1 August 2010.	New regulations on the approval of railway subsystems.
	The Swedish Transport Agency regulations (TSFS 2010:167) on technical specification for interoperability of the subsystem "Rolling stock – freight wagons," in the railway system for conventional trains.	01/12/2010	The Swedish Rail Agency regulations (JvSFS 2006:10) on technical specification for interoperability of the subsystem, "Rolling stock" for the freight wagons of conventional trains, was in need of an update on account of Commission Decision 2009/107/EC. JvSFS 2006:10 was repealed on 01 December 2010.	EC Commission Decision 2009/107/EC adopted in Swedish law.

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
Common rules for operating the railway network, including regulations affecting procedures for signalling and traffic.	The Swedish Transport Agency's regulations (TSFS 2010:1) amending the Swedish Rail Agency traffic regulations (JvSFS 2008:7) The Swedish Transport Agency's regulations (TSFS 2010:163) amending the Swedish Rail Agency traffic regulations (JvSFS 2008:7)	01/03/2010 12/12/2010		Necessary update of JvSFS 2008:7, Necessary update of JvSFS 2008:7,
Provisions concerning requirements for additional internal operational provisions that must be established by the railway undertakings and infrastructure managers.	No change			
Provisions concerning requirements of personnel with duties that are significant for traffic safety, including selection criterion, health requirements, occupational training, and certification.	No change			

	Legal reference	Date legislation enters into force	Reason for introduction (specify new law or amendment to existing legislation)	Description
Provisions concerning the investigation of accidents and incidents, including recommendations	No change			
Provisions concerning requirements for CSIs, including reporting and analysis.	New regulations required on account of Directive 2009/149/EC recently adopted. Will be issued in autumn 2011.	Autumn 2011 (date undecided at the submission of this report)	2009/149/EC	The regulations that specify what information infrastructure managers and railway undertakings have to submit has been replaced as a result of amendments to the Railway Safety Directive.
Provisions concerning authorisation requirements to place railway infrastructure into service (tracks, bridges, tunnels, ATC, radio, signalling, interlocking, level crossings, platforms etc.).	The Swedish Transport Agency regulations (TSFS 2010:116) on the approval of railway subsystems	01/08/2010	The Swedish Rail Agency regulations (JvSFS 2006:1) on the approval of subsystems in railways, etc., were in need of an update. JvSFS 2006:1 was repealed on 01 August 2010	New regulations on the approval of railway subsystems

Annex E: The development of safety certification and authorisation

E.1 Safety certification pursuant to Directive 2001/14/EC

Number of safety certificates issued under Directive **2001/14/EC** to railway undertakings in 2010	In own country	0
	In another Member State	0

Comments on E.2-E.6: A "?" has been placed in the boxes when the Swedish Transport Agency is unsure how to respond to the information. The Agency has raised the issue with ERA, which has come up with a new proposal for Annex E. The proposal has not yet been adopted and the Swedish Transport Agency is therefore reporting in accordance with the current format. If you would like 2010's data in the as yet not adopted new format, please contact us.

E.2 Safety certification pursuant to Directive 2004/49/EC

		New	**Updated/ amended**	**Renewed**
E.2.1. Number of valid Part A safety certificates held by railway undertakings in 2010 registered	in Sweden	8	1	2
	in another Member State	?	?	?

		New	**Updated/ amended**	**Renewed**
E.2.2. Number of valid Part B safety certificates held by railway undertakings in 2010 registered	in your own country	10	1	2
	in another Member State	0	0	0

			Accepted	Rejected	Pending
E.2.3. Number of applications for Part A safety certificates submitted by railway undertakings in 2010 registered	in Sweden	New certificates	8	0	0
		Updated/amended certificates	1	0	0
		Renewed certificates	2	0	0
	in another Member State	New certificates	?	?	?
		Updated / amended certificate	?	?	?
		Renewed certificates	?	?	?

			Accepted	Rejected	Pending
E.2.4. Number of applications for Part B safety certificates submitted by railway undertakings in 2010 registered	in Sweden	New certificates	10	0	0
		Updated/amended certificates	1	0	0
		Renewed certificates	2	0	0
	in another Member State	New certificates	0	0	1
		Updated/amended certificates	0	0	0
		Renewed certificates	0	0	0

E.2.5

List of the countries in which railway undertakings that are applying for or have applied for Part B certificates in Sweden have their Part A certificates:

- Norway, Denmark

E.3. Safety authorisation pursuant to Directive 2004/49/EC

	New	Updated/ amended	Renewed
E.3.1. Number of valid safety authorisations held by infrastructure managers in 2009 registered in Sweden.	95	25	0

		Accepted	Rejected	Pending
E.3.2. Number of applications for safety authorisations submitted in 2009 by infrastructure managers registered in Sweden	New authorisation	95	0	0
	Updated/amended authorisation	25	0	0
	Renewed authorisation	0	0	0

E.4. Procedural aspects – Part A safety certificate

		New	Updated/ amended	Renewed
Processing time (average) after having received all necessary information, between the receipt of an application and the final decision on a Part A safety certificate in 2009 for railway undertakings	Certificate issued by Sweden	2 weeks/2-3 months	2 weeks/1 month	-
	Certificate issued by another Member State	?	?	?

In Tables E.4, E.5, and E.6, the time of two weeks is the average time between the receipt of all necessary information and a safety certificate decision, while 2-3 months and 1 month are the average time between the first application and a safety certificate decision.

E.5. Procedural aspects – Part B safety certificate

		New	Updated/ amended	Renewed
Processing time (average) after having received all necessary information between the receipt of an application and the final decision on a Part B safety certificate for railway undertakings in 2010	Certificate issued by Sweden	2 weeks/ 2-3 months	2 weeks/1 month	-
	Certificate issued by another Member State	?	?	?

E.6. Procedural aspects – Safety authorisations

		New	Updated/ amended	Renewed
Processing time (average) after having received all necessary information between the receipt of an application and the final decision of safety authorisation for railway undertakings in 2010	Certificate issued by Sweden	2 weeks/ 2-3 months	2 weeks/2-3 months	-
	Certificate issued by another Member State	?	?	?