

# Safety report for the railways 2012

September 2012

Summarv

### Foreword

Railway safety was again very high in 2012. Unfortunately, however, the excellent result for 2011, when no one was killed in accidents at level crossings, could not be maintained in 2012, when accidents at level crossings resulted in two deaths. Nevertheless, Denmark is still doing pretty well, both when we compare ourselves with the rest of Europe, and when we look at the development of railway safety in Denmark over time.

It is the Danish Transport Authority's goal that only those changes that have the greatest potential impact on railway safety, or which are most difficult for undertakings to handle, shall have authorisation to be placed into service.

A prerequisite for this is that undertakings have effective safety management systems, which ensure that undertakings are in control of their own risks at all times.

Even if the operational safety of day-to-day traffic is in order, the Danish Transport Authority believes undertakings still face challenges in getting their safety management systems to work.

In 2012, the Danish Transport Authority therefore launched a major effort aimed at guiding undertakings in their work with safety management systems. This work will continue in 2013.

The Danish Transport Authority hopes that the report can contribute to an exchange of experience and inspiration in the Danish railway sector. The report will also be used to exchange experience among the EU Member States and will be submitted to the European Railway Agency (ERA).

Happy reading!

Jesper Rasmussen

Deputy Director

Safety report for the railways Summary 2011

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### Introduction – DK

### Jernbanesikkerheden i Danmark er høj...

Danmark har som mål, at det høje sikkerhedsniveau (målt med udgangspunkt i 2004) skal opretholdes. Der må maksimalt være 0,3 dræbte eller alvorligt tilskadekomne personer pr. mio. tog-km (FWSI). Målsætningen har karakter af et loft over det antal af personskader på jernbanen, der er acceptabelt.

Danmark har i alle årene siden 2004 opfyldt målsætningen og også i år ligger sikkerhedsniveauet væsentligt under de 0,3 pr. mio. tog-km. I 2012 er antallet af væsentlige personulykker på 0,14 pr. mio. tog-km. Dette er på niveau med de bedste lande i Europa.

I 2012 er 11 personer blevet dræbt på jernbanen, mens 12 personer er kommet alvorligt til skade. Tallene ligger en smule højere end sidste år, men er på niveau med det femårige gennemsnit.

Ulykker, hvor passagerer kommer alvorligt til skade eller bliver dræbt, sker sjældent, men i 2012 er en passager blevet dræbt, da han forsøgte at komme ud af et tog, som var i bevægelse og derved faldt ned mellem tog og perron. Det er første gang siden 2005, at en passager er blevet dræbt i en jernbaneulykke.

### ... dog er udviklingen i selvmord på jernbanen bekymrende

Selvmord betragtes almindeligvis ikke som jernbaneulykker, og de indgår derfor heller ikke i statistikken over jernbaneulykker. Årsagen er, at selvmord på jernbanen ikke som sådan adskiller sig fra selvmord, som finder sted andre steder.

Selvmord kan dog have store konsekvenser for lokomotivførernes arbejdsmiljø – samt ikke mindst for de efterladte, og det er derfor vigtigt også at forebygge selvmord. Opgørelsen over selvmord på jernbanen er behæftet med nogen usikkerhed, men man kan alligevel aflæse, at mens antallet af selvmord har ligget nogenlunde stabilt på ca. 25 til 30 selvmord pr år i perioden 2006-2011, så har 44 personer begået selvmord på jernbanen i 2012. Denne udvikling er bekymrende. I 2013 indleder Trafikstyrelsen derfor dialog med branchen om dette problem.

### I 2012 har virksomhederne høstet de første erfaringer med signfikansvurderinger...

Fra 2012 har virksomhederne ifølge EU-reglerne været forpligtede til at signifikansvurdere alle tekniske ændringer, som kan påvirke jernbanesikkerheden. Signifikansvurderingen virker som en screening, som bruges til at afgøre, om en ændring skal have en ibrugtagningstilladelse af Trafikstyrelsen, dvs. en slags bagatelgrænse. Målet er, at kun de ændringer, som har de største potentielle negative konsekvenser, og som er sværest at håndtere for virksomheden, skal have en ibrugtagningstilladelse. Virksomhederne forventes ved brug af deres sikkerhedsledelsessystem gradvist at kunne løfte mere selv.

På infrastrukturområdet har virksomhederne i 2012 været forpligtede til at indsende alle signifikansvurderinger til vurdering i Trafikstyrelsen. Dette har gjort det muligt at vejlede virksomhederne om, hvordan signifikansvurderingskriterierne skal anvendes. Arbejdet fortsætter i 2013.

På køretøjsområdet har virksomhederne kun været forpligtede til at indsende de ændringer til Trafikstyrelsen, som de vurderede var signifikante, da Trafikstyrelsen anså sikkerhedsledelsessystemerne hos jernbanevirksomhederne som mere indarbejdede. Da Trafikstyrelsen kun havde modtaget et fåtal af signifikansvurderinger på køretøjsområdet i 2012, blev der ultimo 2012 igangsat en undersøgelse af jernbanevirksomhedernes organisering og erfaring med signifikansvurderinger. Konklusionerne fra undersøgelsen danner grundlag for Trafikstyrelsens vejledning af jernbanevirksomhederne om signifikansvurderinger i 2013.

### ... og markedet for assessorer er blevet udvidet

I 2012 har signifikante ændringer skulle tilknyttes en assessor – dvs. en uvildig og kompetent 3. part, som jf. EU-forordningen for risikovurdering (CSM-RA) vurderer, om risikovurderingsprocessen er fulgt og resultatet er sikkerhedsmæssigt i orden.

Der er derfor kommet et meget større behov for assessorer end tidligere. For at støtte markedsdannelsen blandt assessorerne har Trafikstyrelsen oprettet et Assessorforum, hvor principielle spørgsmål er blevet diskuteret mellem assessorer og Trafikstyrelsen. Arbejdet med Assessorforum fortsætter i 2013.

### Virksomhederne har fortsat udfordringer med deres sikkerhedsledelsessystemer...

Togdriften vurderes i dag som sikker, men generelt lader der til at være problemer med sammenhængen mellem virksomhedernes sikkerhedsledelsessystemer og det reelle arbejde i driften. Det er vigtigt, at sikkerhedsledelsessystemerne anvendes til at styre risici, så der også opretholdes en sikker drift på sigt. Særligt savner Trafikstyrelsen, at virksomhederne gør sig klart, hvilke risici de administrerer i form af en klar risikoprofil. En sådan risikoprofil er central for at få et sikkerhedsledelsessystem til at fungere.

### ... hvorfor Trafikstyrelsen vil gøre mere for at vejlede virksomhederne i 2013.

Mange virksomheder skal have fornyet deres sikkerhedscertifikat eller sikkerhedsgodkendelse i de næste par år.

Trafikstyrelsen har konstateret, at der er brug for yderligere vejledning af virksomhederne i, hvordan man opbygger et sikkerhedsledelsessystem.

For at hjælpe virksomhederne til at forbedre de eksisterende sikkerhedsledelsessystemer, gør Trafikstyrelsen i 2013 mere for at vejlede virksomhederne i, hvordan de kan arbejde med deres risikoprofil og gøre den styrende for deres sikkerhedsledelsesarbejde.

Dette gør Trafikstyrelsen ved at holde møde med hver af virksomhederne og ved at lave en ny Vejledning i Sikkerhedsledelse.

## Introduction - ENG

### Railway safety is high in Denmark...

The Danish safety target is that the high level of safety (based on the safety performance of the year 2004) is maintained. In order to do so, the total number of fatalities or severely injured people per million train-km (FWSI) may not rise above 0.3. The target functions as a cap on the acceptable number of injuries and fatalities on the Danish railway.

Ever since 2004 Denmark has complied with the cap and in 2012 the safety level is once again considerably below the 0.3 per million train-km. In 2012 the number of fatalities or severely injured people per million train-km reached 0.14. This places Denmark among the best performing countries in Europe.

11 people were killed on the railway in 2012 while 12 people were severely injured. These figures are slightly higher than the year before but are in line with the 5-year average.

Accidents where passengers are severely injured or killed rarely happen, but in 2012, a passenger was killed when he tried to exit a moving train and thus fell into the gap between the train and the platform. This was the first time since 2005 that a passenger has been killed in a railway accident.

# ... however, the development in the number of suicides on the railway is worrying

Suicides are generally not regarded as railway accidents, and they are therefore not included in the railway accident statistics, the reason being that suicides on the railway do not differ from suicides taking place elsewhere.

However, suicides on the railway may have severe implications on the work environment of the train drivers – and of course on the bereaved. Therefore it is also important to prevent suicides. In spite of the uncertainties in the suicide statistics, it is possible to assess that while the number of suicides has been relatively stable at approximately 25-30 suicides per year in the period 2006–2011, 44 people committed suicide on the railway in 2012. This trend is worrying. The Danish Transport Authority will initiate a dialogue with the companies on the matter in 2013.

# In 2012, companies have gained initial experience with assessing significance...

From 2012, the companies are required under EU law to determine the significance of all technical changes that may affect railway safety. The significance assessment functions as a screening used to determine if the change requires an authorization for placing in service, i.e. the significance assessment works as a kind of threshold limit. The aim of this setup is that only changes that potentially have the most severe negative consequences and which are the most difficult to handle for the companies, must be authorised by the Danish Transport Authority.

The companies are expected to gradually handle more changes themselves (without the need for authorisation) through the use of their own safety management systems.

Summary

In 2012, the infrastructure managers were required to submit all significance assessments to The Danish Transport Authority, irrespective of the result of the significance assessment. As a result the Danish Transport Authority has been able to provide guidance to the railway sector on the interpretation and use of the significance criteria. The infrastructure managers will continue to submit all significance assessments to the Danish Transport Authority in 2013.

The railway undertakings have only been required to submit the significance assessments of the changes that they considered significant. The reason for employing different schemes for infrastructure managers and railway undertakings is that The Danish Transport Authority considers the safety management systems of the railway undertakings as being better integrated in the railway undertakings, due to a longer period of experience with safety management systems. Because The Danish Transport Authority has only received a small number of significance assessments from the railway undertakings in 2012, it was decided to initiate a study on how these companies organize their work on significance assessments and what experiences they have had. The conclusions from this study will help the Danish Transport Authority guide the companies on how to assess the significance of a change.

### ... and the market for assessors has been developed

From 2012 and onwards the implementation of significant changes are to be assessed by an assessment body – i.e. an independent and competent third party in accordance with the Common Safety Methods on Risk Assessment (CSM-RA). The assessment body assesses whether the management process complies with CSM-RA and whether the end result is safe.

As a consequence, the need for assessment bodies has become more extensive. In order to support the increasing demand, the Danish Transport Authority has initiated a forum for would-be assessment bodies. The forum deals with questions pertaining to the work of and requirements to an assessment body. The forum will convene again in 2013.

# Some companies still have challenges with their safety management systems...

The railway is considered safe, but there seems to be general problems with the link between the safety management system and the actual dayto-day work in the companies. It is important that the safety management systems are used to managing risks as well as sustaining a safe operation in the long term. Especially, the companies neglect to define the risks they are managing in the form of a risk profile. It is vital to have a risk profile if the safety management system is to function properly.

# ...why the Transportation Authority will do more to guide the companies in 2013.

Many companies will be renewing their safety certificate or safety approval within the next few years.

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The Danish Transport Authority has become aware of a need for additional guidance on how to put together a safety management system.

In order to help the companies improve their existing safety management systems, The Danish Transport Authority will make an effort to provide more guidance in 2013 on how companies can work with their risk profiles and use these profiles to guide their safety work.

The Danish Transport Authority will do this by meeting with each of the companies and by publishing a guide on safety management.

## About the safety report

The safety report is published every year in late September for the previous year. The reason for the relatively late date of publication for an annual report is partly that the Danish Transport Authority only receives the last data from the undertakings in June, and partly that it is an extensive process to validate the information on incidents and accidents on the railways, as reported by the undertakings.

The safety report is made up of the following chapters, as well as a number of annexes:

- **Chapter 1** comprises a review of accidents and incidents on the railways in the past year. The information comes from the undertakings, and in this chapter the Danish Transport Authority assesses how things are looking in terms of railway safety in Denmark.

- **Chapters 2 and 3** concern themselves with the Danish Transport Authority's supervisory work and the authorisations issued by the Danish Transport Authority in the course of the year. Both chapters provide a statement of affairs as at 2012 and suggest how the problems identified in the undertakings have affected how the supervisory and authorisation work will be prioritised in 2013.

- **Chapter 4** looks at changes in legislation in the railways sector. The chapter also includes a statement of affairs as regards international work on the railways in which the Danish Transport Authority is involved.

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### Chapter 1. Accidents and incidents

Accident data for 2011 show that safety levels on Danish railways are still generally high, although there was an increase in the number of suicides

### Accidents, incidents and safety irregularities

There are approximately 2700 km of railway line in Denmark. A large part is equipped with effective train control systems, which, together with competent operators, make serious accidents highly unlikely. The equipment is mainly used on those lines where traffic flow is fast and capacity is greatest (see also figures for the rail system in Annex 1).

Railway undertakings and infrastructure managers are required continually to follow up on accidents, precursors of accidents and safety irregularities that occur in their area.

It is part of the undertakings' safety management system to carry out an investigation when something goes wrong. In the most serious cases, the Accident Investigation Board for Civil Aviation and Railways helps establish the chain of events and possible causes of the fault in the system.

Once a year all the data are passed on to the Danish Transport Authority, which analyses developments in rail safety nationwide. The results are set out in this chapter of the annual safety report.

All accidents, precursors of accidents and safety irregularities are reported in accordance with the 'Reporting Executive Order'<sup>1</sup>. The definitions used are listed in Annex 3. Annex 4 contains an overview of the data. To minimise statistical uncertainty when indicating relatively small data volumes, the 5-year average is used to assess developments in railway safety.

### Significant accidents – slightly more than last year

Railway accidents are described in the following categories: collisions, derailments, accidents at level crossings, collisions with persons, fire and other accidents. Suicides that occur on the railways are not treated as railway accidents. Read more about suicides on the railways later in this chapter.

There are just under 400 railway accidents a year in Denmark. Fortunately the vast majority of these accidents have few, if any, harmful consequences. For example, a collision between a train and a deer or a train and a shopping trolley that has been left on the rails will only rarely have consequences for either stock or passengers.

To distinguish between accidents with and without major consequences, the concept of *significant accidents* is used. Significant accidents are those that cause serious personal injury, death, damage of more than DKK 1.2 million or delays to train operations of more than six hours. Fewer than one-tenth of railway accidents in Denmark are 'significant accidents'.

<sup>&</sup>lt;sup>1</sup> Executive Order No 575 of 25 May 2010 concerning the reporting of data on accidents, precursors to accidents and safety irregularities, etc. to the Danish Transport Authority, *as amended*.

The number of significant accidents increased slightly between 2011 and 2012, from 20 significant accidents in 2011 to 25 significant accidents in 2012. As can be seen in figure 1, there was also a slight rise in the 5-year average.

Figure 1. Significant accidents 1999–2012



Significant accidents per year and per million train-kilometres, 1999-2012

Significant accidents are train accidents involving damage of over DKK 1.2 million, death or serious injury, or delays to train operations of more than six hours. The significant accidents are shown per year and per million train-kilometres.

In 2012, no accidents caused more than two instances of serious personal injury at the same time. There was one collision, one fire and one derailment, all types of accident that have the potential to cause extensive damage, while the majority of the significant accidents, 20 out of the 25, were accidents at level crossings or collisions involving persons.

As can be seen in figure 2, the increase in the number of significant accidents in 2012 conceals a slight increase in the number of accidents at level crossings and collisions involving persons. However, the extent of significant accidents in both accident types lies within the previously seen variation in relation to the 5-year average.

The number of collisions, fires and derailments is slightly above the 5-year average, but other significant accidents are below the 5-year average.



Figure 2. Significant accidents broken down by type of accident

Accident types are given per million train-km for 2011 and as a 5-year average in the period 2008-2012. Suicides are not included.

The change in the different types of accident is an expression of the fact that there is only a small volume of data. The annual change corresponds to a fall or rise of approximately one or two significant accidents in comparison with the average.

### Safety target for the railways – met for 2012

While *significant accidents* are a measure of the number of accidents with major consequences, *significant accidents involving persons* are a measure of the number of accidents involving serious personal injury, with the accident being weighted according to the consequences.

Significant accidents involving persons are a weighted total of the number of persons killed (weighted 1/1) and seriously injured (weighted 1/10) over the year on the railways.

Since the Danish Transport Authority's primary focus is to avoid deaths and injuries, the safety target for the railways has been set on the basis of the average number of 'significant accidents involving persons', taking 2004 as the base year<sup>2</sup>. The Danish Transport Authority uses the safety target to assess whether safety on the railways is acceptable.

<sup>&</sup>lt;sup>2</sup> cf. the strategy 'Den fælleseuropæiske jernbane – Strategi for sikkerhed og smidig gennemførsel i Danmark' [The common European railways – Strategy for high levels of safety and smooth implementation in Denmark], Danish Transport Authority, February 2009.

Compliance with the safety target is assessed on the basis of changes in the number of significant accidents involving persons for all railway lines in Denmark. Significant accidents involving persons are given as a 5-year average and scaled up to train-km travelled.

Figure 3 shows a downward trend in the 5-year average from 2004 to 2011. In 2012 the average rose slightly again, but the number of injuries and deaths is still very low compared with previous years.



Significant accidents involving persons (FWSI) per year and per million train-km, 1999-2012



'Significant accidents involving persons' are a weighted total of the number of persons killed (weighted 1/1) and seriously injured (weighted 1/10). The statistics cover all groups of persons. Suicides are not included. The significant accidents involving persons are shown per year and per million train-kilometres.

The national safety target is still that the number of significant accidents involving persons on the railways in Denmark should be less than 0.3 per million train-km in the 5-year average. The target was met in 2012.

In 2012, the number of significant accidents involving persons was 0.14 per million train-km.

The number of significant accidents involving persons in the period 2008-2012 was on a par with previous years, and also well below the national safety target of 0.3 significant accidents per million train-km.

# Breakdown of accidents involving persons – a passenger was killed for the first time in seven years

The number of personal injuries in railway accidents in Denmark in 2012 was again very low. In all, 11 people were killed and 12 seriously injured – excluding suicides.

Out of the 11 people who were killed in railway accidents in 2012, one was a passenger, while two were level-crossing users. Three people were 'other', while the remaining five people were on railway property without permission.

In total, 12 people were seriously injured in railway accidents. Of these, one was a passenger, one was a railway employee, four were level-crossing users, while six people were on railway property without permission.

The number of deaths rose from 6 to 11 between 2011 and 2012, while the number of serious injuries fell from 13 to 12.

The difference between the two years is due to a very low number of accidents at level crossings in 2011. The number of accidents at level crossings in 2012 was on a par with previous years.

While no one was killed and three people were seriously injured in accidents at level crossings in 2011, two people were killed and four people were seriously injured in 2012.

Table 1, which contains an overview of the most recent 5-year period, shows that collisions involving persons represented almost 70% of the total number of significant accidents involving persons in the period. Accidents at level crossings represented around 25% of the total number. The remaining accidents were mainly 'other accidents' involving, for example, situations where people who are on railway property without permission have come into contact with the traction current.

Type of accident	Significant accidents	Significant accidents (%)	Significant accidents involving persons	Significant accidents involving persons (%)
Collisions with persons	72	57.1	41.5	69.5
Accidents at level crossings	23	18.3	14.5	24.3
Hazardous goods	9	7.1	0	0
Other accidents	12	9.5	3.6	6.0
Collision of trains	4	3.2	0.1	0.2
Derailment	4	3.2	0.1	0.2
Fire	2	1.6	0	0
Total:	126	100	59.7	100
Average per year:	25		11.9	

Table 1. Significant accidents involving persons and significant accidents involving persons broken down by type of accident 2009–2012

The table shows significant accidents and significant accidents involving persons broken down by type of accident over a 5-year period. Significant accidents are those where significant material damage or injury occurred. Significant accidents involving persons are a weighted total for persons killed (weighted 1/1) and seriously injured (weighted 1/10). Suicides are not included.

### Collisions with persons and suicides on the railway

Suicide is not viewed as a railway accident in the traditional sense. This is due to the fact that the causes of suicide are not directly related to the way railways are operated. Suicide on the railways is no different from suicide in other locations, and should be prevented in the same way as other suicides.

Nevertheless, it is interesting to monitor the number of suicides on the railways. Besides the fact that suicide and attempted suicide obviously have very serious consequences for those who choose to take their own lives, and their relatives, suicide also has serious repercussions for train drivers and a general negative effect on the railways.

In the reports for 2012 it can be seen that undertakings have started to record the train drivers as a minor injury when he or she has been involved in a collision involving persons. This new recording practice is helping to show that suicides (and other types of collisions involving persons) have consequences for the operation of the railways and for the psychological work environment among train drivers<sup>3</sup>.

There are therefore many reasons why it is important to prevent suicides wherever possible.

In 2012 the number of suicides was unusually high. 44 people committed suicide on the railways in 2012, compared with 26 suicides in 2011. The 5-year average reflects this increase in the number of suicides. See figure 4.

<sup>3</sup> Since train drivers are only recorded as minor injuries, they are not included in the figures for accidents involving persons, as these only take serious injuries and deaths into consideration.

Figure 4. Number of suicides 2006 -2012



*Suicides resulting in a fatality. Suicides are recorded on the basis of witness statements and police decisions. Note that there is a lack of data prior to 2006.* 

As Statistics Denmark's figures on the number of suicides<sup>4</sup> had not been updated for 2012 at the time of this report's publication, it is not possible to determine whether the increase in the number of suicides on the railways is part of a general trend.

It must be borne in mind that figures for suicides on the railway entail some uncertainty. One source of uncertainty is that it is not always possible to decide whether, when an accident first happens, it involves a suicide or a collision with a person. A further source of error is that some suicides are mistakenly recorded as attempted suicides<sup>5</sup>.

However, there is nothing to suggest that the high number of suicides can be explained by data uncertainty and is therefore not real. If the reason for the large number of suicides was that a larger proportion of the collisions had been categorised as suicides compared with last year, one would expect a decline in the number of collisions involving persons in 2012. On the contrary, there was a slight increase in the number of collisions involving persons in 2012, as figure 5 shows.

<sup>&</sup>lt;sup>4</sup> www.statistikbanken.dk/FOD507

<sup>&</sup>lt;sup>5</sup> Infrastructure managers and operators are responsible for submitting information on suicides to the Danish Transport Authority. Since they do not collect information from hospitals, the infrastructure managers and operators do not know how many of those who attempt suicide on the railway later die from their injuries.

Those injured in collisions with persons are typically on railway property without permission and are hit by trains. The category therefore also includes accidents in which people are injured while in the train<sup>6</sup>, for example as a result of a fall or falling luggage. In 2012, nine people were killed and five seriously injured after being hit by a train. One passenger was seriously injured after falling in the train when the train braked hard, and one employee fell from a work vehicle and was seriously injured.







Number of significant accidents involving collisions with persons that resulted in either death or serious injury. This does not include suicides or accidents at level crossings. The number of collisions involving persons is shown per year and per million train-kilometres.

#### Breakdown of injuries by group of persons

In 2012 one passenger was killed when he tried to alight from a train that had just set off. The passenger fell between the platform and the train and was killed. This was the first time since  $2005^7$  that a passenger was killed in a train accident. See figure 6.

<sup>&</sup>lt;sup>6</sup> Crucial for an injury to a person being counted in this category is that the accident is due to the movement of the train. Therefore, the category includes both people who are hit by a train and people who are injured in the train due to the movement of the train. It does not include people injured as a result of a collision, a derailment or an accident at a level crossing, as these injuries to persons are recorded in separate categories.

<sup>&</sup>lt;sup>7</sup> The statistics for 2009 recorded one passenger killed. This was later corrected by the railway undertaking and infrastructure manager concerned to be a fatality involving an unauthorised person on the railway. The correction was introduced in the statistics for 2010.



*Figure 6. Significant accidents involving passengers* 1999–2012

*Significant accidents involving passengers are described in relation to passenger-km travelled. One passenger km is the transporting of one passenger for one km and expresses the transport work performed.* 

One railway employee was seriously injured in 2012.

The groups of persons most vulnerable to railway accidents are, first, those on railway property without permission. These are followed by users of level crossings. See figure 7.





Number of significant accidents involving persons (FWSI) per million train-km broken down by groups of persons in 2003-2012 as a 5-year average

Significant accidents involving persons are given as the number of persons killed (weighted 1/1) and seriously injured (weighted 1/10). The statistics are given as 5-year cumulative averages for all groups of persons excluding suicides. The number of accidents involving persons is shown per year and per million train-km.

It should be noted that the absolute figure for persons killed and seriously injured in railway accidents is very small. Major fluctuations can therefore be expected from year to year.

# Minor accidents and incidents – drop in the number of signals passed at danger

A total of 367 minor accidents were recorded in 2012. In these statistics, an accident is considered 'minor' if it does not involve extensive material damage or serious personal injury. The figure has risen slightly compared with last year.

Collisions still account for most minor accidents. In the last few years, however, there has been a fall in the number of minor collisions. In the safety report for 2011, the Danish Transport Authority identified that there seemed to be a widespread

misunderstanding about what should be recorded as a collision<sup>8</sup>. The data reported for 2012 have therefore been reviewed for this misunderstanding. This year, the number of collisions is around half the 5-year average.

In addition, there was a slight decline in the number of minor accidents at level crossings and those involving derailments and fire. There were slight increases for collisions involving persons and other accidents. See figure 8.

Figure 8. Minor accidents broken down by type of accident 2012



Number of non-significant accidents per million train-km broken down by type of accident in 2012

Minor accidents are those involving minor injuries or material damage of less than DKK 1.2 million. The types of accident are given per million train-km and as a 5-year average for the period 2008-2012.

283 precursors to accidents were recorded in 2011. Precursors to accidents are lapses in safety that do not cause damage. They can be divided into five types: broken rails, track buckles, signals passed at danger, signal failure, and broken wheels and axles.

Signals passed at danger easily constituted the highest proportion of precursors to accidents again in 2012 (176 cases), as figure 9 shows. However, the number is well below the 5-year average. New for 2012, the Danish Transport Authority records two types of signals passed at danger: signals passed at danger by a train and signals passed at danger by shunting rolling stock or work vehicles.

<sup>&</sup>lt;sup>8</sup> Inasmuch as the causes of collisions are often attributable to vandalism, there has been a tendency for events to be mistakenly recorded as vandalism. In so doing, the cause is confused with the primary event, the accident. In future, the Danish Transport Authority intends to pay special attention to this source of uncertainty.

The two types of signals passed at danger will often have very different risk potentials, since signals passed at danger with shunting rolling stock and work vehicles often occur in an area where there are no passenger trains.

The 176 signals passed at danger above only include signals passed at danger by a train. In 2012 there were a further 316 signals passed at danger with shunting rolling stock or work vehicles. Be aware that the Danish Transport Authority's safety reports from previous years record the total number of signals passed at danger for both trains and shunting rolling stock/work vehicles. The figures cannot therefore be compared.

Broken rails constituted the next biggest proportion of precursors to accidents (47 cases) in 2012, followed by signal failure (51 cases).





Precursors to accidents are given in relation to million train-km travelled, and as a 5-year average over the period 2008-2012. Precursors to accidents do not cause damage.

### Accidents and incidents with dangerous goods

In 2012 there was one accident involving the spillage of dangerous goods. The spillage occurred in May 2012 in Taulov. Here a container marked as holding hazardous goods was found to be leaking. The container was sealed before being shunted on. There was no significant damage.

### Railway safety in other countries - Denmark fares well

On a European level, 2012 was a good year in relation to railway safety, with just two serious railway accidents involving more than 5 deaths – the lowest number of serious railway accidents since 1980. The most serious European railway accident in 2012 was a

head-on collision between an intercity train and a regional passenger train just outside Starzyny near Krakow in Poland. Sixteen people died in the accident, and 2 people were seriously injured. Preliminary investigations have shown that it was human error that was responsible for the two passenger trains being on the same track<sup>9</sup>.

Nevertheless, from time to time very serious accidents do happen on the railways. At the time of this report's publication there had been one serious accident in the city of Santiago de Compostela in Spain, in which 78 passengers were killed and 150 seriously injured.

#### The EU's safety target

The European Railway Agency (ERA) publishes safety indicators and safety levels for EU Member States<sup>10</sup>. Comparison between the countries shows that Denmark has a very high level of safety, on a par with the neighbouring countries with which the country normally compares itself.

The figures in figure 10 are from 2011. Be aware that where the figures in the rest of this chapter concern the entire Danish rail network, those given in figure 10 relate to the Danish rail network excluding the metro and local railways. This is because metros and railways, which are functionally distinct from the rest of the rail network, and which can only be used to transport passengers in local, urban or suburban areas, are not included in the official European statistics.

In 2011, however, there was no major difference between the safety level for the entire Danish rail network including the metro and local railways and the safety level for the Danish railways excluding local railways and the metro. For the entire Danish network, the safety level was 0.14 deaths and weighted serious injuries per million train-km in the 5-year period, while the safety level for the network excluding the metro and local railways was 0.18 deaths and weighted serious injuries per million train-km in the 5-year period.

Figure 10 also shows the European average, which is 0.35 significant accidents involving persons per million train-km in this reporting period. This is almost twice as high as the Danish level for the period 2007-2011.

<sup>&</sup>lt;sup>9</sup> European Railway Accident Information Link (ERAIL), www.erail.era.europa.eu.

<sup>&</sup>lt;sup>10</sup> CSI 2011 as reported by Member States, European Railway Agency. www.era.europa.eu



Figure 10. Significant accidents involving persons in the EU 2007-2011

The safety level is given as the number of deaths and weighted serious injuries over a 5-year period. Source: CSI 2011 as reported by Member States, European Railway Agency.

Common safety targets for the whole EU were adopted in 2010. The targets were set on the basis of the first four years of data collected at Community level, and revised in 2012 with updated data as well as data for 2011<sup>11</sup>. National targets were set for the various countries, but there is also a common safety target for European railways as a

<sup>&</sup>lt;sup>11</sup> The common safety indicators (CSI) are reported, cf. Annex I to the Safety Directive. Published in Denmark in Order No 1293 of 23 November 2010.

whole. The target was set relatively high, at 2.59 accidents involving persons per million train-km.

The basic data for recording safety targets contain major uncertainties.

### Comparison of safety for groups of persons

Between 1200 and 1500 people die each year in train accidents in the EU. In Denmark, around 6 to 15 people die each year<sup>12</sup>. The breakdown by different groups of persons shows the same pattern in Denmark and the EU as a whole, as figure 11 shows.

A significant proportion of the deaths involve people on railway property without permission and users of level crossings. Passengers, employees and others account for a relatively small group.





<sup>12</sup> This figure does not include suicides.



*EU data for 2012 have not yet been published, so for the sake of comparison both calculations are for the period 2007-2011. Significant differences in calculation methods between EU countries mean that the European calculation is subject to a certain degree of uncertainty. Source: CSI 2011 as reported by Member States, European Railway Agency and Danish Transport Authority.* 

There are only minor differences in the size of the individual groups of persons between the European and Danish calculations. The imbalance is due to the fact that data volumes in Denmark are extremely small – i.e. a minor fluctuation in the number of fatalities comes through clearly in the statistics. It should also be noted that the European definitions were not used consistently in the reporting period, which affects the quality of the calculations.

# Safety in connection with different forms of transport – The railways are second-safest

It is methodologically difficult to make a precise comparison of safety across forms of transport. One reason is that journeys made by different forms of transport are very different in their nature. For example, air travel will often be over much longer distances than journeys made by other means of transport, and most people fly much less often than they travel by car or train, for example.

At the same time, serious accidents involving aeroplanes and trains are fortunately very rare, but can potentially cause many fatalities. Therefore, a single fatal accident involving air or rail travel can modify a statistical picture significantly. The most appropriate way to compare safety across forms of transport is therefore considered to be a comparison of the risk to the travelling public – which where the railways are concerned means train passengers.

Comparing the number of fatalities with the number of passenger-kilometres within different forms of transport reveals a clear picture, in which public transport by

aeroplane, train and bus have the lowest number of accidents. See table 2. The difference between the risks involved in public transport and car travel therefore involves a factor of more than 10. Car travel is in turn less risky than travelling by motorcycle by a factor of around 10. Among the forms of public transport, air travel is top, but rail travel is not far behind.

Table 2. Comparison of risk of death by different forms of transport in the EU for the period 2008-2011

	Risk per billion passenger-km
Aeroplane	0.08
Train	0.14
Bus	0.20
Car	3.24
Motorcycle etc.	49.91

Source: EU Commission, DG MOVE

# Chapter 2. The Danish Transport Authority's supervision of undertakings in 2012

The Danish Transport Authority supervises undertakings' safety management systems and ensures that the relevant safety requirements are being met. In 2012 the Danish Transport Authority focused in particular on undertakings' internal supervision and the infrastructure managers' use of the EU Regulation on risk assessment (CSM-RA). This supervision has shown that in many undertakings there is an inadequate correlation between the safety management system described and the actual work.

# The Danish Transport Authority's supervision strategy: Development of maturity model

The long-term objective of the Danish Transport Authority's supervisory work is that the national safety target of 0.3 accidents involving persons per million train-km is not exceeded.

However, this objective is too general to be used to prioritise supervisory efforts year on year. The Danish Transport Authority has therefore identified a short-term endpoint in its supervision strategy<sup>13</sup>: that supervision must maintain and preferably increase the undertakings' ability to manage their own risks.

In 2012 the Danish Transport Authority continued its efforts to establish indicators to be able to measure this endpoint. A number of key issues have been identified in undertakings' safety management systems, including: 'internal audits', 'management evaluation' and 'practice for recording safety conditions'. For each issue, the Danish Transport Authority worked to formulate five maturity levels, where the lowest level is decidedly inadequate and the highest level is masterly.

During generally planned audits<sup>14</sup> in the undertakings, the Danish Transport Authority tested whether the formulation of the maturity levels is usable and adjusted it. This work will continue in 2013.

The work has, among other things, already characterised the Danish Transport Authority's choice of focus areas in 2012. The work has also made the Danish Transport Authority aware that undertakings generally lack knowledge of how safety management systems should operate. This has helped to shape the planning of the Danish Transport Authority's supervisory efforts in 2013, when there will be an increased focus on instruction and training in safety management.

<sup>&</sup>lt;sup>13</sup> Strategi og praksis for tilsyn med jernbanesikkerhed [Strategy and practice for supervising railway safety], Latest version from December 2011. See www.trafikstyrelsen.dk

<sup>&</sup>lt;sup>14</sup> Audits take undertakings' safety management systems as their starting point.

### Planning of supervision in 2012

In January each year, the Danish Transport Authority publishes a schedule of its planned audits of the required safety management systems with railway undertakings and railway infrastructure managers.

The Danish Transport Authority uses the supervision schedule as a tool for planning regular visits to all railway undertakings and railway infrastructure managers. At the same time it is ensured that the Danish Transport Authority's supervisory activities over a 5-year period cover all the undertaking's activities that are part of the safety management system.

The supervision schedule shows where and in which quarter supervisory operations are carried out, and indicates any areas with particular focus that particular year – the 'focus areas'. The scope of the supervision is defined in accordance with the undertaking's size and areas of activity and also the Danish Transport Authority's knowledge of the undertaking. *Focus areas* are selected by the Danish Transport Authority on the basis of its own experiences through the year.

Besides planned supervisory operations, the Danish Transport Authority carries out inspections in the light of incidents or critical situations recorded on a continuous basis. The inspections can be initiated on the basis of information, an event or a submission to the Danish Transport Authority regarding a specific problem, and therefore are not generally announced or planned. They do not therefore form part of the Danish Transport Authority's supervision schedule.

Finally, the Danish Transport Authority carries out *themed supervision*, which is supervision across the industry within a specific subject, e.g. dangerous goods. Themed supervision is carried out either as independent inspections or in connection with other supervision. The themes are often repeated several years in succession. A common aspect of the themed supervisory activities is that they are carried out across the industry within a specific subject.

### Focus areas for audits

In connection with its supervisory work in 2011, the Danish Transport Authority identified that the industry generally faced challenges carrying out internal audits (internal supervision)<sup>15</sup>. In particular, undertakings faced challenges ensuring that internal audits actually included the safety management system.

In 2012 the Danish Transport Authority therefore focused on undertakings' ability to perform internal audits. Eight non-conformities were issued in connection with internal audits.

The general conclusion is that many undertakings allow checks of the work carried out to form part of the internal audit. The Danish Transport Authority has stressed that internal audits are about verifying processes via the safety management system – not simply checking the result.

Furthermore, some undertakings failed to document how they ensure that the entire safety management system is subject to internal auditing, and also what skills requirements are placed on the undertaking's internal auditors.

Those undertakings issued with a non-conformity are required to draw up an action plan outlining how they will rectify the problem. The action plan must be approved by the Danish Transport Authority. The Danish Transport Authority will follow up on the undertakings' ability to perform internal audits in this way.

<sup>&</sup>lt;sup>15</sup> See safety report for the railways 2011. Available at: <u>www.trafikstyrelsen.dk</u>

### Inspections

As the regulatory authority, the Danish Transport Authority carries out inspections that are not directly related to the undertaking's safety management system, but which are based on a specific assessment of the risks on the railways. The Danish Transport Authority carried out 25 such inspections in 2012.

In 2012, among other things, the Danish Transport Authority carried out inspections of: compliance with the conditions imposed in connection with authorisations to place into service, maintenance of rolling stock and missing medical certificates.

The overall picture from these inspections is that the undertakings have handled the various safety-related risks sensibly and that it was only rarely necessary to follow up further on the inspections carried out.

### Themed supervision

Themed supervision is special supervision when the Danish Transport Authority wishes to get a better understanding or an overview of a particular topic across the industry. These themes are carried out as special supervision. Once the supervision year has ended, the Danish Transport Authority evaluates the selected themes. This evaluation forms part of the planning for the next supervision year.

In 2012, the Danish Transport Authority carried out themed supervision within the following areas:

- Transport of dangerous goods
- Undertakings' annual safety report

### Transport of dangerous goods

The Danish Transport Authority carries out supervision of dangerous goods as part of its planned supervision of undertakings, during which the undertakings' processes for handling dangerous goods are checked, and partly using themed supervision, which involved checking that the processes described in the undertakings' safety management systems are being followed.

In connection with the Danish Transport Authority's supervision of dangerous goods in 2011, problems were identified with incomplete wagon lists, among other things. On that basis, it was decided that there was also a need for themed supervision of the transport of dangerous goods in 2012.

In 2012, the Danish Transport Authority carried out one supervisory operation involving transports of dangerous goods combined with supervision of train drivers' training certificates. During the supervision, 16 transports were checked and 11 train drivers were interviewed. Six of the transports checked involved RID wagons (dangerous goods).

The Danish Transport Authority found that the EVN numbers were visible on all the locomotives checked, and that all the locomotives had Danish authorisation to be put into service.

During its supervision, the Danish Transport Authority observed one instance where there was a discrepancy between the wagon list and the actual composition of the train, and one instance where an RID wagon was not marked in accordance with the wagon list.

During its supervision, the Danish Transport Authority found that all the train drivers interviewed were able to produce a valid licence, but that 5 of the 11 train drivers were not able to produce a valid certificate. However, those undertakings where the train drivers in question were employed were able to confirm to the Danish Transport Authority that they had recently passed the examination and had valid certificates. The

Danish Transport Authority also found that several of the train drivers did not carry the necessary regulations with them, or that these were not updated sufficiently.

The undertakings concerned subsequently explained the circumstances found during the supervisory activities. The Danish Transport Authority will follow up on these matters in connection with its follow-up supervision of the undertakings.

#### Undertakings' annual safety reports

To support the undertakings' work with their own annual safety reports, back in 2010 the Danish Transport Authority drew up a guide on drawing up the annual safety report<sup>16</sup>. In 2012 the Danish Transport Authority chose not to update this guide, because in the course of 2013 it wants to integrate the guide on the annual safety reports into a new guide on safety management<sup>17</sup>. The undertakings can therefore expect the template for the safety reports for 2013 to take a different form, to create a greater correlation between the annual safety report and the work of the undertakings on management evaluation.

Based on its supervision of the undertakings and their annual safety reports in 2011, the Danish Transport Authority observed certain central areas where many of the undertakings are in need of a boost to also ensure an effective safety management system in the future.

In particular, the Danish Transport Authority regrets the lack of a clear risk profile of the undertakings, which is absolutely central to a safety management system. In 2013 the Danish Transport Authority therefore summoned all undertakings to discussion meetings to discuss how a safety management system is built on the basis of the undertaking's risk profile, as well as how the undertakings can best apply the safety management system in order to achieve improvements.

# The Danish Transport Authority's assessment of undertakings' safety reports for 2012<sup>18</sup>

In general, the level in the safety reports for 2012 is largely identical to the safety reports from 2011. However, some undertakings managed to reconcile the management evaluation process with the annual safety report, such that the management evaluation also serves as the annual safety report, which is extremely positive.

In 2012, the Danish Transport Authority's focus area was internal audits, which can already be detected in the annual safety reports for 2012, in that more undertakings than previously managed to distinguish between inspections/checks and supervision of the undertaking's safety management system (audits).

The general picture is that the safety reports from the undertakings comply with the formal requirements and give an account of activities within the four required areas.

- · Safety targets and action plans
- Safety indicators
- The results of internal safety audits

<sup>18</sup> Safety reports must be drawn up by all railway infrastructure managers and railway undertakings. Two undertakings did not submit their safety reports until after the 30 June deadline.

<sup>&</sup>lt;sup>16</sup> 'Vejledning i udformningen af den årlige sikkerhedsrapport fra jernbanevirksomheder og infrastrukturforvaltere' ['Guidance on drawing up the annual safety report from railway undertakings and infrastructure managers'], February 2011. Available at www.trafikstyrelsen.dk

<sup>&</sup>lt;sup>17</sup> The Danish Transport Authority felt that the existing guidelines for Executive Orders 13 and 14 were in need of revision, and it was therefore decided that they should be revised and assembled in a guide. The work to draw up the new guide to safety management under Executive Orders 13 and 14 of 4 January 2007 and Commission Regulation (EC) No 1078/2012 began in the autumn of 2012 and is expected to be published in the autumn of 2013.

• Comments on railway safety, including reporting on experiences with the EU Regulation on risk assessment (CSM-RA) and the outcome of its application.

The undertakings' safety reports provide no reason for the Danish Transport Authority to revise its general impression that the day-to-day operation of the railways is safe, but the Danish Transport Authority regrets that the undertakings have not adopted a position on their own risk profile in the safety reports. At each change, it must be assessed whether the change gives rise to a modified risk picture, and thus a change in the risk profile, as well as changes in the system. The Danish Transport Authority has noticed that some undertakings do not report changes that have taken place in the course of the year. This may involve, for example, the closure of level crossings, significant increases in traffic, or major organisational changes that affect the organisation of safety. It is important that undertakings have an overview of and relate to these changes.

Overall, it is also welcomed that undertakings are actually using the data collected – over a longer period – from the achievement of targets, incidents and internal audits to assess developments in safety and thereby identify any new targets/areas for improvement, as well as any requirements for changes in the safety management system.

The Danish Transport Authority's assessment of how the undertakings have given an account of the three topics is given below. The undertakings' experiences with the use of the EU Regulation on risk assessment (CSM-RA) are discussed in the next section:

### Safety targets and action plans

All undertakings set targets for their safety levels in 2012 and assessed the achievement of these targets in their safety reports. However, many undertakings are still using safety indicators as targets instead of setting their own safety targets within the risk areas that characterise their business or where the undertaking proactively wishes to improve. Safety indicators are 'only' values that should be continually measured to monitor developments in safety levels.

All undertakings have also drawn up action plans, but in many cases there is no documented link between targets and action plans. The action plans must describe procedures to ensure compliance with the quantitative and qualitative targets set.

There is also some confusion in relation to the concepts of targets and action plans. Some undertakings are setting targets that are actually action plans.

#### Safety indicators

All undertakings reported relevant safety indicators. Some of these data were presented in the safety reports. It is the Danish Transport Authority's assessment that the undertakings' gathering of data is generally good, and that it is constantly improving.

However, very few undertakings actually use these data to analyse trends and their causes in order to identify areas for possible improvement. In their reports, most undertakings simply compared the figures from 2-3 years, and noted whether developments are heading in one direction or the other.

### Results of internal safety audits

In their safety reports, undertakings typically indicated how many supervisory operations were carried out and how many non-conformities there were. The Danish Transport Authority would welcome a description of non-conformities and trends as well as the relevant corrective actions undertaken as a result of the undertaking's supervision.

The safety reports show that since 2011, undertakings have been better at distinguishing between supervision of operations, i.e. inspections, and supervisions of safety management systems (audits). This means more undertakings than previously are able to explain how supervision covers the undertakings' own safety management system.

# Supervision of the application of the EU Regulation on risk assessment (CSM-RA)

In its safety report for 2011, the Danish Transport Authority identified that undertakings were facing challenges implementing the CSM-RA. In particular, the assessment of significance caused problems. Under EU rules, from 2012 undertakings are required to assess the significance of all technical changes that may affect railway safety. The significance assessment acts as a screening, which is used to determine whether a change should have authorisation to be placed into service from the Danish Transport Authority, i.e. a kind of triviality limit.

Supervision of undertakings in 2012 therefore focused on how the undertakings have assessed the significance of changes.

Since 1 January 2012, infrastructure managers and railway undertakings have been required to assess the significance of all technical changes<sup>19</sup>.

There is a difference in which changes have to be submitted to the Danish Transport Authority. Only *significant* technical changes to vehicles must be submitted to the Danish Transport Authority, while *all* technical changes to infrastructure that may affect railway safety, and which were made in 2012, must be submitted to the Danish Transport Authority for assessment<sup>20</sup>. In 2012, the Danish Transport Authority therefore conducted 100% of its supervision of all significance assessments of technical changes to infrastructure.

The reason for this difference is that infrastructure managers have generally approved safety management systems in less time than railway undertakings. The Danish Transport Authority therefore considered that it could be a challenge for infrastructure managers in particular to assess the significance of changes. At the same time it was important for the Danish Transport Authority and undertakings to achieve a common interpretation and understanding of when something is significant, since there was no experience of this as of 2012.

### Applying the CSM-RA to infrastructural changes

Infrastructure managers' experiences of applying the CSM-RA

All infrastructure managers assessed most of the changes made by the undertakings as not significant.

As there is limited knowledge of how many major changes were made by the smaller infrastructure managers in 2012, and how many of these changes were significant, it is primarily Banedanmark that gained experience in 2012 in applying the risk assessment methods described in the CSM-RA.

In its safety report, Banedanmark indicates that in some cases it has created challenges in using an assessor for the significant changes.

Banedanmark also writes that the work to identify dangers, which is an integral part of the CSM-RA method, led to Banedanmark beginning work on creating a common danger register for the undertaking. This avoids the need to start from scratch each time a change needs to be risk-assessed.

Result of the 100% supervision of significance assessment in the area of infrastructure

In a count of the number of significance assessments in late 2012, the Danish Transport Authority estimated that out of 63 significance assessment received in the period January 2012 – October 2012, it agreed with the applicant's assessment of

<sup>&</sup>lt;sup>19</sup> As a result of Commission Regulation (EC) No 352/2009 of 24 April 2009 on the adoption of a common safety method on risk evaluation and assessment (CSM-RA).

<sup>&</sup>lt;sup>20</sup> As a result of Executive Order No 1031 of 7 November 2011 on authorisations to be placed into service for sub-systems in the rail infrastructure.

significance for 46 changes, and disagreed with the applicant's assessment of significance for 17 changes. In those cases where the undertaking and the Danish Transport Authority disagreed, the applicant estimated that the change was not significant, while the Danish Transport Authority felt that it was. This equates to the Danish Transport Authority and the infrastructure managers disagreeing on approximately 25% of the changes.

However, this picture includes the fact that undertakings often fail to submit a significance assessment if they are sure a change is significant. In this case, an application for approval of an assessor is submitted instead. These changes are not included in the above figures, which affects the figures. Therefore, the Danish Transport Authority and the undertakings actually disagreed in fewer than 25% of cases.

### Applying the CSM-RA to changes to vehicles

Since the Danish Transport Authority had not received any significant changes to vehicles during 2012, at the end of 2012 a study was launched into the numbers and types of vehicle changes within undertakings. During 2012, a total of 142 significance assessments were carried out among railway undertakings – of these only 2 changes were assessed as significant.

#### Railway undertakings' experiences of applying the CSM-RA

In connection with the study, the undertakings indicated that the two guides issued by the Danish Transport Authority on the assessment of significance and the definition of systems lacked concrete examples of how the changes should be handled.

The undertakings also regretted that certain 'minimum values' had not been defined for what is not significant. This both to facilitate the work of the undertakings, but also to help create a common understanding of what is significant across the industry.

Finally, undertakings with activities in both Sweden and Denmark regretted that there was not a greater degree of coordination between what the authorities felt was a significant change in Sweden and Denmark, respectively.

### Result of the study of railway undertakings' significance assessments

In the study the Danish Transport Authority asked undertakings how they organise their significance assessments, and what procedures they use to do so. For example, who in the undertaking can assess whether something is significant, how the correct assessor is assigned to the change, and so on. The study showed that in some undertakings, the safety management system did not include such procedures, or they were deficient.

Based on the study, the Danish Transport Authority will be increasing the focus on railway undertakings' significance assessments and guidance in this regard in its supervision in 2013.

### **Results of supervision**

The Danish Transport Authority made 68 supervision visits in 2012, relating to undertakings' safety management systems in connection with safety certification and safety authorisation and the follow-up of these. The total number of audit days amounted to 154. Audit days are those days on which the Danish Transport Authority is actually present in the undertaking – i.e. the actual 'confrontation time'.
	Issue, renewa and fol	l, amendment low-up	Focus areas	Oth	er	
Supervision	Railway undertakings	Infrastructure managers	Railway undertakings and infrastructure managers	Inspections	Themed supervision	Total
Laid down in the supervision schedule	27	11	1	-	3	
Carried out	30	10	1	25	2	68

Table 5. Number of supervisory operations planned and carried out in 2012

In 2012, 30 audits were carried out of railway undertakings' safety management systems, together with 10 audits of infrastructure managers' safety management systems. In addition, 25 inspections were carried out.

The Danish Transport Authority also carried out one supervisory operation covering all undertakings in the industry, namely the focus area 'internal audits', cf. above.

In conjunction with the audits carried out in 2012, 3 orders were issued and 78 non-conformities recorded.

The orders were issued as a result of the Danish Transport Authority finding that the staff of one undertaking were not adequately trained, one undertaking's safety management system was not sufficiently implemented and finally one undertaking's handling of a track possession.

The non-conformities were mainly identified within the following 4 areas:

- Maintenance
- Document management
- Internal audits
- Identification of legal requirements

No bans were issued in 2012.

In addition to the circumstances already mentioned, it is the Danish Transport Authority's opinion that in many undertakings there is not an adequate degree of correlation between the risks involved in the individual undertaking's activities and its safety management system, including the objectives and actions plans that are drawn up.

It was also noted that some undertakings lack the necessary coherence between the safety management system and the actual work. Audits were carried out during the year that resulted in undertakings having to draw up a new safety management system. However, during these audits it was noted that operational safety was still good enough for the activities to be able to continue until the new system was implemented.

During 2012, the Danish Transport Authority received one complaint in relation to the supervisory operations carried out. The complainant felt he had not been understood and called for greater insight into specific conditions on the railways within the Danish Transport Authority and auditors.

In its response to the complaint, the Danish Transport Authority referred to the motives behind its supervision and expressed its regret if there had been situations in this regard which the complainant had experienced as disruptive.

# The Danish Transport Authority's follow-up of recommendations from the Accident Investigation Board

In 2012, the Accident Investigation Board for Civil Aviation and Railways published three reports with recommendations for the Danish Transport Authority. In 2012, the Danish Transport Authority did not follow up on the reports from previous years.

Table 6: reports from the Danish Accident Investigation Board in 2012 with recommendationsfor the Danish Transport Authority

Report date	Incident	Incident date
11-12-2012	Collision involving person(s) on crossing at station	13-02-2012
16-11-2012	Fire in roof of SSR 532	30-03-2012
12-09-2012	Cyclist hit by train on crossing at Århus Port	29-06-2012

Note that the last report, *Collision involving person(s) on crossing at station*, was first addressed by the Danish Transport Authority in 2013, and is not therefore included in this review.

# Fire in roof of SSR 532

During the transportation of a work vehicle and two personnel carriers on 30 March 2012, the driver discovered that a fire had broken out on the roof of the work vehicle. The work vehicle and personnel carriers were heading towards the Storebælt tunnel. The fire arose through a combination of an oil spillage from faulty silencers and a fibreglass roof construction. At the latest 1-year inspection the comment was that the work vehicle could continue in operation despite the corroded silencers. The work vehicle was not fitted with a dry extinguisher.

## Recommendation:

The Accident Investigation Board recommends that the Danish Transport Authority assess the approval procedures for driving through tunnels for work and placement services for work vehicles and the requirements placed on the vehicles' fire-fighting equipment.

# Danish Transport Authority's follow-up

The Danish Transport Authority has asked Banedanmark for an explanation of:

- the rules in SIN concerning tunnel checks,
- the clearing procedure for work vehicles,
- Banedanmark's requirements regarding fire-fighting equipment in work vehicles, and
- any special requirements (from the infrastructure manager) regarding conveying stock through tunnels.

Banedanmark explained the above, stating among other things that tunnel checks (SIN) only apply to passenger trains, and that there is a clearing procedure to deal among other things with fire-fighting equipment (number and type). There were no special requirements (from the infrastructure manager) for conveying stock through tunnels, but there were requirements concerning the conveyance of dangerous goods,

as well as tunnel training. Banedanmark drivers are not automatically trained in fire fighting.

The Danish Transport Authority carried out a supervisory operation at Banedanmark concerning the maintenance of rolling stock. The Danish Transport Authority carries out ongoing supervision at Banedanmark (of the safety management system) concerning Banedanmark's assurance that stock is maintained, and that the clearing procedure is implemented.

It is the Danish Transport Authority's assessment that there is no need for a separate authorisation procedure for work vehicles. It is also the Danish Transport Authority's assessment that the current requirements placed on fire-fighting equipment in these vehicles are adequate. It should be emphasised in this connection that it is Banedanmark's responsibility at all times to ensure that the authorised vehicles are used in complete safety, including being well maintained.

The Danish Transport Authority considers the recommendation to have been followed, which means the Danish Transport Authority has estimated that Banedanmark has implemented measures that adequately ensure that the applicable rules are observed.

# Cyclist hit by train on crossing at Århus Port

The level crossing accident occurred on 29 June 2012 at Århus Port. While traversing the level crossing the train collided with a cyclist, who died. At the time of the accident, the person was within the train's profile. The safety distance was not marked and at the time of the accident the markings on the carriageway could lead cyclists within the train's profile without there being adequate warnings or barriers to prevent this.

#### Recommendation

The Danish Accident Investigation Board recommends that the Danish Transport Authority arrange for the safety measures on and around level crossings to be changed so that cyclists cannot inadvertently get closer to the track than the normal safety distance of 1.75 m.

# Danish Transport Authority's follow-up

The road directorate and highways authority are responsible for road safety up to level crossings. The Danish Transport Authority is not authorised to require these to change the road safety measures.

As infrastructure manager, Banedanmark is, however, responsible for establishing, operating and maintaining the safeguards necessary to ensure the safety of road and rail traffic. The Danish Transport Authority therefore contacted Banedanmark to ensure that Banedanmark is handling the situation properly, even though this is not the Danish Transport Authority's area of authority.

In addition, in connection with the ongoing review of the Railways Act, the Danish Transport Authority and the Danish Accident Investigation Board have raised the problem of handling safety weaknesses outside or in interaction with the railway safety distance, including coordination, official responsibility and the handling of safety recommendations.

The Danish Transport Authority considers the recommendation to have been followed.

Following the accident, the municipality of Århus decided to change the road markings so that cyclists are no longer led inside the level crossing's safety distance. This was done by painting cycle lanes in blue and removing a misleading cyclist symbol.

# Major challenges for the industry in 2013

Many undertakings are due to renew their safety certificate or safety authorisations within the next few years. One of the biggest tasks for many of the undertakings in this connection will be to establish a sound base for a risk-based approach to safety work.

In 2013 the Danish Transport Authority will hold a series of discussion meetings with undertakings for discussion and training in how they can work with their risk profile and let this be a determining factor in their safety management work.

# Chapter 3. Technical authorisations and certification

The aim of the EU legislation that has been implemented in the railway sector over the past few years has been to increase mobility while maintaining or increasing safety on the railways. In order to ensure uniform handling of undertakings' safety conditions across national borders, EU law has specified that it is the undertakings that should handle safety conditions, while the authorities should play a more unobtrusive role. In 2012 the Danish Transport Authority has changed the way technical changes are approved, to support this clearer division of roles.

# **Technical authorisations**

The European legislation that has been implemented in the railway sector over the past few years is designed to increase undertakings' responsibility. To support this development, the Danish Transport Authority is working to change the way it approves technical changes, so that over the coming years fewer technical changes are approved, and efforts are instead focused on those changes of a certain scope or complexity and on supervision of undertakings' safety management systems.

How the Danish Transport Authority approves technical changes, and how practices have been changed in 2012 in relation to previous years, is examined below.

# Authorisation of infrastructure

As in previous years, the Danish Transport Authority issued a number of authorisations to be placed into service for major and smaller infrastructure projects. In addition, in 2012 a number of new authorisation elements were introduced to support development towards less technical handling of cases and greater accountability of undertakings.

## New executive order

The new Executive Order on Infrastructure No 1031 of 7 November 2011 came into force on 1 January 2012. The Order contained a number of new elements that influenced the work of the Danish Transport Authority in 2012. The following should be mentioned:

- Changes must be assessed in terms of their significance
- Non-significant changes do not require authorisation to be placed into service from the Danish Transport Authority
- Significant changes must be reviewed by an assessor.
- The assessor's safety assessment report will be used as a basis for the Danish Transport Authority's authorisation to be placed into service

## Significance assessments

With the new Executive Order No 1031 and the implementation of the CSM-RA Regulation, applicants are now required to assess the significance of all proposed changes.

In 2012, all infrastructure managers who proposed a change had to submit a significance assessment of the change to the Danish Transport Authority. If both the

infrastructure manager and the Danish Transport Authority felt that the change was not significant, the infrastructure manager could implement the change in accordance with its own safety management system.

In 2012, significant changes pursuant to Executive Order No 1031 followed the risk assessment process described in the CSM-RA and received authorisation to be placed into service from the Danish Transport Authority.

#### Assessor approval

From 2012, an assessor has been attached to all significant changes. This assessor is an independent and competent third party who, pursuant to the CSM-RA Regulation, assesses whether the risk assessment process in the CSM-RA has been followed by the applicant, and whether the result is in order from a safety point of view.

In 2012, the Danish Transport Authority approved a number of assessors for infrastructure projects. This typically involved teams of assessors, as one assessor cannot cover all the specialist areas involved, including the discipline of risk management. In connection with the approval of assessors, the Danish Transport Authority focused on two areas: assessor competencies and market openings for new assessors. The Authority attempted to address both interests by comparing the assessor's competencies with the scope and complexity of the project at all times. At the same time, the Authority chose to contribute to opening the market by in some cases giving the applicant the benefit of the doubt, thereby supporting assessor approval with increased assessor supervision.

## Assessor supervision

The Authority used the assessor supervision tool in 100% of its cases of authorisation to be placed into service in 2012. This was done both through written supervision and verbal supervision in meetings with assessors. Assessor supervision typically began after the project's safety requirement had been identified, and the Danish Transport Authority asked to be briefed on this in connection with the approval of assessors. It has been the Danish Transport Authority's position that there is sufficient basis at this time to begin assessor supervision, while being early enough in the process for the project and assessor still to have the opportunity to rectify any defects and shortcomings without much affecting the project's timetable. The purpose of the inspections was partly to reconcile the expectations of the Danish Transport Authority regarding the assessors' work and partly to determine which assessors understand and fulfil their role satisfactorily.

## Authorisations to be placed into service

The number of changes for which the Danish Transport Authority issued authorisations to be placed into service fell compared with previous years as a result of Executive Order No 1031. This is because changes that are not significant will no longer need authorisation to be placed into service.

## Approval of undertakings' safety rules in relation to infrastructure

Up until 31 January 2011, the Danish Transport Authority approved all changes to undertakings' safety rules, including granting exemptions in the case of departures from the safety rules.

However, the Safety Directive contains a fundamental principle that it is the undertakings that are responsible for railway safety. At the same time, the CSM-RA opened the door for undertakings to handle and document risk management during changes to infrastructure without necessarily complying with their own safety rules if they can simply show that safety is being maintained.

The Danish Transport Authority therefore began a gradual transfer of rule-approval competencies to undertakings. In 2012 there has thus been a phasing-out of rule approval in three initial areas:

A) Since 1 January 2012, special rule changes (dispensations) for use with concrete infrastructure projects have not been the subject of separate official approval, cf. application of the CSM-RA.

This is due to the fact that the assessment of a project's use of safety rules is now handled by an independent CSM assessor as one element in his or her assessment of the safety of the project, including the project's application of safety rules and departures from these.

B) Similarly, the practice for handling generic (also non-project-specific) changes in the infrastructure managers' technical and traffic rules has changed. Generic changes are changes that are not geared towards use in a specific project.

The infrastructure managers will no longer have to notify the Danish Transport Agency when they make changes to rules they do not consider to be of significance for railway safety.

C) Finally, the approval of most of the 'normal drawings' has been phased out.

The phase-out concerns those normal drawings that contain type-specific requirements, i.e. that describe a specific component or plant type (e.g. a particular type of points, a particular type of protection system, etc.).

Changes to type-specific normal drawings are handled in connection with the use of the drawings. In connection with maintenance, the use of the drawing is authorised by the undertaking's own technical system manager responsible for the relevant specialist area. In connection with significant changes to infrastructure, the use of the drawing is authorised by the independent CSM assessor attached to the project.

The other normal drawings, i.e. those drawings that describe generic requirements for railway systems (e.g. describe general requirements for the construction of relaybased safety systems), still have to be approved by the Danish Transport Authority.

Overall, it is estimated that the above rule phase-outs have reduced the amount of rule approvals by around 75%.

# Authorisation of rolling stock

As table 5 shows, 91 permits were issued for rolling stock in 2012. The permits consist of authorisations to be placed into service, type approvals and permits for tests and transport. The Danish Transport Authority also approved experts and assessors who perform verification tasks in connection with the construction and modification of rolling stock.

## New executive order

The new Executive Order No 1030, of 7 November 2011, came into force on 1 January 2012. The Order includes a number of simplifications that had an impact on the work of the Danish Transport Authority in 2012. The following should be mentioned:

- Extended exemption provisions.
- New threshold for the submission of changes.
- Withdrawal of the requirement to have operating instructions approved.

The above simplifications led to a decrease in the number of cases of around 40% compared with 2011.

Table 5. Authorisation of rolling stock in 2012.

Authorisations	Number
Traction units, locomotives and trainsets	30
Passenger wagons	0
Goods wagons	10
Special vehicles	21
Transport and trial runs	26
Type approvals	4
Total	91

An authorisation can cover several vehicles.

# Safety certificates and safety authorisations

# Safety certification

A safety certificate is a prerequisite of being a railway undertaking.

A safety certificate comprises a part A and a part B. The requirements are described in Executive Order No 14 of 4 January 2007.

Part A of the safety certificate sets requirements for the undertaking to have implemented a safety management system. The railway undertaking must have a safety certificate part A in the country where it has its main operations. This is valid throughout the EU for a maximum of five years.

Part B is the documentation to allow the undertaking to comply with its safety management system, as well as the relevant legal requirements in the country in which the undertaking carries out railway transport. The railway undertaking must have been issued with a safety certificate part B for each country in which it wishes to carry out railway transport.

All railway undertakings with a safety certificate part A in Denmark simultaneously receive a safety certificate part B to operate on designated stretches in Denmark. The issue of both safety certificates is dealt with in the same process.

For railway undertakings with a safety certificate part A from another EU Member State, an application for a safety certificate part B is dealt with as a separate process. To ensure that the undertaking in question's procedures also include activities in Denmark, the Danish Transport Authority can enquire about parts of the safety management system that have already been approved by a national authority in another EU country.

## Safety authorisation

A safety authorisation is a prerequisite of being an infrastructure manager.

The requirements for safety authorisations are described in Executive Order No 13 of 4 January 2007.

The safety authorisation covers both the safety management system and the documentation for compliance with the system and relevant national legal requirements, cf. above.

# Fee

For the issuing, amendment or renewal of a safety certificate or safety authorisation, a fee is paid as per account rendered, but a max. 200 hours plus 10 hours per million

train-kilometres, which is expected to be carried out by the railway undertaking in question or completed on the infrastructure concerned.

At the end of 2012, the fee was set out in Executive Order No 1194 of 13 December 2012.

# Status as at 2012

By the end of 2012, a total of 17 railway undertakings had a certified or approved safety management system for managing railway safety. The distribution is shown in table 6:

7 undertakings had both a safety certificate as a railway undertaking and a safety authorisation as an infrastructure manager: Arriva Tog A/S DSB Lokalbanen A/S Metroservice I/S Midtivske Jernbaner A/S Nordjyske Jernbaner A/S Regionstog A/S 2 undertakings had a safety authorisation only: Banedanmark Øresundsbro Konsortiet 4 undertakings had a safety certificate part A and B only: CFL Cargo A/S DB Schenker Scandinavia DSB S-tog A/S DSB Øresund 4 undertakings had a safety certificate part B\* only: Hectorrail Railcare S1 • TX Logistik \* All four of these undertakings have a safety certificate part A in Sweden.

Table 6: Undertakings with safety certificates and/or safety authorisations in Denmark

## Changes to safety certificates and safety authorisations in 2012

In 2012 the Danish Transport Authority issued 1 new certificate part B to a railway undertaking.

Amendments were made to nine safety certificates, one of which was amended twice and one three times. The amendments were primarily issued on the basis of a change in organisation, changed lines or a change in the undertaking's name.

One undertaking had its safety certificate parts A and B revoked.

The Danish Transport Authority is aware of the fact that there is one railway undertaking with a safety certificate part A from Denmark that has two safety certificates part B in Sweden and Germany, respectively.

No new or amended safety authorisations were implemented in 2012.

During 2012, two undertakings began introductory talks with the Danish Transport Authority on the certification or authorisation of safety management systems. One of the undertakings obtained part B of the certificate in 2012 after two attempts, while the other undertaking abandoned the process before submitting an application.

(See also Annex 5).

# **Personal certification**

The Danish Transport Authority approves training programmes for persons who carry out safety-classified functions on the railway. The Authority also issues licences to train drivers and approved instructors and examiners.

#### Train driver licences

At the end of 2012 the Danish Transport Authority had issued around 3 200 train driver licences, of which around 2 500 were registered as active.

Of these, 42 licences were issued in 2012. The number of valid licences has increased fractionally, while the number of *active* train drivers is stable. The difference between the number of valid licences and active train drivers is most likely due to the fact that the licences are valid for 10 years, and not all certified train drivers actively use their licences. The Danish Transport Authority did not revoke any licences in 2012.

From 2013, train drivers who perform a-functions (drivers, drivers of work vehicles, etc.) must be re-certified. The requirements for a-drivers are thus being tightened with additional requirements relating to professional skills, prior training and also requirements concerning vocational psychological assessment.

Following analysis of training requirements, selection criteria and entry requirements, railway undertakings and infrastructure managers with a-drivers have decided to establish an industry standard. The Danish Transport Authority expects that a common industry standard for the training of a-drivers will enhance the recognition of a-drivers across the undertakings, and support the undertakings in their skills development and management.

# Training centres for railway undertakings

The Danish Transport Authority has implemented the common European provisions on the certification of training centres for train drivers through Executive Order No 1027. The order determines the criteria by which a training centre may be approved, as well as the training activities that trigger a requirement for certification. All undertakings that train external<sup>21</sup> train drivers must be approved separately as training centres. Approval must have been granted by 15 July 2013 for all existing training centres (railway undertakings, infrastructure managers and schools for public train driver training).

## Medical certificates

The Danish Transport Authority issues medical certificates to persons who carry out safety-classified functions on the railways. In 2012, 3 470 medical certificates were issued, while 5 were revoked. 19 applications for medical certificates were refused. In 2012 there were no complaints concerning decisions on medical certificates taken by the Danish Transport Authority. The Authority continued its practice of recognising Swedish medical certificates issued for all types of safety-classified functions. In addition, the Authority is continuing its practice of recognising German medical certificates for train drivers and employees in the undertakings not covered by the current agreements on mutual recognition.

#### Light railways

In 2012, the Danish Transport Authority gathered information about light railway drivers in neighbouring countries. Norwegian, Swedish and in particular German requirements for light railway drivers, and practical experiences with light railway drivers, formed the basis of the process of drafting Danish requirements for light

<sup>21</sup> i.e. staff employed by another undertaking.

railway drivers. It is expected that the requirements for light railway drivers will be established in 2013 in close dialogue with the special Light Railway Forum<sup>22</sup>.

<sup>&</sup>lt;sup>22</sup> Together with the industry, the Danish Transport Authority has established a Light Railways Forum where issues relating to light railways will be addressed. Read more about this on the Danish Transport Authority's website.

# Chapter 4. Important amendments to legislation and regulations

In 2012, the Danish Transport Authority implemented a series of rules. Some of these rules implement European legislation and create greater interoperability on the railways in Europe, while the purpose of the other rule changes is to adapt legislation in order to maintain the high Danish safety level. In the international sphere, the Danish Transport Authority continued its efforts to shape the development of the common European railway by taking part in committee work and in Freight Corridor 3.

In 2012, the Danish Transport Authority implemented a series of legislative changes. Particular mention should be made of the introduction of user fees for the Danish Transport Authority's approval work. The introduction of user fees brings the railways into line with other modes of transport such as e.g. aviation. User fees will least affect those undertakings that have effective safety management systems that ensure the quality of the material sent to the Danish Transport Authority.

The extension of the provision in the Infrastructure Order on the submission of all significance assessments of technical changes to infrastructure to the Danish Transport Authority for assessment also to apply to 2013 should also be emphasised. The extension of the provision will give the Danish Transport Authority the opportunity to provide adequate support and guidance to those undertakings that still face challenges in applying the significance assessment criteria.

# **Relevant legislative changes**

This section outlines the main changes in the regulation of railway safety in Denmark. The purpose of the changes is briefly outlined. See Annex 7 for a complete list of legislative changes in the railway sector in 2012. The implementation of the Safety Directive is discussed in the next section.

# Changes to the Railways Act

In 2012 the Railways Act was amended. During debates in Parliament, the bill was divided into 2 acts, Act No 612 of 18 June 2012 amending the Railways Act (fees and charges) and Act No 613 of 18 June 2012 amending the Railways Act and on public roads (approval of training institutions, etc.).

The acts regulate a variety of subjects in the railways sector. The amendments include the following:

 Act No 612 of 18 June 2012 provides authority for a system for user-financing the Danish Transport Authority's supervision in the railways sector. The Act has thus created a legal basis for financing the costs associated with supervision. The starting point for the Danish Transport Authority's supervision is an undertaking's safety certificate or safety authorisation. In addition, the Danish Transport Authority supervises a number of other aspects, including compliance with safety rules, requirements for infrastructure plant, rules on dangerous goods, security-classified staff, etc. The scheme under which the Danish Transport Authority can charge a fee for tasks under the Railways Act is being continued. One new feature is that it will be possible to charge a fee for tasks under Community rules in the railways sector.

The Act also contains a simplification of the rules on level crossings, in that it brings together the rules on level crossings in the Railways Act. In this connection it has been necessary to make certain changes and modernisations, including regarding the costs of operation and maintenance.

The amendment also contains rules on the accreditation of certifying undertakings (certifying bodies) designated under EU legislation. These are undertakings/bodies that that issue certificates to, among others, maintenance units or maintenance workshops. The accredited system should ensure the national and international recognition of certificates.

 Act No 613 of 18 June 2012 provides authority to establish rules for the approval of training centres for train drivers. These are EU rules, whereby all railway undertakings and schools that train train drivers must be approved under the new EU rules. The aim is to achieve greater uniformity in the training of train drivers. The rules were implemented by an executive order and came into force on 8 November 2012. See below.

#### Executive Order on fees

In connection with the amendment of the Railways Act, a new fees order was issued, which came into force at the same time as the amendment, on 1 July 2012.

This means that the Danish Transport Authority charges fees for all approval work, such that its expenses are covered by the fees. This is the same as applies in, for example, the aviation sector, and as applies in various EU countries, including Sweden and Germany.

In addition, the Danish Transport Authority offers increased guidance in connection with the handling of major railway projects, including the possibility of advance dialogue and notification.

Advance dialogue and notification go beyond the general commitment to guidance and are voluntary tools that can help the individual (preferably large) projects that want to minimise project risk, be it economic, temporal or other risks. There is a fee for this additional service.

# Relevant changes to other legislation

# *Executive Order on the approval of training centres, examiners, etc. for training train drivers in the railway sector*

The Order implements the European Commission's Decision of 22 November 2011 on criteria for the recognition of training centres involved in the training of train drivers, on criteria for the recognition of examiners for train drivers and on criteria for the organisation of examinations in accordance with Directive 2007/59/EC of the European Parliament and of the Council.

Furthermore, the Order incorporates the European Commission's Recommendation of 22 November 2011 on the procedure for the recognition of training centres and train driver examiners, cf. Directive 2007/59/EC of the European Parliament and of the Council (the Train Driver Directive).

The Order supports the purpose of the harmonised competence requirements for train drivers in the EU by ensuring harmonised requirements for undertakings and individuals who train and test candidate train drivers. The Order came into force on 8 November 2012.

The Order contains a transitional provision for the railway undertakings, railway infrastructure managers and institutions that are training train drivers for others at the time the Order comes into force. These must have applied to the Danish Transport Authority for approval as training centres so that they have been granted approval no later than 1 July 2013.

*Provisions (RP) for operating and traffic management rules on the railways* On 12 May 2011 the Commission took a decision concerning amendments to the technical specifications relating to the 'Operation and Traffic Management' sub-system applicable to conventional and high-speed trains (Commission Decision 2011/314/EU).

This concerns: Decisions 2006/920/EC and 2008/231/EC concerning the technical specification of interoperability relating to the sub-system 'Traffic Operation and Management' of the trans-European conventional and high-speed rail systems, respectively.

The Danish Transport Authority has therefore updated the existing RP (railways provision).

The rules must be applied on lines equipped with ERTMS. The rules may be applied on other lines if the operating conditions make this appropriate. This is a technical update of TSI OPE operation and traffic management, which is reflected in the rules for operation and traffic management.

*Executive Order on requirements for designated bodies in the railway sector* The Order establishes requirements for designated bodies in the railway sector.

Designated Bodies (DeBo) have the task of assessing whether sub-systems in the railway sector comply with national legislation (national regulations). National regulations are given as the national technical rules in the railway sector of which Denmark has informed the European Commission under Article 17(3) of the Interoperability Directive.

The requirements in Annex 1 to the Order are entirely analogous to the minimum requirements placed on Notified Bodies (NoBo), which can be found in Annex VIII to the Interoperability Directive.

*Executive Order on the safety certification of entrepreneurially managed undertakings in the railway sector* 

The Order contains provisions on what an entrepreneurially managed undertaking must satisfy if it wishes to be safety-certified, i.e. be awarded a safety certificate.

The Order makes it possible for an entrepreneurially managed undertaking to transport vehicles and materials at its own risk.

*Railway Provisions RP 4-1 on the implementation of the Commission's decision on train control and communication sub-systems (TSI CCS)* 

The RP implements a change to the technical specification for interoperability (TSI) that applies to train control and communication sub-systems in the trans-European rail system (CCS) in Danish law.

TSI CCS sets requirements for when and how ERTMS should be used.

ERTMS is the common name for the common European Train Control System (ETCS), and the common European train radio system (GSM-R).

The TSI applies to the sub-system Mobile Train Control and Communication Equipment and the sub-system Fixed Train Control and Communication Equipment.

The change to the TSI means that it now refers to two versions of ERTMS: baseline 2 and 3.

*Executive Order on technical requirements for work vehicles on the railway network* The Order establishes technical requirements for work vehicles that have to be approved for use on that part of the Danish rail network covered by the Interoperability Directive.

The Order applies to new work vehicles as well as to work vehicles that have been reconditioned or upgraded.

Under TSI Loc & Pas, the application of the requirements of the TSI to work vehicles is optional. The Order states that if it is decided not to apply TSI Loc & Pas in connection with the approval of work vehicles, the requirements of EN 14033-1 must be applied.

This must be verified by a 'Designated Body' (DeBo).

# *Executive Order on the application of the RID to national transport and the transport of dangerous goods in hand luggage etc.*

The Order brings together some of the applicable rules on the transport of dangerous goods into a single order. The Order also establishes new rules for, among other things, the scope of the RID. This scope is extended to also apply within a railway infrastructure manager's area, i.e. marshalling yards and intermodal terminals, etc. In particular, it is the RID's provisions on marking, filling station approvals and mixed loading prohibitions that must be respected.

In addition, the railway undertakings have been given the opportunity to receive assistance from the police if a passenger violates a provision on fireworks that the undertaking has included in its regulations.

*Executive Order on vehicles' technical compatibility with the rail network* The Order establishes technical compatibility requirements for vehicles that have to be approved for use on that part of the rail network covered by the Interoperability Directive. The Order applies to new vehicles as well as to vehicles that have been modernised or upgraded.

With this Order, the Danish Transport Authority has satisfied the EU legal obligations arising from TSI LOC & PAS and TSI WAG, in that the Order closes the open points in the relevant TSIs.

The Order contains requirements on how to prepare a compatibility certificate against the current declarations of conformity.

The Executive Order on vehicles' technical compatibility with the rail network was published in the Official Gazette on 6 December 2012, but only came into force on 1 July 2013. The long introduction period was chosen to facilitate the transition from the current declarations of conformity to certificates of compatibility.

*Executive Order on noise from rolling stock (vehicles) used on the Danish rail network* The Order implements the Commission's decision of 4 April 2011 (2011/229) concerning the technical specification of interoperability relating to the sub-system 'rolling stock' in the trans-European conventional rail system (TSI NOI).

The TSI concerns the regulation of noise from conventional rolling stock (vehicles) in the form of goods wagons, locomotives, trainsets and passenger wagons and work vehicles.

For new equipment, limits are set for noise near stations, start-up noise, pass-by noise and internal noise in the cabin from conventional rolling stock.

For reconditioned or upgraded goods wagons, pass-by limits are also given if the performance of the braking system is altered and a new authorisation for placing into service is required. In other situations with reconditioned or upgraded rolling stock, it

must be demonstrated that the stock does not emit more noise than before the conversion.

The Order extends the TSI's scope to cover the entire Danish rail network and not just the TEN network (the trans-European rail system). This means the Order's rules must also be applied to new, upgraded and reconditioned vehicles used outside the TEN network.

Provisions on the European register of approved types of railway vehicles The provisions establish specifications for the European register of approved vehicle types, which the European Railway Agency (ERA) must establish and maintain under the Interoperability Directive.

Executive Order on authorisations to be placed into service for sub-systems in the rail infrastructure

The Order extends the requirement to submit significance assessments for changes to infrastructure to the Danish Transport Authority by one year, giving the Danish Transport Authority the opportunity to guide those undertakings that do not yet have any specific experience in applying the significance assessment criteria. In addition, the complaints provision is clarified.

# The Safety Directive and secondary legislation

The implementation actions and experiences with legal instruments that are derived from the Safety Directive and which were amended in 2012 are described below. This concerns the following legal instruments:

- CSM for RA (Common Safety Method for Risk Analysis)
- The Reporting Executive Order
- The Executive Order on requirements for certifying undertakings in the railway sector

The Commission also issued the following legal instruments in 2012 in relation to the Railway Safety Directive:

- Commission decision of 23 April 2012 on the second set of common safety targets for the rail system (2012/226/EU).
- CSM supervision (Common Safety Method on supervision), which concerns supervision by authorities. The regulation is to be applied from 7 June 2013.
- CSM monitoring (Common Safety Method on monitoring), which concerns internal supervision within undertakings. The regulation is to be applied from 7 June 2013.

# CSM-RA:

The CSM-RA is a regulation issued by the Commission in 2009. The regulation lays down requirements on the application of a common safety method for risk evaluation and assessment to all changes to a Member State's rail system that are deemed to be significant. The changes can be of a technical, operational or organisational nature. Where organisational changes are concerned, only those changes that could affect operating conditions are taken into account.

From November 2011 and into January 2012, the Danish Transport Authority held a CSM school, where the Authority provided instruction on the regulation and its application, in particular with regard to the fields of application for which the regulation came into force in the summer of 2010. The aim of the 'CSM school' was to introduce the railway industry to the European requirement of risk assessment and

management, including the requirement to use independent assessors and the use of system definitions and significance assessment.

The 'CSM school' was directed partly at Danish infrastructure managers and railway undertakings that are required to use the European risk assessment methods, and partly at those undertakings that traditionally act as advisors on railway projects. Around 300 people from the railway industry took part.

In 2012, work was carried out with significance assessments in the railway infrastructure area. This work resulted in the transitional period for communicating significance assessments to the Danish Transport Authority being extended to the end of 2013.

#### The Reporting Executive Order:

The Reporting Executive Order defines what data railway undertakings and railway infrastructure managers must submit to the Danish Transport Authority on accidents, precursors to accidents and safety irregularities.

In 2010 a new Reporting Executive Order was issued, due to the revision of Annex 1 of the Safety Directive and a desire to reduce undertakings' administrative burden.

At the end of 2011, a few minor changes were made to the Reporting Executive Order. The changes were justified by the fact that the Danish Transport Authority had become aware that the incident category: 'Passing a stop signal' only covered trains and not other railway vehicles such as shunting rolling stock and work vehicles.

The main objective was therefore to correct this so that there would be greater comparability with other countries, and to ensure that information on signals passed at danger by work vehicles and shunting movements continue to be recorded in the incident database.

In addition, a few minor changes were made to the Order.

The amendment to the Order came into force on 1 January 2013, and the undertakings must therefore apply this when reporting data to the Danish Transport Authority for 2013.

*Executive Order on requirements for certifying undertakings in the railway sector* In May 2011, the Commission issued the regulation on the certification of entities in charge of maintenance for freight wagons, which came into force on 31 May 2011. The regulation lays down provisions on a system of certification of entities in charge of maintenance for freight wagons. The purpose of the certification system is to create a framework for the harmonisation of requirements and methods for assessing the suitability of entities in charge of maintenance in the EU.

Certifying bodies can be accredited bodies, recognised bodies or national safety authorities.

Denmark informed the Commission by letter of 30 November 2011 that certifying bodies must be accredited in Denmark. In other words, Denmark does not wish to make use of the opportunity to appoint certified bodies.

The requirement of accreditation is established in the Executive Order on requirements for certifying undertakings in the railway sector.

# International work

The area of safety and interoperability is largely regulated internationally. This means that the issuing of rules as well as supervisory and approval activities often take place within the framework of common European legislation. The Danish Transport Authority is widely represented in the international forums that draft and take decisions within the mandate granted in the Interoperability Directive and the Safety Directive, respectively. In the decision-making processes, the Danish Transport Authority works to exert influence as early as possible by contributing input to the early versions of a draft decision.

In 2012, the bulk of the Danish Transport Authority's international work took place within three forums: working groups under the European Railway Agency (ERA), the European Commission's Railway Interoperability and Safety Committee (RISC) and the Freight Corridor 3 Executive Board.

## Participation in the ERA's working groups

In the European Railway Agency (ERA), proposals for resolutions within safety and interoperability are drafted in a series of specialist technical working groups. In order to achieve coherence between the domestic specialist technical reality and the development of EU rules, the Danish Transport Authority participates actively in all relevant working groups. In 2012, the Danish Transport Authority continued its participation in over a dozen working groups.

An example of the areas being worked on in the various groups is the common European train control and communication system, ERTMS, where this year, by participating in working groups, Denmark made a significant impact on the Commission's final decision on ERTMS.

The discussions in the working groups form the cornerstones of the decisions to be taken at a later date in the RISC Committee.

## Taking decisions in RISC

The European Commission's Railway Interoperability and Safety Committee (RISC) discusses and takes decisions on the proposals produced by the working groups in the ERA. RISC is the first decision-making element in a legislative process. The EU Council of Ministers and the European Parliament generally confirm decisions taken in RISC.

Like the previous year, 2012 was productive for RISC. During three multi-day meetings, eight new pieces of legislation were adopted, and the Danish Transport Authority influenced in advance the design of several decisions and the progress of the preceding discussions.

For example, Denmark helped to ensure:

- The translation control of all legal acts adopted.
- The continued rejection of the imposition of mandatory derailment mechanisms until it can be demonstrated that this is an effective and economically viable device.
- The adoption of a Commission decision on the common European train control and communication system, ERTMS, following the ERTMS conference in Copenhagen on 16 April during the Danish EU Presidency.

In the area of interoperability, the work this year focused in particular on the harmonisation of technical requirements for infrastructure and rolling stock.

While defining the adaptation of EU legislation to the UN's Convention on the rights of persons with disabilities (RPD), Denmark ensured that the EU legislation would stay close to the Convention and not clash with the ongoing revision of the Technical Specifications for Interoperability relating to persons with reduced mobility (TSI-PRM).

#### Chair of the Freight Corridor 3 Executive Board

In order to move the amount of goods transported in Europe, from road to rail, a number of lines that are strategically important corridors for rail freight traffic have been identified by the EU. On these lines, particular attention is being paid to improving infrastructure, relieving bottlenecks, harmonising procedures for train operation and promoting technical cohesion when rolling out the common European train control and communication system, ERTMS.

The extended Freight Corridor 3 from Stockholm to Palermo (formerly ERTMS Corridor B) is one of these lines, and aims to provide railway undertakings and transport purchasers with a competition-based efficient rail freight transport infrastructure of high quality.

In 2012 Freight Corridor 3 went operational, meaning that under the Freight Regulation (913/2010), a functional Management Committee was set up, as well as an Executive Board with representatives from the transport ministries of Sweden, Denmark, Germany, Austria and Italy – the Member States through which the Freight Corridor passes. The Chair of the Executive Board and the Secretariat are provided by the Danish Transport Authority, and in 2012 these became fully functional with the adopted rules of procedure, which now makes it possible to ensure effective planning of solutions to the challenges associated with the establishment of the corridor.

# Annex 1: The railways in figures



Figure 12. Map of the various classes of line and their distribution in Denmark

Railway infrastructure	2011	2012
Number of infrastructure managers	9	9
Total length of lines*	2650	2649
Total length of track	4094	4070
Length of electrified lines*	642	642
Km of lines with ATC, ATC train stopping/ACT equipment	1447	1438
Total number of level crossings**	1390	1362
- automatic level crossings with half or full barriers	534	463
- automatic barrier systems and track-side protection	172	237
- manually operated barrier systems	15	13
- level crossings with warning signal systems	182	196
- manually operated automatic warning signal systems	1	1
- level crossings without automatic protection	486	452

# Table 7. Information on railway infrastructure

Figures from railway infrastructure managers. Source: infrastructure managers' safety reports for 2011 and 2012. However, data marked \* are from Statistics Denmark. Note that the 2011 figures for the distribution of level crossings between different types of crossing contained some errors, therefore the 2011 figures differ from those in last year's safety report. \*\*The breakdown of the distribution of level crossings into sub-categories is flawed. This is due to the fact that there was some uncertainty about how the categories should be understood. The Danish Transport Authority is working to obtain the right figures.

Table 6. Inionnation on Taiway undertakings	Table 8.	Information	on railway	undertakings
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Railway undertaking	2011	2012
Number of railway undertakings	15	14
Number of locomotives	168	131
Number of trainsets (passenger transport)	685	693
Number of train drivers	2661	2399
Volume of passenger transport (million passenger-km)*	6890	7026
Volume of freight transport (million tonne-km)*	2614	2278
Total number of kilometres travelled (million train-km)*	84.8	83.3

Figures from railway undertakings. Source: railway undertakings' safety reports for 2011 and 2012. However, data marked \* are from Statistics Denmark.

# **Overview of railway undertakings**

Table 9. National railway undertakings

Bus. Reg. No	Railway undertaking	Scope	Certificate No	Valid until
27 97 37 95	CFL Cargo Danmark ApS	Goods traffic, including transport of dangerous goods. Banedanmark's and DSB's infrastructure in Denmark, Nordjyske Jernbaner, Lokalbanen, Øresundsbro Konsortiet's infrastructure in Denmark, and sidings and dock sidings on the above lines.	A: DK1120090023 B: DK1220110001	31-03-2014
26 15 90 40	Lokalbanen A/S	Passenger traffic, not high-speed traffic. Passenger and stock services: Hillerød – Hundested, Hillerød – Gilleleje/Tisvildeleje, Hillerød – Snekkersten, Helsingør – Hornbæk – Gilleleje, Jægersborg – Nærum, Snekkersten – Helsingør. Stock services: Snekkersten – Copenhagen H/Copenhagen G – Høje Taastrup (remote), S-Banen. DSB infrastructure for Kh/Gb and Høje Taastrup	A: DK1120090027 B: DK1220090028	31-05-2014
26 13 93 25	NJ Holding Nordjylland A/S	Passenger traffic. Frederikshavn – Skagen, Hjørring – Hirtshals and Frederikshavn – Aalborg	A: DK1120120011 B: DK1220120012	12-06-2013
12 24 59 04	Arriva Tog A/S	Passenger traffic, not high-speed traffic Århus – Struer, Struer – Thisted, Struer – Skjern, Århus – Skjern, Skjern – Esbjerg, Esbjerg – Tønder, Holstebro – Herning, Tønder – national border, and DSB's infrastructure in association with the above Banedanmark lines. Varde – Nr. Nebel.	A: DK1120130001 B: DK1220130002	24-01-2018
26 09 24 85	DB Schenker Rail Scandinavia A/S	Goods transport including dangerous goods. Infrastructure managed by Banedanmark and by Øresunds Konsortiet with affiliated locally and privately owned stock sidings, dock sidings and sidings. The infrastructure owned by DSB and DSB S-tog, including terminal sidings, sidings, depot sidings and workshop sidings, and affiliated locally and privately owned stock sidings, dock sidings and sidings managed by DSB or by DSB S- tog. Infrastructure belonging to Nordjyske Jernbaner A/S	A: DK1120090029 B: DK1220090030	07-07-2013
21 82 77 38	DSB S-tog A/S	Passenger traffic, not high-speed traffic. TIB lines: 8.1 Copenhagen H – Køge, 8.2 Høje Taastrup – Copenhagen H & 3	A: DK1120120005	31-12-2013

Bus. Reg. No	Railway undertaking	Scope	Certificate No	Valid until
		Frederikssund – Valby, 8.4 Copenhagen H – Hillerød, 8.5 Svanemøllen – Farum, 8.6 Vigerslev – Hellerup, 8.7 Hellerup – Klampenborg. Sidings and depot sidings connected to the above lines.	DK1220120006	
31 48 54 60	Midtjyske Jernbaner Drift A/S	<ul> <li>Passenger traffic, not high-speed traffic, also transport of dangerous goods.</li> <li>Odder – Århus, Holstebro – Vemb – Lemvig – Thyborøn, Århus – Herning – Holstebro.</li> <li>Only materials trains are run on the line Århus – Herning – Holstebro.</li> </ul>	A: DK1120080012 B: DK1220080013	26-11-2013
25 05 00 53	DSB	Passenger traffic, not high-speed traffic. Infrastructure managed by: Banedanmark, Øresundsbro Konsortiet and by DSB, including depot and workshop sidings. Sidings from Randers station to Bombardier Transportation. Infrastructure managed by Nordjyske Jernbaner. The infrastructure between Århus H and Odder is managed by Midtjyske Jernbaner.	A: DK1120120008 B: DK1220120010	31-05-2014
57 34 47 17	Regionstog A/S	Passenger traffic, not high-speed traffic: Nykøbing Falster – Nakskov, Køge – Hårlev – Rødvig /Fakse Ladeplads, Slagelse – Tølløse, Tølløse – Holbæk, Holbæk – Nykøbing Sjælland, Maribo – Bandholm. Stock services: All lines east for Korsør including S-train lines, except for Copenhagen Metro lines.	A: DK1120090031 B: DK1220090033	31-12-2013
21 26 38 34	Metro Service A/S	Passenger traffic, not high-speed traffic. Copenhagen Metro lines in conjunction with metro stage 1+2+3	A: DK1120080014 B: DK1220080015	31-12-2013
29 30 82 41	DSB Øresund A/S	Passenger traffic, not high-speed traffic: TIB 1: Copenhagen H – Høje Taastrup TIB 10: Copenhagen H – Helsingør TIB 11: Copenhagen H – Peberholm TIB 26: Høje Taastrup - Vojens Øresundsbro Konsortiet's infrastructure in Denmark	A: DK1120120001 B: DK1220120003	09-12-2013

Safety certificates issued under Executive Order No 14 of 4 January 2007 on safety certificates for railway undertakings

Registration No	Railway undertaking	Scope	Certificate No	Valid until
556663-0132	Hector Rail AB	Goods transport including transport of dangerous goods. TIB 11. Peberholm – Vigerslev/Copenhagen H. TIB 1. Copenhagen – Fredericia/Taulov, including infrastructure on and around the goods/combi terminals in Taulov and Høje Tåstrup. TIB 26. Fredericia – Padborg, including infrastructure in Kolding Havn and at Fredericia station. Øresundsbro Konsortiet's infrastructure in Denmark	A: SE112007001 B: DK1220090022	25-03-2014
556196-1599	SJ AB	International passenger traffic and stock services, not high-speed traffic: Line 1: Copenhagen H – Odense, Line 10: Copenhagen H – Helsingør and Line 11: Copenhagen H/Vigerslev – Peberholm (DK/Se national border). Øresundsbro Konsortiet's and Banedanmark's infrastructure and access to sidings for deployment in Copenhagen H, Østerport, Helgoland, Helsingør and Odense	A: SE1120080015 B: DK1220090034	26-11-2013
556619-3479	Railcare Tåg AB	Freight transport, not transport of dangerous goods. The infrastructure managed by Banedanmark and Øresundsbro Konsortiet with affiliated locally and privately owned stock sidings, dock sidings and sidings managed by Banedanmark or Øresundsbro Konsortiet. The infrastructure managed by DSB, including terminal, sidings, depot sidings and workshop sidings, and also affiliated locally and privately owned stock sidings, dock siding and sidings managed by DSB.	A: SE1120080021 B: DK1220100002	24-08-2015

Table 10. Foreign railway undertakings

Safety certificates issued under Executive Order No 14 of 4 January 2007 on safety certificates for railway undertakings

# **Overview of infrastructure managers**

Bus. Reg. No	Infrastructure manager	Scope	Certificate No	Valid until
12 24 59 04	Arriva Tog A/S	Track and sidings belonging to Vestbanen A/S • Varde – Nr. Nebel	DK132009006	14-12-2014
18 63 22 76	Banedanmark	The lines shown in Annex 1 except for 'private lines' and 'local lines'. (See Banedanmark's website for further information). The agreed sharing of tracks and switches between DSB and Banestyrelsen under profit sharing businesses rev. 1 of 08.01.2007.	DK1320100008	26-01-2015
25 05 00 53	DSB	<ul> <li>Infrastructure:</li> <li>Owned by DSB</li> <li>Owned by DSB Ejendomsudvikling A/S</li> <li>Owned by DSB S-tog</li> <li>(Infrastructure primarily used for travel to and from workshops and staging areas and by goods operators).</li> <li>Including the agreed sharing of tracks and switches between DSB and Banestyrelsen under profit sharing businesses rev. 1 of 08.01.2007.</li> </ul>	DK1320100003	14-07-2015
26 15 90 40	Lokalbanen A/S	<ul> <li>Infrastructure:</li> <li>Hillerød-Hundested</li> <li>Hillerød-Gilleleje/Tisvildeleje</li> <li>Helsingør-Gilleleje</li> <li>Hillerød-Snekkersten</li> <li>Jægersborg-Nærum</li> <li>And the track area of Lokalbanen A/S workshop at Hillerød station</li> </ul>	DK1320100001	20-04-2015
21 26 38 34	Metro service A/S	<ul><li>Infrastructure:</li><li>Copenhagen Metro: stage 1, 2 and 3</li></ul>	DK1320080002	31.12.2013
64 64 00 11	Midtjyske Jernbaner A/S	Infrastructure: • Vemb – Lemvig – Thyborøn • Odder - Århus H	DK1320080001	09.10.2013
29 81 89 83	Nordjyske Jernbaner A/S	<ul> <li>Infrastructure:</li> <li>Hirtshals – Hjørring (Hjørring station only own platform tracks and workshop area)</li> </ul>	DK1320090007	17-12-2014

Table 11. Infrastructure managers	Table 11.	Infrastructure	managers
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Bus. Reg. No	Infrastructure manager	Scope	Certificate No	Valid until
		<ul> <li>Skagen (including dock railway) – Frederikshavn (excluding station)</li> <li>Both lines including safety and remote control equipment</li> </ul>		
57 34 47 17	Regionstog A/S	Infrastructure: Nakskov – Nykøbing Falster Maribo – Bandholm Køge – Hårlev – Rødvig Hårlev – Fakse Ladeplads Tølløse – Slagelse Nykøbing Sjælland - Holbæk	DK1320100002	31-12-2013
24 24 67 87	Øresundsbro Konsortiet I/S	The infrastructure managed by Øresundsbro Konsortiet on the Øresund link's Danish section, including the Danish system section from km 12.854 to the system border at km 18.235 and the Swedish system section from the system border at km 18.235 to the territorial border at km 23.6.	DK1320090004	30-06-2014

Infrastructure managers safety-authorised pursuant to Executive Order No 13 of 4 January 2007 on the safety authorisation of railway infrastructure managers.

# Annex 2: Relations between different parties involved in the railways

The Danish Transport Authority is an authority which falls under the auspices of the Ministry of Transport. With two mergers between different authorities in 2010, it now has responsibilities and tasks covering railways, roads and aviation.

The Authority deals with a wide range of tasks in the fields of railways, public transport, as well as within road transport, automotive technology and in connection with postal legislation. The Authority has nearly 300 employees.

As a railway authority, it is the Danish Transport Authority's task to take care of the rules for safety and interoperability. The Ministry of Transport drafts the general bills.

At the same time, it is the Authority's role to safety-approve infrastructure managers and certify railway undertakings. Changes to technical systems, safety rules, etc. must also be approved to some extent by the Authority if related to safety or covered by rules on interoperability.

Railway undertakings and infrastructure managers are responsible for safety. They manage day-to-day operation, as well as the development and maintenance of technical systems.

The Accident Investigation Board for Civil Aviation and Railways is the investigating authority in the event of an accident. It carries out independent investigations and makes recommendations to prevent accidents.

Figure 12. Parties involved in railway safety



The principal players in the railway sector today. Railway undertakings and railway infrastructure managers are each separately responsible for safety, operation etc. in relation to passengers and the public. The Danish Transport Authority deals with authorisations and carries out supervision to check that these players fulfil their responsibilities responsibly. The Ministry of Transport owns Banedanmark and DSB.

# Annex 3: Definitions used

# Accidents

– Accident is understood to mean an unwanted or unintended sudden incident or a specific chain of such incidents that has harmful consequences. Accidents are broken down into the following categories: train collision, train derailments, accidents at level crossings, personal injury caused by moving rolling stock, fire and other<sup>23</sup>.

— Train collision is understood to mean a train collision, including a collision with obstacles within the structural gauge limits (collision), a head-on collision between two trains or a collision between the front and rear of two trains or a sideways collision between part of one train and part of another train, or a train in collision with shunting rolling stock or objects that are fixed in place or are temporarily on or near the track, except at level crossings, if the objects have been lost by crossing vehicles or persons.

 Derailment is understood to mean any incident in which at least one of the train's wheels comes off the rails.

 Accidents at level crossings is understood to mean accidents at level crossings involving at least one railway vehicle and one or more crossing vehicles, other crossing users, e.g. pedestrians, or objects temporarily on or near the track if these have been lost by crossing vehicles or users.

– Personal injury caused by moving rolling stock is understood to mean injury to one or more persons who are either hit by a railway vehicle or by an object attached to or which has been dislodged from the vehicle. The definition also covers persons who fall out of railway vehicles, and persons who fall or are hit by loose objects while travelling in railway vehicles.

– Fire in rolling stock is understood to mean fires and explosions, including of loads, under way between a departure station and a destination, including while stopped at the departure station, the destination or while stopped on the way and while shunting.

-Other types of accident is understood to mean all accidents other than train collisions, derailments, accidents at level crossings, personal injury caused by moving rolling stock and fire in rolling stock.

# Significant accidents

– Significant accidents is understood to mean any accident involving at least one moving railway vehicle and which results in at least one person being killed or seriously injured, or in the extensive destruction of rolling stock, track or other plant or the environment or in extensive disruption to traffic. Accidents in workshops, warehouses and depots are excluded<sup>24</sup>.

 $<sup>^{23}</sup>$  §3 of Exec. Order No 575 of 25 May 2012 on the reporting of data on accidents, precursors to accidents and safety irregularities, etc. to the Danish Transport Authority.

<sup>&</sup>lt;sup>24</sup> Commission Directive 2009/149/EC of 27 November 2009, Annex 1. Implemented by Exec. Order No 1293 of 23/11/2010.

– *Extensive destruction of rolling stock, track or other plant or the environment* is understood to mean destruction valued at at least DKK 1.2 million.

 Extensive disruption to traffic is understood to mean that train traffic is at a standstill for six hours or more on a main line.

# Suicide

- *Suicide* is understood to mean an action by which a person intentionally takes his own life, and which is recorded as such by the competent authorities.

# Dangerous goods

- *Dangerous goods* is understood to mean substances and objects that may not be transported under the Regulation concerning the International Carriage of Dangerous Goods by Rail (RID), or may only be transported under conditions defined in the RID.

– Accidents in connection with the transport of dangerous goods is understood to mean any accident or incident that must be reported in accordance with Chapter 1.8.5 of the RID or the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR).

# **Precursors to accidents**

Precursors to accidents is understood to mean broken rails, track buckles, signal failure, passing a stop signal, broken wheels and axles on rolling stock in operation.<sup>25</sup>

– Broken rails is understood to mean any rail that has broken into two or more pieces, or any rail from which a piece of metal has broken away, leaving a hole more than 50 mm long and more than 10 mm deep on the running surface.

- Track buckles and other faults in the relative position of the track is understood to mean a fault in the continuum or geometry of the track which for safety reasons requires the immediate closure of the track or a reduction of the permissible speed.

- *Signal failure* is understood to mean any failure in the signal system, either on the infrastructure or on the rolling stock, that results in a less restrictive signal than required.

- *Passing a stop signal* is understood to mean any situation where any part of the train travels further than allowed.

 Broken wheels and axles is understood to mean a breakage that affects the key components of the wheel or axle, thereby creating a risk of accident in the form of derailment or collision.

## **Personal injury**

*Personal injury* is recorded according to five different types of person (passenger, employee, level-crossing users, unauthorised persons on railway property and others) and according to the seriousness of the injury (fatality, serious injury and less serious injury).

<sup>&</sup>lt;sup>25</sup> §3 para.2 of Exec. Order No 575 of 25 May 2012 on the reporting of data on accidents, precursors to accidents and safety irregularities, etc. to the Danish Transport Authority.

 Passenger is understood to mean anyone who undertakes a journey by railway, excluding train staff. In accident statistics this also includes persons who attempt to board or alight from a moving train.

- *Staff, including contract staff* is understood to mean any person employed in connection with a railway and who is at work at the time of the accident. The definition includes train staff and persons operating rolling stock and infrastructure plant.

- *Level-crossing users* is understood to mean anyone who uses a level crossing to cross the railway with the help of a vehicle or on foot.

- *Persons on railway property without permission* is understood to mean all persons on railway property where this is prohibited, excluding level-crossing users.

- *Other persons* is understood to mean all persons not covered by the definitions of passenger, staff, level-crossing users or persons on railway property without permission.

*Fatality* is understood to mean a person who is killed immediately or dies within 30 days as a result of an accident. Suicides are not included.

- *Seriously injured person* is understood to mean a person who has been admitted to hospital for more than 24 hours as a result of an accident. Attempted suicides are not included.

Less seriously injured person is understood to mean a person who has suffered injury.
 Deaths and serious injuries are not included.

# Costs

– Costs of environmental damage is understood to mean costs that must be met by railway undertakings and infrastructure managers, estimated on the basis of their experience, in returning a damaged area to its condition before the railway accident.

- Costs of material damage to rolling stock or infrastructure is understood to mean the costs of purchasing new rolling stock or constructing new infrastructure with the same functionality and technical parameters as the rolling stock or infrastructure damaged in the accident, as well as the costs of returning rolling stock or infrastructure that can be repaired to its condition prior to the accident. Both parts must be estimated by the railway undertakings and infrastructure managers on the basis of their experience. Costs of leasing rolling stock to replace damaged vehicles that are not available are also covered by this definition.

# Level crossings

- Level crossing is understood to mean any level crossing between the railway and roads and paths that is recognised by the railway infrastructure manager, and which is open to general traffic. Footbridges and walkways over tracks that may only be used by employees are not covered by this definition.<sup>26</sup>

<sup>26</sup> Exec. Order No 1142 of 07/12/2011. Executive Order on safety measures at level crossings managed by Banedanmark that are open to general traffic.

– *Level crossing with automatic protection or user-side warning signal system* is understood to mean a level crossing where the protection or warning signal is activated by the approaching train.

 Track-side protection is understood to mean a signal or other operational safety system that only allows trains to pass if the level crossing is protected on the user side, and no-one is about to cross; this is checked by means of monitoring or detection of obstacles.

- Level crossing with manually operated protection or warning signal system is understood to mean a level crossing where the protection or warning signal system is activated manually and is not linked to a railway signal that only allows the train to pass if the protection or warning signal system has been activated.

- *Unprotected level crossing* is understood to mean a level crossing where no form of warning system or protection is activated if users cannot use the crossing safely.

# Annex 4: Safety indicators for 2012

# Data

The statistical data in the annex were recorded by railway undertakings and railway infrastructure managers in the period 2007-2011. Some of the figures in the report are based on data that go back to 1999, but data for private and local lines is only available to a limited extent before 2003.

Data are reported in accordance with the Reporting Executive Order (Order No 575 of 25 May 2010), as amended. The definitions used can be found in annex 2 and are described in greater detail in the guidelines on the reporting of accidents, precursors to accidents and safety irregularities.

Some categories of data contain relatively small quantities of data, and can give rise to big fluctuations in the statistics from year to year. This is why 5-year cumulative averages are calculated for comparison with annual figures.

Calculation methods and definitions have changed in the course of the last 5-year period, and the statistical information may be subject to a certain degree of inaccuracy. The tables use () to indicate calculations of 5-year averages where data are unreliable.

# **Current overview of national safety indicators**

Indicators	Total in 2012	Total in 2012/million train-km	5-year average/million train-km.
Significant accidents	25	0.30	0.28
Minor accidents	367	4.41	6.47
Precursors to accidents	284	3.29	4.42
Safety irregularities	2554	30.67	30.87
Persons killed	11	0.13	0.13
Serious injuries	12	0.14	0.14
Suicides	44	0.53	0.36

Table 12. Safety indicators for 2012

Safety indicators for the railways. Significant accidents are recorded in situations giving rise to serious personal injuries, damage in excess of DKK 1.2 million or significant delays to traffic. The figures for persons killed exclude suicides.

Table 13. Indicators relating to significant accidents

Significant accidents	Total in 2012	Total in 2012/million train-km	5-year average/million train-km
Collision of trains	1	0.01	0.01
Derailment	1	0.01	0.01
Level-crossing accidents	5	0.06	0.06
Accidents involving persons	15	0.18	0.17
Fire	1	0.01	0.00
Other	2	0.02	0.03

*Significant accidents are recorded in situations giving rise to serious personal injuries or material damage in excess of DKK 1.2 million. The total number of significant accidents in 2012 was 25.* 

Table 14. Indicators relating to persons killed

Persons killed	Total in 2012	Total in 2012/million train-km	5-year average/million train-km
Passengers	1	0.01	0.00*
Staff	0	0.00	0.00*
Level-crossing users	2	0.02	0.03
Persons on railway property without permission	7	0.08	0.09
Other	1	0.01	0.00*

The figures for persons killed do not include suicides. \*zero indicates that the 5-year average is extremely small (< 0.01).

Table 15. Indicators relating to serious injuries

Serious injuries	Total in 2012	Total in 2012/million train-km	5-year average/million train-km
Passengers	1	0.01	0.03
Staff	1	0.01	0.02
Level-crossing users	4	0.05	0.03
Persons on railway property without permission	3	0.04	0.04
Other	3	0.04	0.01

The figures for serious injuries do not include attempted suicides.

Minor accidents	Total in 2012	Total in 2012/ million train-km	5-year average/million train-km
Collision of trains	134	1.61	3.28
Derailment	19	0.23	0.52
Level-crossing accidents	7	0.08	0.15
Accidents involving persons	71	0.85	0.67
Fire	75	0.90	1.17
Accidents involving spillage of dangerous goods	61	0.73	0.68
Other accidents	134	1.61	3.28

Table 16. Indicators relating to minor accidents

Minor accidents not causing serious injuries and where any material damage is below DKK 1.2 million.

Precursors to accidents	Total in 2012	Total in 2012/ million train- km	5-year average/million train- km
Broken rails	51	0.61	0.44
Track buckles and other faults in the relative position of the track	2	0.02	0.04
Signal failure	47	0.56	0.77
Signals passed at danger	176	2.08	3.22
Broken wheels and axles	7	0.08	0.16
Incidents involving dangerous goods	3	0.03	0.01

Table 17. Indicators relating to precursors to accidents

Figures for precursors to accidents. Precursors to accidents have no harmful consequences.

# Table 18. Indicators in connection with safety irregularities

Safety irregularities	Total in 2012	Total in 2012/million train-km	5-year average/million train-km
Risk of collision with person	432	5.19	4.05
Fault in braking system	52	0.62	0.67
Irregularity at level crossing	79	0.95	1.35
Deformation of tracks	9	0.11	0.14
Non-technical signalling error	287	3.45	3.49
Gauge conditions	162	1.95	2.04
Vandalism	218	2.62	3.28
Other	1315	15.79	15.87

Figures for safety irregularities. Safety irregularities have no harmful consequences.
## Annex 5: Certification, safety authorisation and supervision

#### Licences

When issuing licences to railway undertakings and infrastructure managers, the Danish Transport Authority must check compliance with a number of basic economic, insurance and legal conditions. The Authority's supervision of licences is usually based on documents. The undertaking submits documentation showing compliance with the current requirements. Relevant authorities such as the Danish tax authority, municipalities and the National Police Board are consulted, and the submitted documentation is assessed.

The Danish Transport Authority did not issue any new licences to either railway undertakings or railway infrastructure managers in 2012.

One railway undertaking's continued fulfilment of the conditions for holding a licence was reassessed. The Danish Transport Authority also carried out close economic supervision of another undertaking to ensure that it still satisfies the requirements of the law on the size of equity capital. The Danish Transport Authority also received statements concerning changes in directors and changes to the boards, respectively.

The Danish Transport Authority has received insurance documentation from all the railway undertakings and infrastructure managers (apart from those infrastructure managers covered by the state self-insurance scheme).

#### Safety certificates

	New	Amended	Renewed	Revoked	Total number of valid certificates
Number of valid safety certificates part A issued to railway undertakings in 2012	0	4	0	1	11

Table 6. Safety certificates part A under Executive Order No 14 of 04/01/2007

Figures for safety certificates part A in 2012

Table 7.	Safety certificate	es part B under	Executive Order	r No 14 of 04/01/2007
				,

		New	Amended	Renewed	Revoked	Total number of valid certificates
Number of valid safety certificates part B issued to railway undertakings in 2012	A-certificate in Denmark	0	4	0	1	11
	A-certificate in other Member States	1	1	0	0	4

Figures for safety certificates part B in 2012

## Table 8. Applications for safety certificate part A (broken down into accepted (A), rejected or withdrawn (R) and pending (P))

			А	R	Р
Number of applications for safety certificates part A submitted by railway undertakings in 2012	A-certificate in	New certificates	0	0	0
	A-certificate in Denmark	Amended certificates	3	0	0
		Renewed certificates	0	0	2
	A-certificate in other Member States	New certificates	0	0	0
		Amended certificates	0	0	0
		Renewed certificates	0	0	0

Applications for safety certificate part A in 2012. Note that a safety certificate part A issued in 2012 may be the outcome of an application in a previous year. A: Application accepted, certificate issued. R: Application rejected or withdrawn, no certificate issued. P: case pending, no certificate issued as at 31.12.2012.

## Table 9. Applications for safety certificate part B (broken down into accepted (A), rejected or withdrawn (R) and pending (P))

			А	R	Р	
Number of applications for safety certificates part B submitted by railway undertakings in 2012	A-certificate in Denmark A-certificate in Denmark	A-certificate in New certificates		0	0	0
		Amended certificates	5	0	0	
		Renewed certificates	0	0	2	
	A-certificate in other Member States	New certificates	1	1	0	
		Amended certificates	1	0	0	
		Renewed certificates	0	0	0	

Applications for safety certificate part B in 2012. Note that a safety certificate part B issued in 2012 may be the outcome of an application in a previous year. A: Application accepted, certificate issued. R: Application rejected or withdrawn, no certificate issued. P: case pending, no certificate issued as at 31.12.2012.

### Safety authorisations

Table 10. Safety authorisations under Executive Order No 13 of 04/01/2007

	New	Amended	Renewed	Revoked	Total number of valid certificates
Number of valid safety authorisations issued to infrastructure managers by the Danish Transport Authority in 2012	0	0	0	0	9

Number of safety authorisations in 2012

## Table 11. Safety authorisations (broken down into accepted (A), rejected (R) and pending (P))

		А	R	Ρ
Number of applications for safety authorisations submitted to the Danish Transport authority by infrastructure managers in 2012	New authorisations	0	0	0
	Amended authorisations	0	0	1
	Renewed authorisations	0	0	0

Applications for safety authorisations in 2012. Note that a safety authorisation issued in 2012 may be the outcome of an application in a previous year. A: Application accepted, certificate issued. R: Application rejected or withdrawn, no certificate issued. P: case pending, no certificate issued as at 31.12.2012.

# Annex 6: Amendments to legislation and regulations

Legislation	Instrument	Date of entry into force	New or amended legislation	Comments
Railways Act	Act No 612 of 18 June 2012	1 July 2012	Amending act	The Act provides authority for a system for user-financing the Danish Transport Authority's supervision of the railway sector.
Railways Act	Act No 613 of 18 June 2012	1 July 2012	Amending act	The Act contains a simplification of the rules on level crossings as well as the rules on the accreditation of certifying undertakings, rules on the approval of training centres, rules on injunctions and bans on entrepreneurs and historic lines, etc.
Provisions on the implementation of the technical specification for interoperability (TSI) relating to the sub- system operation and traffic management in the trans-European conventional rail system	RP 5-1-2012	1 April 2012	New RP	The RP implements the Commission's decision on operation and traffic management. It is a technical update of the TSI.
Provisions for operation and traffic management rules in the railway sector	RP 5-2-2012	1 April 2012	Amending RP	On 12 May 2011 the Commission took a decision on changes to the technical specifications for the 'Operation and Traffic Management' sub-system relating to conventional and high-speed trains. The Danish Transport Authority therefore updated the existing RP on operation and traffic management rules. The rules must be applied on lines equipped with ERTMS. The rules can be applied on other lines if the operating conditions make this appropriate.
Executive Order on authorisation for placing into use of sub-systems in the railway infrastructure.	Executive Order No 1187 of 12 December 2012	1 January 2013	Revised	The requirement to submit significance assessments to the Danish Transport Authority has been extended by one year. In addition, the complaints provision is clarified.

Table 12. Amendments to legislation and regulations in 2012. RP=Railways Provision.

Provisions on the implementation of the technical specification for interoperability (TSI) relating to train control and communication sub- systems in the trans- European rail system.	RP No 4-1-2012 of 21 November 2012.	1 October 2012	New RP	The TSI applies to the sub-system Mobile Train Control and Communication Equipment and the sub- system Fixed Train Control and Communication Equipment.
Executive Order regulating compensation and insurance amounts pursuant to the Railways Act	Executive Order No 981 of 12 October 2012	1 January 2013	Annual executive order	A positive adjustment is being made to the compensation and insurance amounts that apply to railway undertakings and railway infrastructure managers under the Railways Act
Executive Order amending the Reporting Executive Order	Executive Order No 1197 of 12 December 2012	1 January 2013	Amendment	The Reporting Executive Order establishes what data undertakings must submit to the Danish Transport Authority on accidents, precursors to accidents and safety irregularities. The amending Executive Order was justified inter alia by a need to clarify one of the incident categories.
Executive Order on requirements for certifying undertakings in the railway sector	Executive Order No 982 of 12 October 2012	22 October 2012	New	The Order establishes requirements specifying that undertakings that certify entities with responsibility for maintenance under Commission Regulation No 445/2011/EU must be accredited.
Executive Order on the Danish Transport Authority's fees in the railway sector etc.	Executive Order No 658 of 22 June 2012	1 July 2012	Repealed with the entry into force of Executive Order No 1194 of 13 December 2012	Rates for existing fees are being adjusted, and fees are being set for a series of services for which no fees were previously charged.
Executive Order on the Danish Transport Authority's fees and charges in the railway sector	Executive Order No 1194 of 13 December 2012	1 January 2013	Annual executive order	The Order updates the amount charged for supervision of safety certificates and safety authorisations
Executive Order on noise from rolling stock (vehicles) used on the Danish rail network	Executive Order No 627 of 15 June 2012	1 July 2012	New	The Order implements the Commission's decision of 4 April 2011, (2011/229) on the technical specification for interoperability relating to the sub-system 'rolling stock - noise' (TSI NOI).
Executive Order on the safety certification of entrepreneurially managed undertakings in the railway sector	Executive Order No 626 of 15 June 2012	1 July 2012	New	The Order makes it possible for an entrepreneurially managed undertaking to transport vehicles and materials at its own risk on the railways by having itself safety-certified, i.e. granted a safety certificate by the Danish Transport Authority.

Executive Order on the application of the RID to national transport and the transport of dangerous goods in hand luggage etc.	Executive Order No 541 of 12 June 2012	1 July 2012	New	The Order brings together some of the previously applicable rules on the transport of dangerous goods into one order. The Order also establishes several new rules on inter alia the scope of the RID, which is extended to also apply within a railway infrastructure manager's area, i.e. marshalling yards and intermodal terminals, etc.
Executive Order on technical requirements for work vehicles on the rail network	Executive Order No 542 of 12 June 2012	20 June 2012	New	The Order establishes technical requirements for work vehicles that require approval for use on that part of the Danish rail network covered by the Interoperability Directive. The Order applies to new work vehicles as well as to work vehicles that have been reconditioned or upgraded.
Executive Order on safety advisors for the transport of dangerous goods	Executive Order No 543 of 12 June 2012	1 July 2012	New	The Order establishes requirements specifying that undertakings that transport dangerous goods, and undertakings involved in the classification, packaging, marking, loading and unloading of dangerous goods and the completion of transport documents must have consulted a safety advisor as a starting point.
Executive Order on requirements for designated bodies in the railways sector	Executive Order No 441 of 16 May 2012	1 June 2012	New	The Order establishes what requirements must be satisfied to be a designated body under the Interoperability Directive.
Provisions on the European register of approved types of railway vehicles	RP 6-1-2012	1 April 2012	New	The provisions establish the specification for the European register of approved types of vehicles, which the European Railway Agency (ERA) must establish and maintain under the Interoperability Directive.
Executive Order on vehicles' compatibility with the rail network	Executive Order No 1127 of 30 November 2012	1 July 2013	New	The Order establishes technical compatibility requirements for vehicles that must be approved for use on that part of the [Danish] rail network covered by the Interoperability Directive. The Order includes requirements on how to draft a compatibility certificate against the current declarations of conformity.

Executive Order on the approval of training centres, examiners, etc. for training train drivers in the railway sector	Executive Order No 1029 of 5 November 2012	8 November 2012/ 1 July 2013	New	The Order implements the European Commission's Decision of 22 November 2011 on criteria for the recognition of training centres involved in the training of train drivers, on criteria for the recognition of examiners for train drivers and on criteria for the organisation of examinations in accordance with Directive 2007/59/EC of the European Parliament and of the Council.
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The summary shows where amendments have been made to acts or regulations with reference to the relevant instrument and a short description of what the amendment involved.

Safety on the railways in Denmark in 2012 remains high. A few more people were killed in railway accidents in 2012 than in 2011, but the level of safety for 2012 is still on a par with the 5-year average and Denmark is still at the top when we compare ourselves with other European countries.

2012 was the year when undertakings were required to assess the significance of all technical changes that could affect railway safety. The significance assessments serve as a triviality limit, which ensures that only the most serious or complicated changes have to be approved by the Danish Transport Authority. The Danish Transport Authority monitored this work closely in 2012.

Trafikstyrelsen (Danish Transport Authority) Edvard Thomsens Vej 14 DK-2300 Copenhagen S info@trafikstyrelsen.dk www.trafikstyrelsen.dk

#### Safety report 2012

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