Instituto da Mobilidade
e dos Transportes Terrestres, I.P.

RAIL TRANSPORT

ANNUAL SAFETY REPORT 2008

Instituto da Mobilidade
e dos Transportes Terrestres, I.P.

DOCUMENT CONTROL		
Drafted by	Instituto da Mobilidade e dos Transportes Terrestres Avenida das Forças Armadas, no 40 1649-022 Lisboa Portugal	
Approved by	Crisóstomo Teixeira	Signature on original
Revised by	João Antunes	Signature on original
Drafted by	Emídio Cândido	Signature on original
Version/Revision	1.0	
Date	24.09.2009	
Type of document	Report	
Document status	Approved	

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A.1 – Scope

This report describes IMTT [Institute for Mobility and Land Transport] activities in its role as the National Railway Safety Authority during 2008 and assesses developments in the safety of passenger and goods transport on the National Railway Network.

It does not cover the activities of other guided transport systems, such as: metros, light railways, trams, electric trains and cable cars.

A.2 – Summary

The IMTT Annual Safety Report 2008 sets out the activities of the Portuguese National Railway Safety Authority, the Common Safety Indicators and the year's most significant safety-related events.

The report gives a detailed description and analysis of railway safety performance during the last five years in order to identify trends that may inform decision-making on future measures to improve railway safety.

The report does not cover the activities of other guided transport systems such as metros, light railways, trams, electric trains and cable cars.

B – Introduction

B.1 – Introduction to the report

Publication of this report for 2008 discharges the legal requirement to publish an annual report on rail transport safety, as set out in Article 66-O of Decree Law No 270/2003, as amended by Decree Law No 231/2007 of 14 June.

The IMTT produced this report in accordance with European Railway Authority (ERA) guidelines and recommendations on the content and structure of National Safety Authority annual safety reports.

This report sets out the IMTT's safety-related activities, particularly its initiatives for improving railway safety, and covers the publication of safety rules, the development of the safety certification and authorisation of undertakings and the supervision of their activities.

Annex C presents the Common Safety Indicators (CSIs) listed in Annex V of the above-mentioned Decree Law which are used to measure and assess safety performance.

Since 2006, the IMTT/former INTF and railway undertakings have worked together to ensure that the definitions used to analyse data on CSIs are clearly understood and harmonised and that all parties analyse and validate the results in a rigorous and transparent fashion.

A series of definitions of CSIs are presented for analysing and verifying trends with a high standard of reliability.

Although the report seeks to present reliable data, there are still some gaps in the information submitted by certain undertakings on the cost of accidents. Some progress has been made in this area, and undertakings that have not provided sufficient information are taking steps to ensure that they will soon be able to do so.

This report will be circulated directly to the following:

- Ministry of Public Works, Transport and Communications
- European Railway Agency
- *Gabinete de Investigação de Segurança e Acidentes Ferroviários* (GISAF) [Safety and Rail Accident Investigation Bureau]
- Infrastructure manager and rail transport undertakings.

It will also be made available to the public through the IMTT website

B.2 – Information on the structure of the railway system

A generic description of the national railway network and details of railway network and infrastructure management undertakings are provided in Annex A.

B.3 – Trends

B.3.1 – Accidents

The year 2008 showed an improvement compared to 2007 and compared to the average over the last five years, with a significant reduction in the number of accidents and their consequences.

The frequency of accidents and the number of victims have also fallen over the last five years (2004-2008).

The most significant accidents during the year were the three derailments on the Tua line, the most recent of which caused one fatality. This came after the line was reopened in 2008 following the serious accident on 12 February 2007, in which three people died and two were seriously injured.

This series of accidents led to the decision to suspend traffic on the stretch of the Tua line between Cachão and Tua pending an assessment of infrastructure and rolling stock safety.

B.3.2 – Development of Safety Management

History was made in 2008 when, as a consequence of the deregulation of railway goods transport, an undertaking asked for the first time for its safety management system to be approved and for safety certificates to be issued (Parts A and B), as provided for by Decree Law No 270/2003, as amended by Decree Law No 231/2007 of 14 June.

The IMTT issued Parts A and B of these certificates to TAKARGO on 23 May and 25 July respectively. The undertaking's first commercial journey took place in September.

As in 2007, the remaining uncertified undertakings that provide railway services (CP and REFER) did not ask for their safety management systems to be approved and for a Safety Certificate or Authorisation to be awarded.

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C – Organisation of the IMTT

The IMTT was created by Decree Law No 147/2007 of 27 April and took on the land passenger, goods and other transport responsibilities of various defunct industry bodies (in the case of the railways, from the INTF). It also took responsibility for matters related to drivers, transport professionals, vehicles and infrastructure.

The IMTT has a functionally autonomous Railway Regulatory Unit with responsibilities for the economic and technical regulation of this subsector.

C.1 – Mission

The IMTT's mission is to regulate, monitor and take responsibility for coordinating and planning the land transport sector in order to meet the mobility needs of people and goods.

It is also responsible for supervising and regulating the sector's activities and promoting the safety, quality and rights of land transport service users.

C.2 – Safety

The IMTT is the designated National Safety Authority, as provided for in European Parliament and Council Directive 2004/49/EC of 29 April 2004 on safety on the Community's railways, and has the power to:

- approve, authorise and certify vehicles and equipment used by land transport systems, including railway infrastructure, guarantee the required technical and safety standards and authorise and supervise the agencies responsible for certification and inspection;
- approve and reject safety management systems and impose penalties for inadequate performance;
- monitor land transport sector activities and ensure that the system for dealing with administrative offences is applied;
- decide on the introduction of technical improvements in the railway and road subsectors in the light of technological changes with a view to improving safety, making services more efficient and reducing negative environmental impacts.

C.3 – Organisation chart

See Annex B1 for the IMTT organisation chart.

C.4 – Workforce

To discharge its responsibilities in the road and rail transport sectors throughout national territory, the IMTT had a labour force of 909 on 31 December 2008.

For the purposes of regulating safety on guided transport systems such as metros, light railways, trams and cable cars in 2008, the IMTT's Railway Infrastructure and Equipment Department, part of the Directorate for Technical Regulation and Safety Services, employed:

- 5 Senior Technical Officers
- 1 Advisory Technical Officer
- 1 Administrative Technical Officer

C.5 – Relations with other agencies

In discharging its responsibilities as the National Railway Safety Authority, the IMTT has institutional relations with various agencies, as shown in Annex B.2.

D – Development of railway safety

D.1 – Implementation of Directive 2004/49/EC (Railway Safety Directive)

Directive 2004/49/EC was transposed into Portuguese legislation (only in part in the case of safety aspects) by Decree Law No 231/2007 of 14 June, which amended Decree Law No 270/2003 of 28 October. This Decree Law made safety certification and authorisation obligatory, established common safety indicators, objectives and methods and set out the safety responsibilities of the railway regulator – the IMTT.

Transposition of the Directive into national legislation was completed with the publication of Decree Law No 394/2007 of 31 December, which set out the responsibilities, jurisdiction and procedures of the Gabinete de Investigação de Segurança e Acidentes Ferroviários (GISAF) [Safety and Rail Accident Investigation Bureau] for the technical investigation of accidents and incidents. GISAF's nature, mission and organisation were set out in Decree Law No 395/2007 of 31 December.

In order to make Decree Law No 270/2003, as amended by Decree Law No 231/2007, operational, the IMTT immediately made arrangements for drafting the following regulations:

- Regulation on common emergency procedures (Article 66);
- Regulation on the procedure for approving safety management systems (Article 66-B);
- Regulation on safety certification and authorisation (Article 66-I);
- Regulation on training, inspections and the issue of certificates (Article 66-I).

The IMTT prepared these regulations in 2008 and put out them out for public consultation at the beginning of 2009.

Although the regulatory framework was not completed in 2008, in accordance with the Safety Directive the IMTT successfully handled and completed the first safety certification process of the first private undertaking to begin services following the deregulation of railway goods transport. The IMTT used criteria and methodologies developed by ERA Working Groups, in which it participates.

Finally, GISAF began activities in 2008, having been created at the end of 2007 by Decree Law No 394/2007 of 31 December.

The year 2008 witnessed another significant step towards the implementation of the Safety Directive with the issue of the first Safety Certificate under the scheme established by Decree Law No 231/2007 of 14 June, which amended Decree Law No 270/2003 of 28 October, and with the creation of the GISAF.

D.2 – Initiatives for maintaining or improving safety

The most significant initiatives for maintaining and improving rail transport safety are presented in Tables D.2.1 and D.2.2 respectively. Some initiatives were taken in response to accidents while others continued previous initiatives and were implemented by the IMTT and railway undertakings.

Safety initiatives	Accident giving rise to the measure		
	Date	Place	Description
Suspension of traffic between Tua and Cachão stations and verification of compliance with safety requirements on other narrow gauge lines (Tâmega and Corgo)	22.08. 2008	Tua line	Derailment of railcar LRV 9503

Table D.2.1 – Most significant safety initiatives taken in response to accidents

Safety initiatives	Reason
Resumption of services through the Rossio tunnel on the Sintra line after suspension of traffic and major work to strengthen the infrastructure and renovate systems	To improve operating conditions and reinforce transport safety
Planning and testing of train and station platform video surveillance system based on wireless image transmission	To improve safety inside trains and in passenger embarkation and disembarkation
Continuation of the level crossing safety improvement programme, closing 40 LCs and reclassifying a further 17	To eliminate/reduce accidents associated with the use of level crossings
Entry into service of the Porto Operational Command Centre	To improve operating conditions and reinforce transport safety
Simulated railway accident at Vila Nova da Baronia coordinated by the SNBPC	To test emergency plans and improve response to emergencies
Replacement of the mechanical signalling system/telephone block by traffic light signalling/automatic block and CONVEL on the Pinhal Novo – Barreiro stretch	To improve operating conditions and reinforce transport safety

Table D.2.2 –Most significant safety initiatives taken for other reasons

D.3 – Analysis of trends

The data presented in this report were collected and processed in accordance with definitions and methods harmonised at European level and developed by the European Railway Agency. They will form the crucial part of the revision of Annex 1 of Directive 2004/49/EC (Safety Directive), scheduled for 2009/10.

This section analyses some of the trends revealed by the Common Safety Indicators during the five-year period from 2004 to 2008. The graphs use the R^2 value to assess the reliability of trends. A value close to 1 indicates a strong correlation between the variables.

This section will also analyse railway safety system performance in 2008 compared to 2007 and the period from 2004 to 2008.

Annex C presents tables with numerical data, ratios and definitions used in verifying the Common Safety Indicators for 2008.

With regard to methodology, the accident numbers for 2004 and 2005 have been slightly adjusted in this report as a result of a new and exhaustive review of data by the INE in 2009.

In addition, the classification of accident victims in the 'others' category has been adjusted in light of the European Railway Agency's clarification of the interpretation of the definition. This did not involve any addition or reduction in the total number of victims, but redistributed some into the 'unauthorised persons' category, which means that the values in the tables and graphs in this report are slightly different from those presented in the annual safety report for 2007.

D.3.1 – Number of accidents

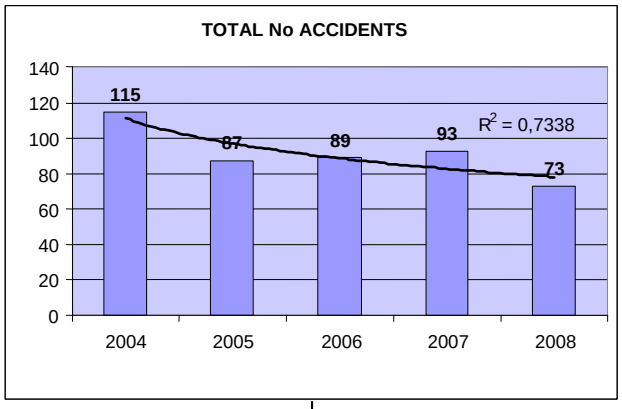
There was a significant fall in the number of accidents in 2008 compared to 2007 (- 20) and in the average for the last five years (-18), due in large part to the reduction in accidents at level crossings (- 5 on average) and accidents caused by rolling stock in motion (-11 on average).

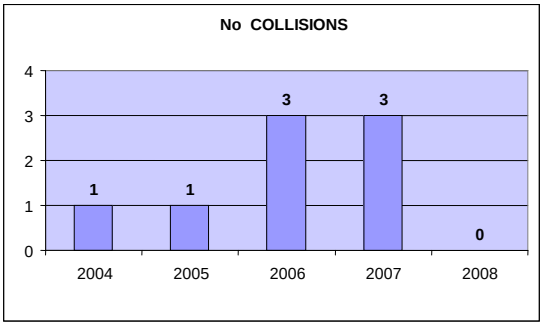
As has become the norm with our railway system and in the rest of Europe, the categories in which most accidents occur are accidents to persons caused by rolling stock in motion and accidents at level crossings.

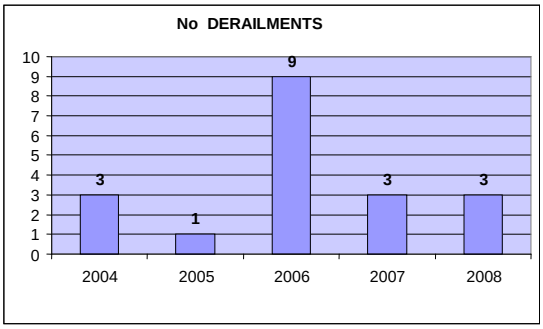
For the fifth consecutive year there were no collisions between trains. The few collisions occurring (an average of two per year) involved trains colliding with obstacles on the track. Also for the fifth consecutive year, there were no accidents due to fires on rolling stock.

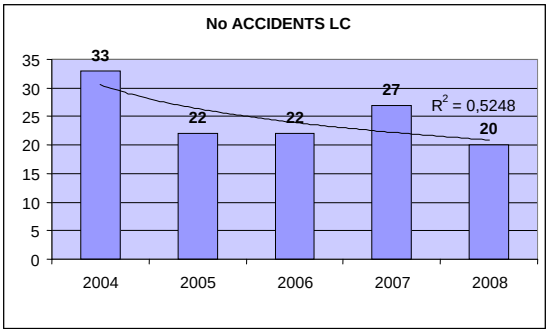
The following page presents graphs of the number of accidents during the period from 2004 to 2008 and shows the respective trends.

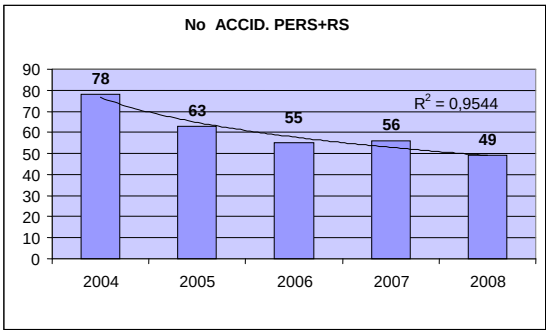
Number of Accidents	2004	2005	2006	2007	2008	Average
Total number of accidents	115	87	89	93	73	91
Train collisions, including collisions with obstacles within the clearance gauge	1	1	3	3	0	2
Train derailments	3	1	9	3	3	4
Accidents at level crossings, including accidents involving pedestrians	33	22	22	27	20	25
Accidents to persons caused by rolling stock in motion, except for suicides	78	63	55	56	49	60
Fires in rolling stock	0	0	0	0	0	0
Other accidents	0	0	0	4	1	1
Suicides	25	39	40	52	50	41

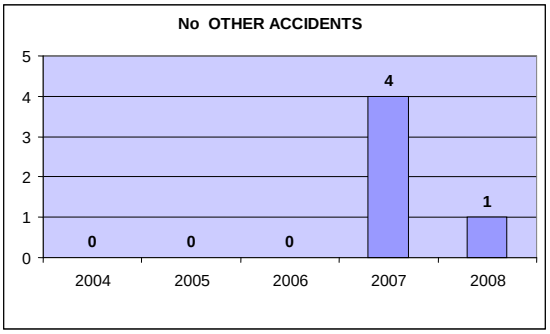

TOTAL No ACCIDENTS
140
120
100
80
60
40
20
0
115
87
89
93
73
R2 = 0,7338
2004
2005
2006
2007
2008


No COLLISIONS
4
3
2
1
0
1
1
3
3
0
2004
2005
2006
2007
2008


No DERAILMENTS
10
9
8
7
6
5
4
3
2
1
0
3
1
9
3
3
2004
2005
2006
2007
2008

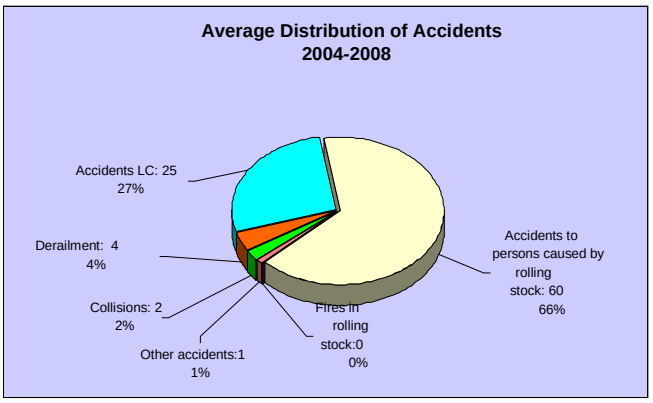

No ACCIDENTS LC
35
30
25
20
15
10
5
0
33
22
22
27
20
R2 = 0,5248
2004
2005
2006
2007
2008


No ACCID. PERS+RS
90
80
70
60
50
40
30
20
10
0
78
63
55
56
49
R2 = 0,9544
2004
2005
2006
2007
2008


No OTHER ACCIDENTS
5
4
3
2
1
0
0
0
0
4
1
2004
2005
2006
2007
2008

The graphs shows a clear downward trend in the total number of accidents, which correlates closely with the downward trend in the categories in which accidents are more numerous: accidents to persons caused by rolling stock in motion and accidents at level crossings.

The distribution of accidents and their relative importance remains virtually unchanged compared to the previous year, with two-thirds occurring in the category of accidents to persons caused by rolling stock in motion and just over a quarter in accidents at level crossings. Derailments and collisions represent a small minority of the total number of accidents (6%).



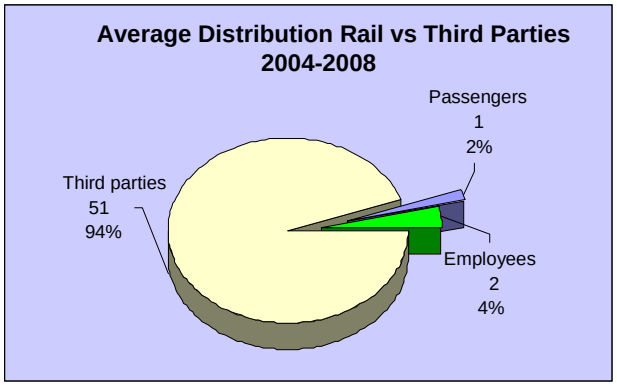
D.3.2 – Fatalities

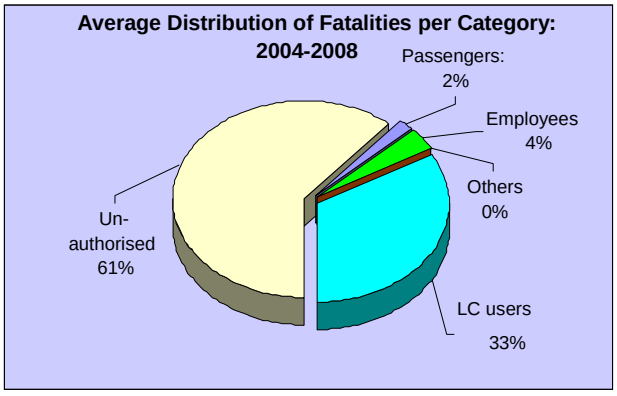
In 2008 the number of fatalities resulting from railway accidents was the lowest in the last five years and fell significantly compared to the previous year (-16 fatalities), due to the reduction in the number of victims among unauthorised persons, workers and users of LC [level crossings]:

Passengers: + 2
Employees: - 4
LC users: - 5
Unauthorised persons: - 9
Other persons: 0

In Portugal, as in other European countries, the overwhelming majority of fatalities involve people who use railway property inappropriately, either because they trespass on railway premises or because they do not follow rules on the use of level crossings, as shown by the accompanying graphs.

The table and graphs on the following page show the average distribution of total fatalities in all categories over the last five years:





Total fatalities by type of accident	2004	2005	2006	2007	2008	Average
Total in all accidents	72	47	53	58	42	54
Train collisions, including collisions with obstacles within the clearance gauge	0	0	0	0	0	0
Train derailments	3	0	0	3	1	1
Accidents at level crossings, including accidents involving pedestrians	26	11	18	20	15	18
Accidents to persons caused by rolling stock in motion, except for suicides	43	36	35	35	26	35
Fires in rolling stock	0	0	0	0	0	0
Other accidents	0	0	0	0	0	0

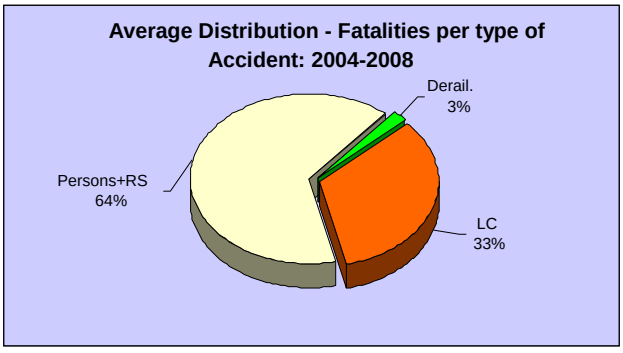
There has been a downward trend in the total number of fatalities on the railways during the last five years.

The types of accident that cause most fatalities are, on average, those caused by rolling stock in motion (almost two thirds) and those occurring at level crossings (one third).

Although derailments are high-profile events that have great social impact, they are responsible for a mere 3% of victims.

One especially relevant and significant improvement in railway safety is that there has been no significant collision of trains during the last five years.

The graphs on the following page show a breakdown of trends in mortality during the last five years.



Fatalities per category	2004	2005	2006	2007	2008	Average
Total	72	47	53	58	42	54
Passengers	0	0	0	1	3	1
Employees	3	2	1	5	1	2
LC users	26	11	18	20	15	18
Unauthorised persons	43	33	34	32	23	33
Others	0	1	0	0	0	0

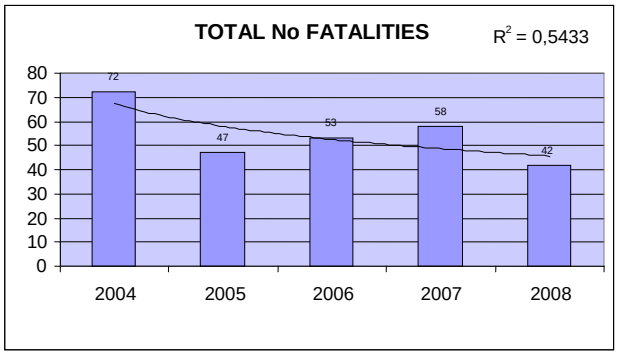
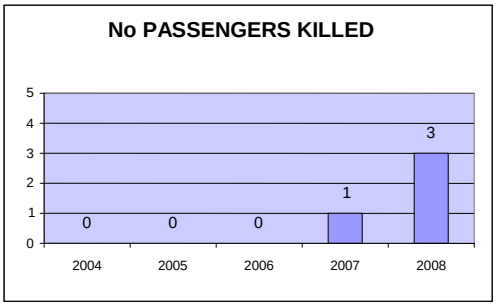
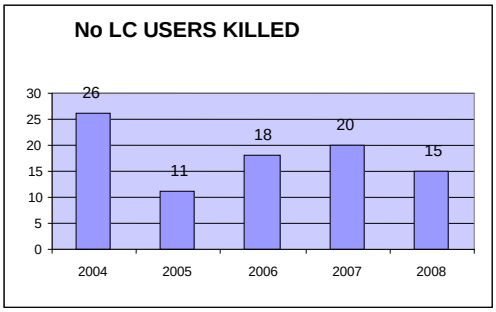
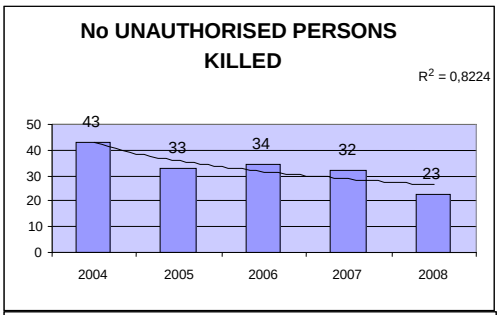
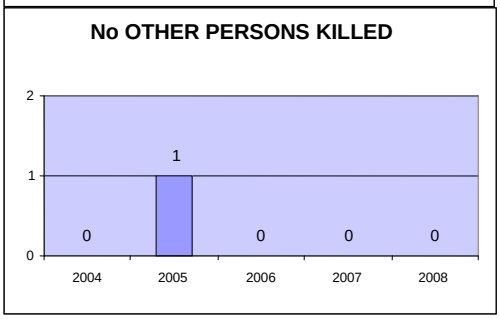


Fig 2 - Fatalities 2004-2008







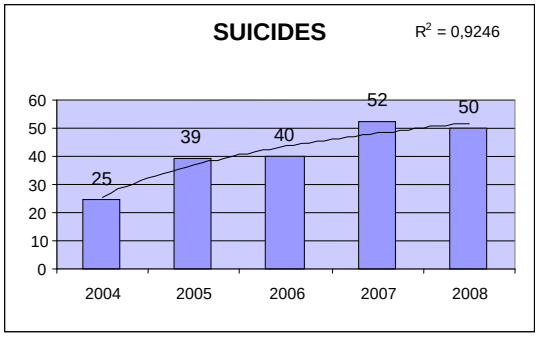


D.3.3 – Suicides

Suicides are not deemed to be accidents because they are classified as voluntary acts of self-harm.

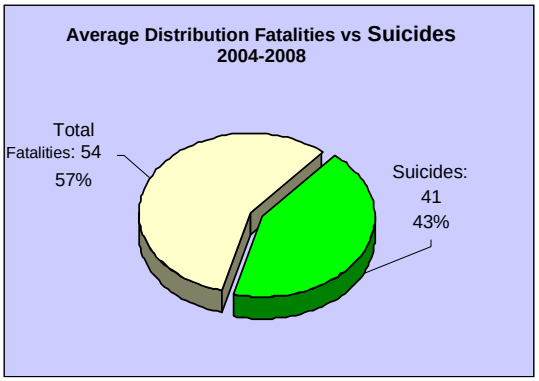
In addition to being a personal and social tragedy, suicides cause enormous disruption to the railways.

In 2008, 50 fatalities were classified as suicides on the basis of documentary and witness evidence. This represents a slight reduction compared to 2007, though the trend during the last five years has been clearly upward.



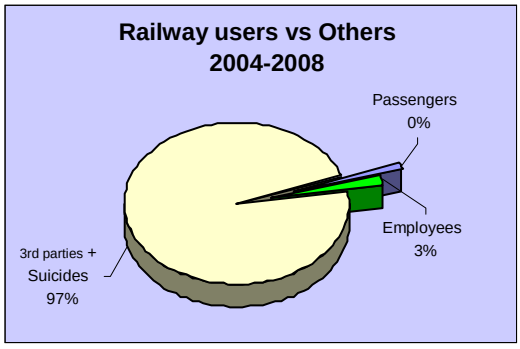
In the period from 2004 to 2008 there was, on average, a downward trend in the number of fatalities and an upward trend in the number of suicides.

An interesting statistic with which to assess the impact of suicides on the railway network is the proportion of suicides out of the total number of fatalities. The following graph shows that on average suicides accounted for almost half the number of fatalities during the last five years.



Another interesting statistic is the ratio between the number of fatalities caused by railway network activities (passengers + railway workers) and those caused by third parties (level crossing users + unauthorised persons + others + suicides).

The overwhelming majority of fatalities on the railways (97%) involve third parties who, in one way or another, interact with the railway network in an unsafe way.



D.3.4 – Serious Injuries

As with fatalities, most serious injuries occurred in accidents involving rolling stock in motion (47.5%) or at LCs (17.5%).

In 2008 there was an increase in the number of serious injuries compared to 2007, but there has been a slight reduction during the last five years.

The pattern of serious injuries is similar to that of fatalities, with the overwhelming majority of accidents involving unauthorised persons or level crossing users.

The averages for the period from 2004 to 2008 show a significant number of injuries to passengers (18%), a much higher percentage than the number of fatalities among passengers (around 2%).

No of serious injuries by type of accident	2004	2005	2006	2007	2008	Average
Total in all accidents	50	44	33	34	39	40
Collisions of trains, including with obstacles within the clearance gauge	1	0	1	0	0	0
Train derailments	0	0	1	2	4	1
Accidents at level crossings, including accidents involving pedestrians	13	15	9	8	10	11
Accidents to persons caused by rolling stock in motion, except for suicides	36	29	22	23	23	27
Fires in rolling stock	0	0	0	0	0	0
Other accidents	0	0	0	1	2	1

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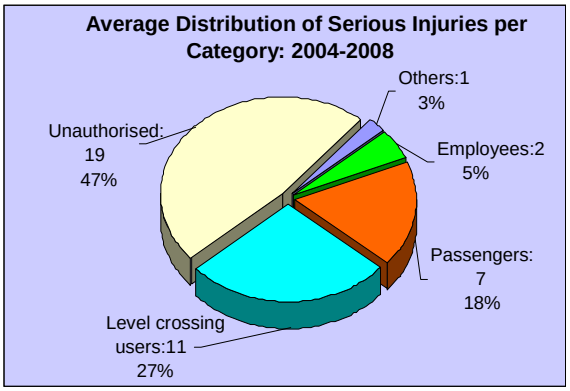
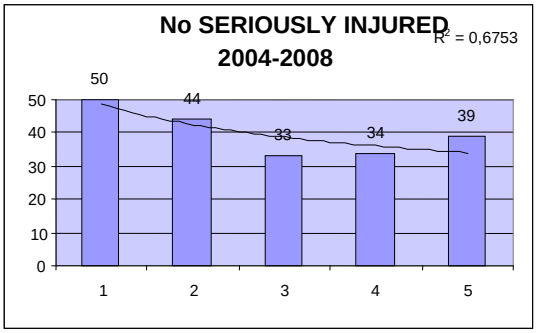
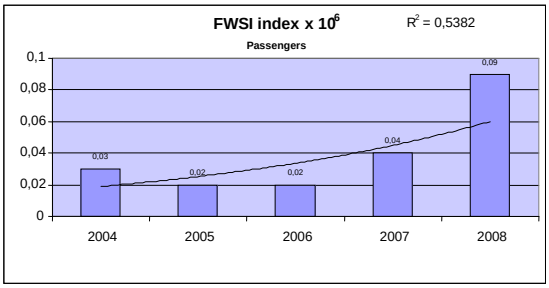


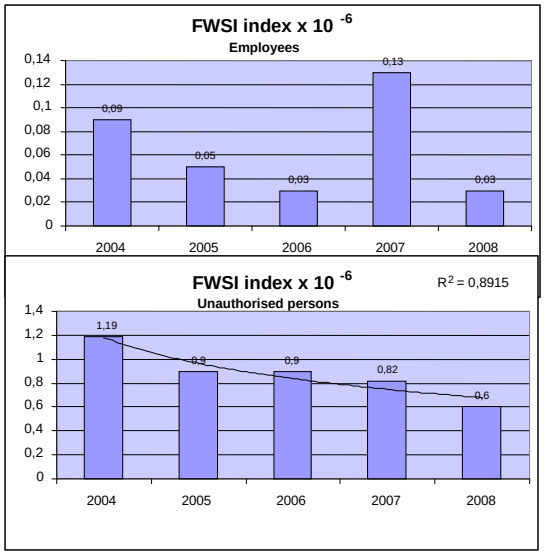


D.3.5 – The risk for society

A useful method for analysing trends in railway accidents and the risks to which society is exposed by rail transport involves calculating a standard index that takes into account the number of fatalities and serious injuries during the year.



FWSI index x10^{-6}	2004	2005	2006	2007	2008	Ave.
Total in all accidents	2.03	1.32	1.43	1.5	1.1	1.48
Passengers	0.03	0.02	0.02	0.04	0.09	0.04
Employees	0.09	0.05	0.03	0.13	0.03	0.07
LC users	0.72	0.32	0.48	0.51	0.38	0.48
Unauthorised persons	1.19	0.9	0.9	0.82	0.6	0.88
Others	0	0.03	0.01	0	0	0.01

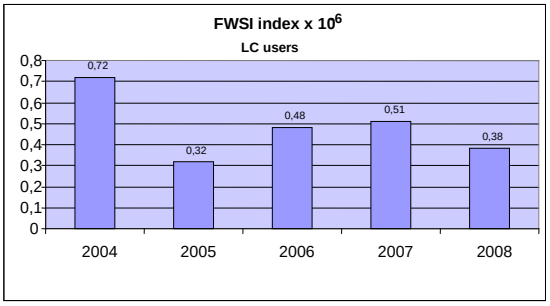


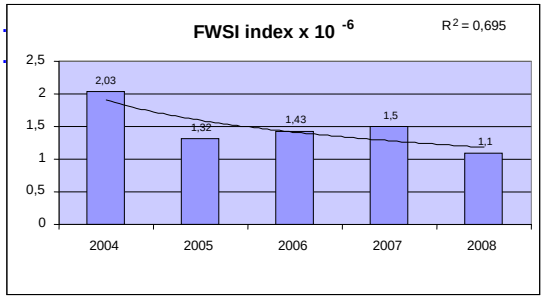
This indicator is calculated by dividing the total number of Fatalities and Weighted Serious Injuries (FWSIs) by the number of trains/kilometres travelled during the year under analysis. For the purposes of calculating the index, a weighted serious injury is considered to be statistically equivalent to 0.1 of a fatality.

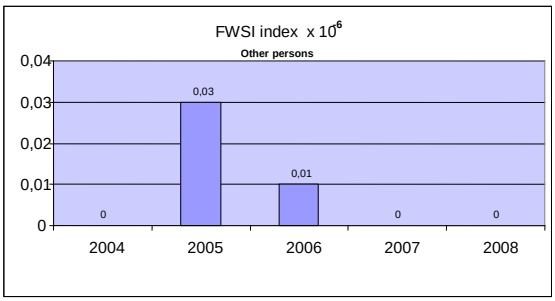
The following tables and graphs show the figures for this index during the period from 2004 to 2008

The trend suggests a clear reduction in the risk to society posed by the railway network.

The different categories of risk are shown in the following graphs and indicate a trend towards an increased risk for passengers.





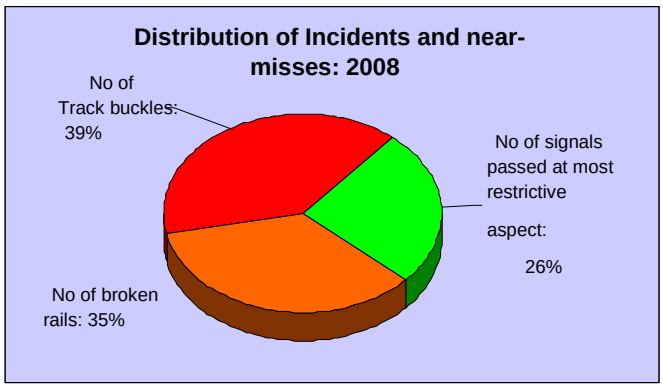


D.3.6 – Incidents and near misses

The total number of incidents and near misses fell by 44% in the period between 2006 (the first reference year) and 2008. However, this positive development was not accompanied by a fall in the number of signals passed at their most restrictive aspect. This issue will be the subject of particular attention in the near future.

Incidents and near misses by type	2006	2007	2008
Total number of incidents and near misses	168	100	94
Broken rails	45	39	33
Track buckles	95	40	37
Wrong side signalling failures	0	0	0
Signals passed at their most restrictive aspect	24	20	24
Broken wheels on rolling stock	1	0	0
Faulty axles on rolling stock	3	1	0

The causes of incidents and near misses are roughly equally divided between the three main categories.

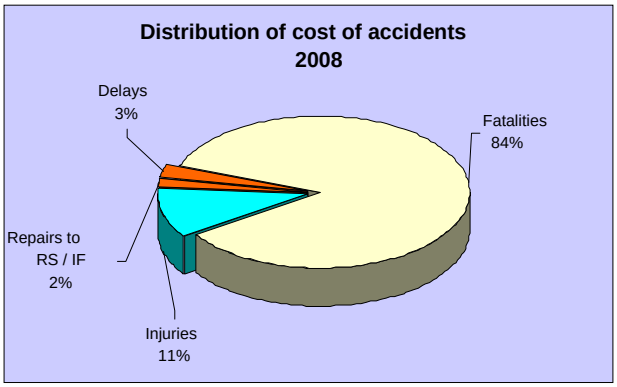


D.3.7 – Cost of accidents

The cost of accidents was determined by means of the methodology developed by the ERA for use in calculating common safety indicators. The methodology will be incorporated into EU legislation when Annex I of Directive 2004/49/EC is revised in 2009. This methodology calculates the cost of accidents by taking account of the value society attributes to preventing accidents causing fatalities, serious injuries and delays to passenger and goods trains (see details in Annex C).

The figures were calculated by considering the values defined by Portugal in Tables 1, 2 and 3 of Annex C, corrected on a linear basis by the factor of growth in per capita GDP between 2002 and 2008.

Cost of accidents (EUR million)	2006	2007	2008
Total cost	52.11	60.25	47.69
Fatalities	47.24	54.96	40.54
Injured	3.93	4.31	5.03
Cost of replacing or repairing damaged rolling stock and infrastructure	n.a.	n.a.	0.75
Cost of delays, disruption and rescheduling of traffic, including supplementary expenditure on staff and lost profits	0.94	0.98	1.37



The cost of accidents in 2008 fell significantly compared to 2007 (- 20%) due to a significant reduction in the number of fatalities, which is the most costly category of accident.

D.3.8 –Indicators relating to the technical safety of infrastructure and their implementation

Indicators relating to the technical safety of infrastructure in 2008 (see accompanying table) show a small improvement compared to previous years and a consistent improvement in technical safety on the railways. This improvement in the safety conditions of infrastructure may correlate with and have a direct influence on trends in the number of accidents and victims recorded in the last five years.

Indicators relating to the technical safety of infrastructure and their implementation	2006	2007	2008
% of lines with Automatic Train Protection (ATP) systems in operation	50.3%	50.8%	51.3%
% of ck carried out using operational ATP systems	90.0%	90.0%	90.0%
Total number of LCs	1297	1266	1229
Number of LCs per kilometre of track	0.37	0.36	0.35
Number of LCs per kilometre of line	0.46	0.45	0.43
% of LCs with automatic or manual protection	39.3%	38.2%	37.3%

E – REELVANT AMENDMENTS TO LEGISLATION AND REGULATIONS

E.1 – National Legislation

The most significant legislative change in 2008 was the entry into force of the Technical Specifications for Interoperability [TSI] on safety in railway tunnels and accessibility for people with reduced mobility to conventional and high-speed trans-European railway networks and to high-speed railway network subsystem infrastructure.

E.2 – Technical Safety Regulations

The most significant documents drawn up in developing compulsory technical safety regulations were the following:

- Addendum 26 to General Safety Regulation III (Movement of Trains) – changes in procedures related to traffic records and departures of trains from terminal stations with automatic/telephone block systems;
- Addendum 31 to General Safety Regulation V (Train Braking) – regulates the use of automatic brakes in shunting;
- Addendum 32 to General Safety Regulation V (Train Braking) – restricts the use of dynamic braking by goods trains with empty wagons on switches for diverted lines;
- Addendum 19 to General Safety Regulation VI (Composition of Trains) – establishes rules for the identification of rolling stock in accordance with the TSI on the Traffic Operation and Management subsystem on the conventional railway network;
- IG 4 (Shunting) – establishes new procedures and responsibilities for shunting on national railway network premises;
- CSI 01/08 (Immobilisation of rolling stock) – establishes new procedures for immobilising rolling stock on national railway network premises.

F – DEVELOPMENT OF SAFETY CERTIFICATION AND AUTHORISATION

F.1 – National Legislation

Decree Law No 231/2007, which introduced the amendments to Decree Law No 270/2003 necessary to transpose the Safety Directive, came into force on 14 June 2008. That date therefore marked the beginning of a new scheme for the safety certification of rail transport undertakings, making it obligatory for the infrastructure manager to obtain safety authorisation in order to carry out the respective activities.

The relevant documentation for safety certification and authorisation procedures can be found on the IMTT website.

Other supporting documentation that may be required for applications, such as the list of railway-related legislation and regulations, was published in the Network Directory (REFER). Applicants can obtain these safety regulatory documents from REFER on request.

F.2 – Numerical data

Portugal issued its first Railway Safety Certificate in 2007 in response to an application submitted by the rail transport undertaking Fertagus on 10 November 2006. The certificate was issued on 10 May 2007 under the safety certification arrangements created by Decree Law No 270/2003, which transposed Directive 2001/14/EC of 26 February.

On 15 February 2008 the IMTT received a formal request from the company TAKARGO for Safety Certificate - Part A under Decree Law No 270/2003, as amended by Decree Law No 231/2007 of 14 June, which transposed Directive 2004/49 (Safety Directive) into national legislation.

The IMTT issued Part A of this certificate on 23 May.

After obtaining Safety Certificate Part A, TAKARGO applied for Part B on 17 July. The IMTT issued this certificate on 25 July. After meeting the legal requirements for the rail transport of goods, the company made its first commercial train journey in September.

REFER, the company responsible for managing the infrastructure, did not apply for Safety Authorisation in 2008.

Annex E presents numerical data on the development of safety authorisation and certification.

F.3 – Procedural aspects

Applications for Safety Certificate Part A, which shows that an approved safety management system exists, are assessed according to criteria harmonised at European level that have been developed by a European Railway Agency Working Group in which the IMTT participates.

The application was analysed exhaustively, both by means of documentation and pre-certification interviews and auditing. We worked closely with TAKARGO, whose staff were always prepared to ensure that corrections were made and that additional information was provided.

Although this was the first application, the legislation was recent and new analytical methods were used, it was processed and the certificate was issued within three months, which can be regarded as very reasonable.

The application for Safety Certificate Part B was examined according to assessment criteria set out in documents produced by the above-mentioned ERA Working Group and in Commission Regulation (EC) No 653/2007 of 13 June 2007 (on the use of a common European format for safety certificates and application documents in accordance with Article 10 of Directive 2004/49/EC of the European Parliament and of the Council and on the validity of safety certificates delivered under Directive 2001/14/EC).

Part B of the certificate was issued within one week of the application, mainly due to previous work carried out in response to the application for Part A and the undertaking's swift response to the IMTT's additional questions.

In 2008, TAKARGO applied for a change to the Part B certificate originally issued since it had broadened the scope of its railway operations to include an additional route.

Since the certificate was issued the IMTT has audited the company, in cooperation with REFER, and to date no significant accident or incident has been recorded in connection with its railway operations.

G – SUPERVISION OF RAIL TRANSPORT UNDERTAKINGS AND OF THE INFRASTRUCTURE MANAGER

G.1 – Description of supervision

Various procedures are used in supervising the activities of the infrastructure manager and railway undertakings:

- Analysis of occurrences recorded in the Daily Traffic Report drawn up by REFER;
- Planned monitoring;
- Monitoring decided after analysing events relating to accidents or incidents, claims or investigation board recommendations;
- Safety Management System audits.

Monitoring is always ensured by IMTT staff, who may ask personnel from the undertakings concerned for assistance in carrying out the work necessary for such monitoring.

G.2 – Annual safety reports by rail transport undertakings and the infrastructure manager

Railway undertakings submitted their respective annual safety reports for 2008 and therefore complied with the requirements of Article 66-C of Decree Law No 270/2003 for the third consecutive year.

As in previous years the IMTT, the infrastructure manager and rail transport undertakings worked together to harmonise the criteria and methodologies used to analyse data on the Common Safety Indicators.

As reflected in the annual safety reports for 2008, the following documents were published in 2009: TSI 78 – Report Template; TSI 79 – Definitions for the analysis of CSIs; and ICET 179 – Table of Common Safety Indicators. These documents follow the recommendations and guidelines produced by the European Railway Agency, which the European Commission will soon incorporate into Community legislation.

Following these activities and in compliance with their legal obligations, the undertakings produced and submitted their safety reports for 2008 to the IMTT. For the first time, all the reports were delivered by the legal deadline of 30 June.

With regard to compliance with legal requirements concerning the content of the report, there was a notable improvement in the organisation and quality of the information provided.

As referred to above, some difficulties persisted in determining accident costs, and measures are being taken to address this in future reports.

G.3 – Supervision

The year 2008 was the IMTT's first year of operation. It was therefore a year in which it had to adjust the entire organisation to the new organic structure and to its various responsibilities. As a result, supervision was largely limited to the daily monitoring of occurrences on the railways. The most significant specific monitoring initiatives were:

- inspection of the operational conditions of a new Global System for Mobile Communications (GSM) ground to train radio on the Tua line;
- audits of the TAKARGO Safety Management System as part of procedures related to the issue of the Safety Certificate.

G.4 – Corrective action

No corrective actions were suggested or implemented as a consequence of IMTT supervision in 2008, except for those resulting from the accident on the Tua line on 22 August 2008, set out in section D.2.1 above.

H – CONCLUSIONS

The following railway safety incidents took place in 2008:

- a series of derailments on the Tua line leading to the decision to suspend traffic between Cachão and Tua stations;
- the start-up and consolidation of IMTT operations;
- the start-up of GISAF operations;
- issuing of the first Safety Certificate to a private rail transport undertaking as part of the deregulation of railway goods transport under the legislation transposing the Safety Directive;
- the start-up of railway operations by the first private goods transport undertaking following market deregulation;
- a sharp fall in the number of significant accidents (-21.5%) and fatalities (-27.6%) compared to 2007.

The analysis of safety indicators shows a fall in the total number of accidents and victims, mainly due to a reduction in the number of accidents in the categories in which they are most frequent, i.e., those involving rolling stock in motion and accidents at level crossings.

Conversely, the trend towards an increase in the number of suicides is a negative development.

As in previous years, improvements continued to be made in the technical safety of infrastructure as a result of continued investment in eliminating and reclassifying level crossings, installing automatic train protection systems, modernising signalling and command and control traffic systems and installing new telecommunications systems.

In 2008 there was no new railway safety and safety management legislation, though a start was made on implementing legislation published in 2007 – Decree Law No 231/2007 of 14 June, which transposed the Safety Directive.

As in 2007, there were no significant developments in the certification of the safety management systems of existing railway undertakings that do not have certification.

IMTT railway safety priorities for 2009/2010, some of which it was not possible to address in 2007, include the following:

- to conclude and publish regulations necessary for safety certification and authorisation set out in Decree Law No Nº 231/2007 of 14 June, i.e.:

- regulations on procedures and requirements for Safety Certification and Authorisation;
  - regulations on the approval of Safety Management Systems;
  - regulations on the approval of Common Emergency Procedures;
  - regulations on training, inspections and the issuing of certificates to staff with relevant safety functions within the scope of Safety Certification and Authorisation;

- to conclude the updating of the Technical Safety Regulations;
- to continue to support undertakings in developing their safety management

systems by disseminating and clarifying the results of work carried out by the ERA;

- to cooperate with undertakings in identifying the most problematic aspects of railway safety with a view to taking action to reduce the number of accidents involving third parties;

- to increase the number of inspections and improve controls on the implementation of corrective measures;

- to cooperate with rail transport undertakings in identifying the underlying causes of signals passed at their most restrictive aspect (SPAD [Signal Passed at Danger]).

I – BIBLIOGRAPHY

- Template - Structure for the content of the NSA Annual Report: ERA - Network of National Safety Authorities
- Guideline for the use of the template – Structure for the content of the NSA Annual Safety Report: ERA - Network of National Safety Authorities
- Recommendation to revise Annex 1 to Directive 2004/49 - WG on Common Safety Indicators/Safety Performance
- Guidance for use of the CSI recommendation - WG on Common Safety Indicators/Safety Performance
- Annual Safety Report 2008 – REFER
- Annual Safety Report 2008 – CP
- Annual Safety Report 2008 – FERTAGUS
- Annual Safety Report – TAKARGO
- *Destaque*, INE, 9 June 2009

J - ANNEXES

ANNEX A – INFORMATION ON THE STRUCTURE OF THE RAILWAY SYSTEM

ANNEX B – INFORMATION ON THE ORGANISATION OF THE IMTT

ANNEX C – COMMON SAFETY INDICATORS AND DEFINITIONS USED

ANNEX D – AMENDMENTS TO LEGISLATION AND REGULATIONS

ANNEX E – DEVELOPMENT OF SAFETY CERTIFICATION AND AUTHORISATION

Instituto da Mobilidade
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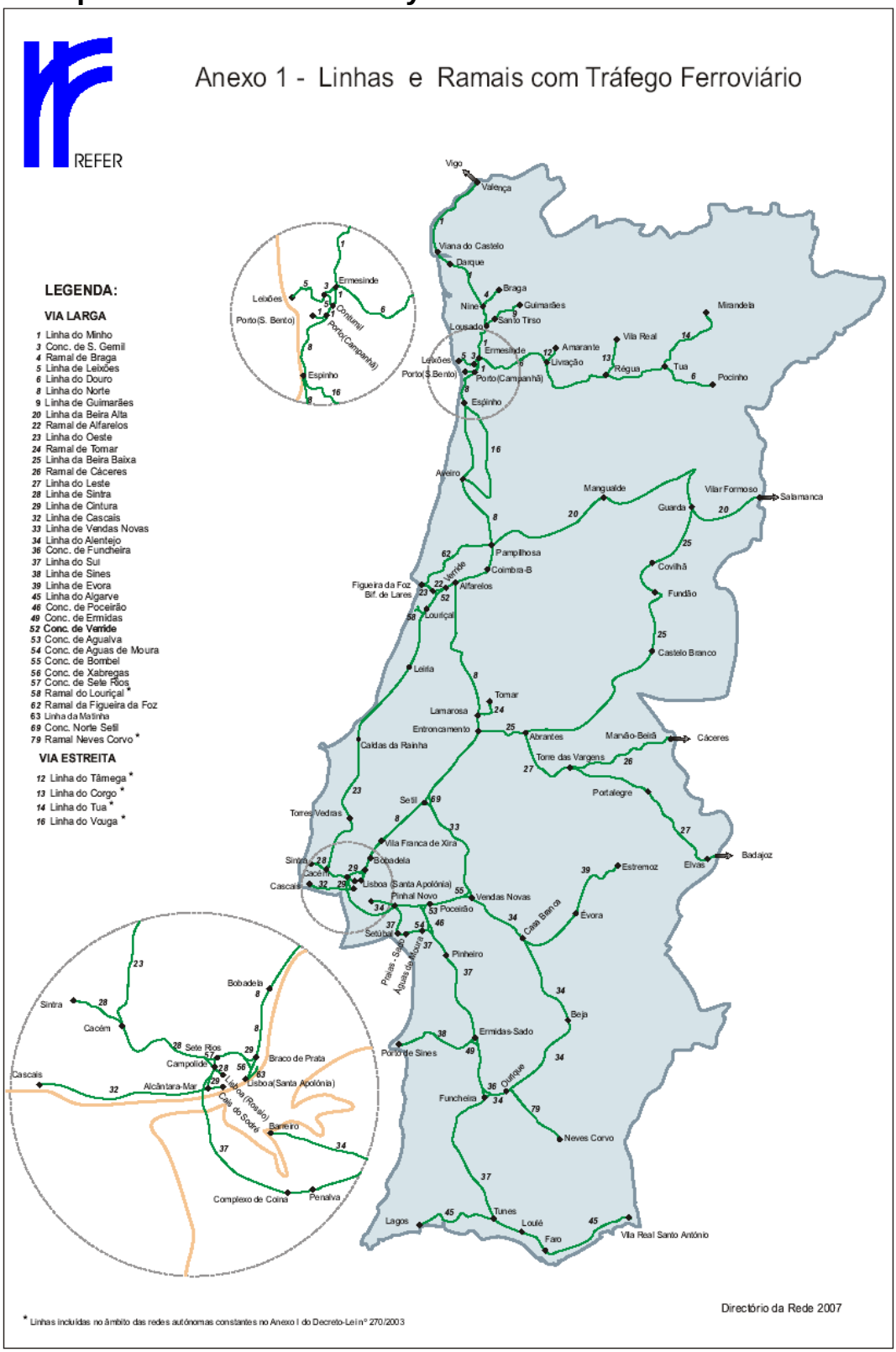
ANNEX A

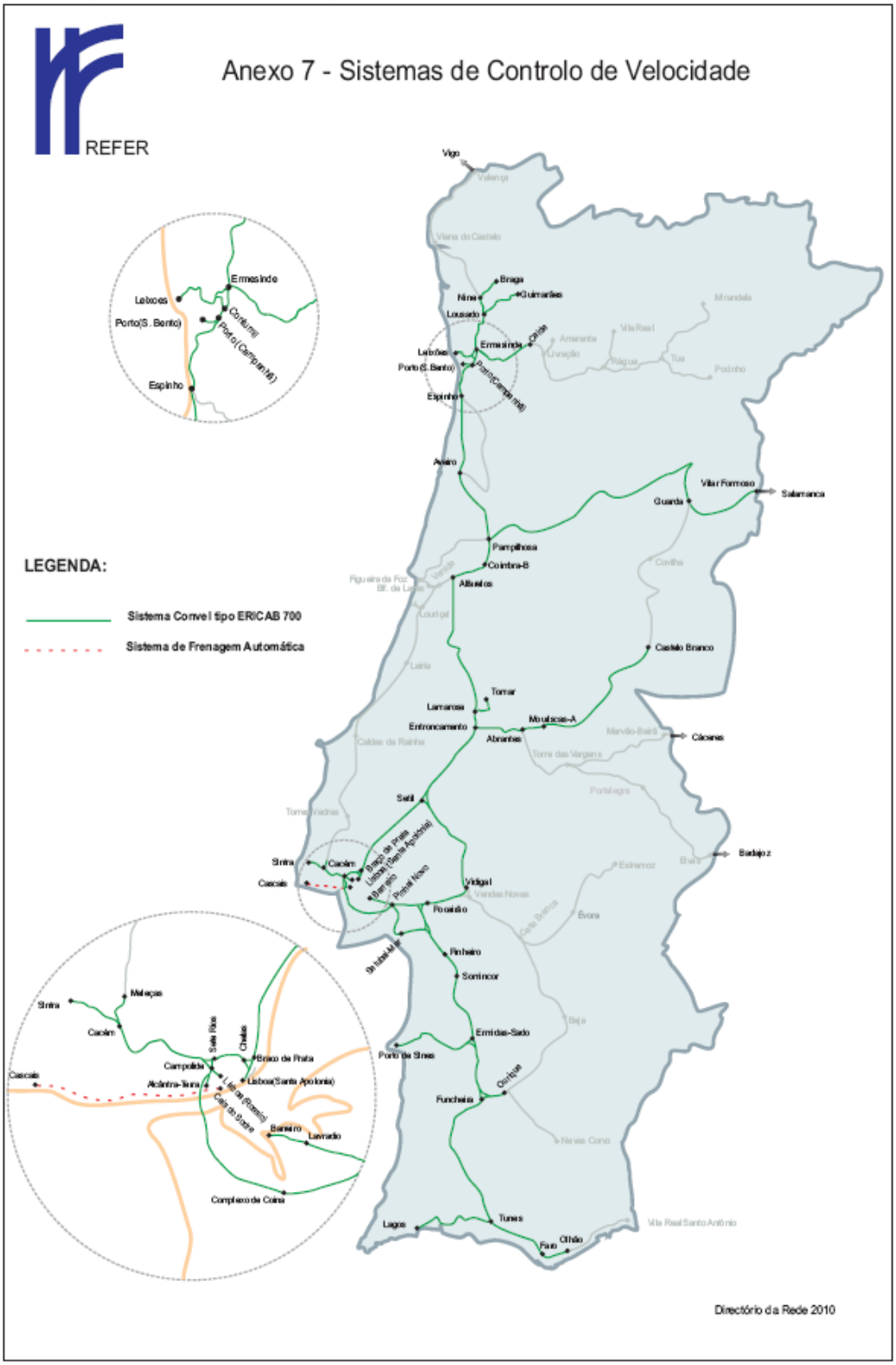
INFORMATION ON THE STRUCTURE OF THE RAILWAY SYSTEM

2008

A.1 – Map of the National Railway Network



A.1.1 – Map of Automatic Speed Control Systems



Key to Map A.1 above:

Anexo 1 – Linhas e Ramais com Tráfego Ferroviário	Annex 1 – Lines and branches open to rail traffic
Legenda	Key
Via larga	Broad gauge
Via estreita	Narrow gauge

Key to Map A.1.1 above:

Anexo 7 – Sistemas de Controlo de Velocidade	Annex 7 – Speed control systems
Legenda	Key
Sistema Convel tipo ERICAB 700	ERICAB 700 Convel system
Sistema de Frenagem Automática	Automatic braking system

A.2 – List of infrastructure management and rail transport undertakings

A.2.1 – Infrastructure Manager

Description	Information
Name	REFER, Rede Ferroviária Nacional, E.P.
Address	Estação de Santa Apolónia, 1100-105 Lisbon, Portugal
Website	www.refer.pt
Safety Authorisation (DL No 270/2003, as amended by Decree Law No 231/2007 of 14 June)	Not yet issued
Date of commencement of activity	29 April 1997
Length of network open to traffic	Total: 2 841.6 km Broad gauge track (1 668 mm gauge): 2 649.9 km Narrow gauge track (1 000 mm gauge): 191.7 km
Length of lines by number of tracks	Multiple track: 607.3 km Single track: 2 234.2 km
Length of electrified network	Total: 1 460.2 km 25 000 V_{CA}: 1 434.7 km 1 500 Vcc: 25.5 km % of network open to traffic: 51.4%
Length of lines equipped with CONVEL/ATS:	1 459.1 km % of network open to traffic: 51.3%
Length of lines equipped with ground-train radio:	1 428 km % of network open to traffic: 50.3%
Number of level crossings (including private and pedestrian)	1 229 density: 0.43 LC / km of line 0.35 LC / km of track
Level crossings with automatic or manual protection	459 % of total LC: 37.3%
Number of trains on network	Total: 706 879 (includes empty stock movements) Passengers: 628 732 (includes empty stock movements) Goods: 78 147 (includes empty stock movements)
Train km run on network (tk)	Total: 41.7 x 10^6 Passengers: 33.9 x 10^6 Goods: 8.34 x 10^6
% tk with CONVEL/ATS in operation	90%
No of hours worked on company business	6 223 775

A.2.2 – Railway Undertakings
A.2.2.1 – CP – Caminhos-de-ferro Portugueses, E.P.E.

Description	Information
Name	CP – Caminhos-de-ferro Portugueses, E.P.E.
Address	Calçada do Duque, n.º 20 1249-109 Lisbon Portugal
Website	www.cp.pt
Licence to begin activity (DL No 270/2003, as amended by DL No 231/2007 of 14 June)	Not yet awarded
Safety certificate (DL No 270/2003, as amended by DL No 231/2007 of 14 June)	Not yet awarded
Date of commencement of activity	9 May 1951
Type of traffic	Passenger and goods
Number of locomotives	Total: 152 Diesel: 83 Electric: 69
Number of railcars	Total: 279 Diesel: 76 Electric: 203
Number of carriages	137
Number of wagons	3 043
Number of drivers	1 104
Number of driver's assistants	174
Number of commercial operators with safety-related responsibilities	656
Number of trains used	Total: 636 645 (includes empty stock movements) Passenger: 558 212 (includes empty stock movements) Goods: 78 433 (includes empty stock movements)
Train km travelled (tk)	Total: 39.9 x 10^6 Passengers: 31.6 x 10^6 Goods: 8.3 x 10^6
% of tk travelled with CONVEL / ATS in operation	99.8%
Number of passenger km (pk)	3 814 x 10^6
Number of tonnes km (tonne.k)	2 550 x 10^6
Number of hours of work done on company business	7 893 504

A.2.2.2 – FERTAGUS, S.A.

Description	Information
Name	FERTAGUS, Travessia do Tejo, Transportes, S.A.
Address	Estação do Pragal Porta 23 2805-333 Almada Portugal
Website	www.fertagus.pt
Licence for commencement of activity (DL No 270/2003, as amended by DL No 231/2007 of 14 June)	Licence no 01 of 1 June 2006
Safety certificate (DL No 270/2003 of 28 October)	Safety Certificate 1/2007
Date of commencement of activity	29 July 1999
Type of traffic	Passenger
Number of railcars	Electric: 18
Number of drivers	44
Number of driver's assistants	Not applicable
Number of commercial operators with safety-related responsibilities	80
Number of trains	Passenger: 55 166 (includes empty stock movements)
Train km travelled (tk)	Passengers: 1 786 x 10^6
Number of passenger km (pk)	398 584 x 10^6
% of tk travelled with CONVEL/ATS in operation	99.98%
Number of hours of work done on company business	319 629

A.2.2.3 – TAKARGO, Transporte de Mercadorias, S.A.

Description	Information
Name	TAKARGO, Transporte de Mercadorias, S.A.
Address	Rua Mário Dionísio, n.º 2 2799 – 557 Linda-a-Velha Portugal
Website	Not available
Licence for commencement of activity (DL No 270/2003, as amended by DL No 231/2007 of 14 June)	Licence no 2 of 1 March 2008
Safety Certificate (DL No 270/2003, as amended by DL No 231/2007 of 14 June)	Safety Certificate: Part A - PT 11 2008 0001 Part B - PT 12 2008 0001
Date of commencement of activity	25 September 2008
Type of traffic	Goods
Number of locomotives	Diesel: 2
Number of wagons	83
Number of drivers	11
Number of driver's assistants	(engine driver covers this post)
Number of trains	Goods: 532 (includes empty stock movements)
Train km travelled (tk)	Goods: 0.037 X 10^6
Number of tonnes x km (tk)	2.15 x 10^6
% of tk travelled with CONVEL/ATS in operation	79%
Number of hours of work done on company business	106 156

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ANNEX B

INFORMATION ON THE ORGANISATION OF THE IMTT

2008

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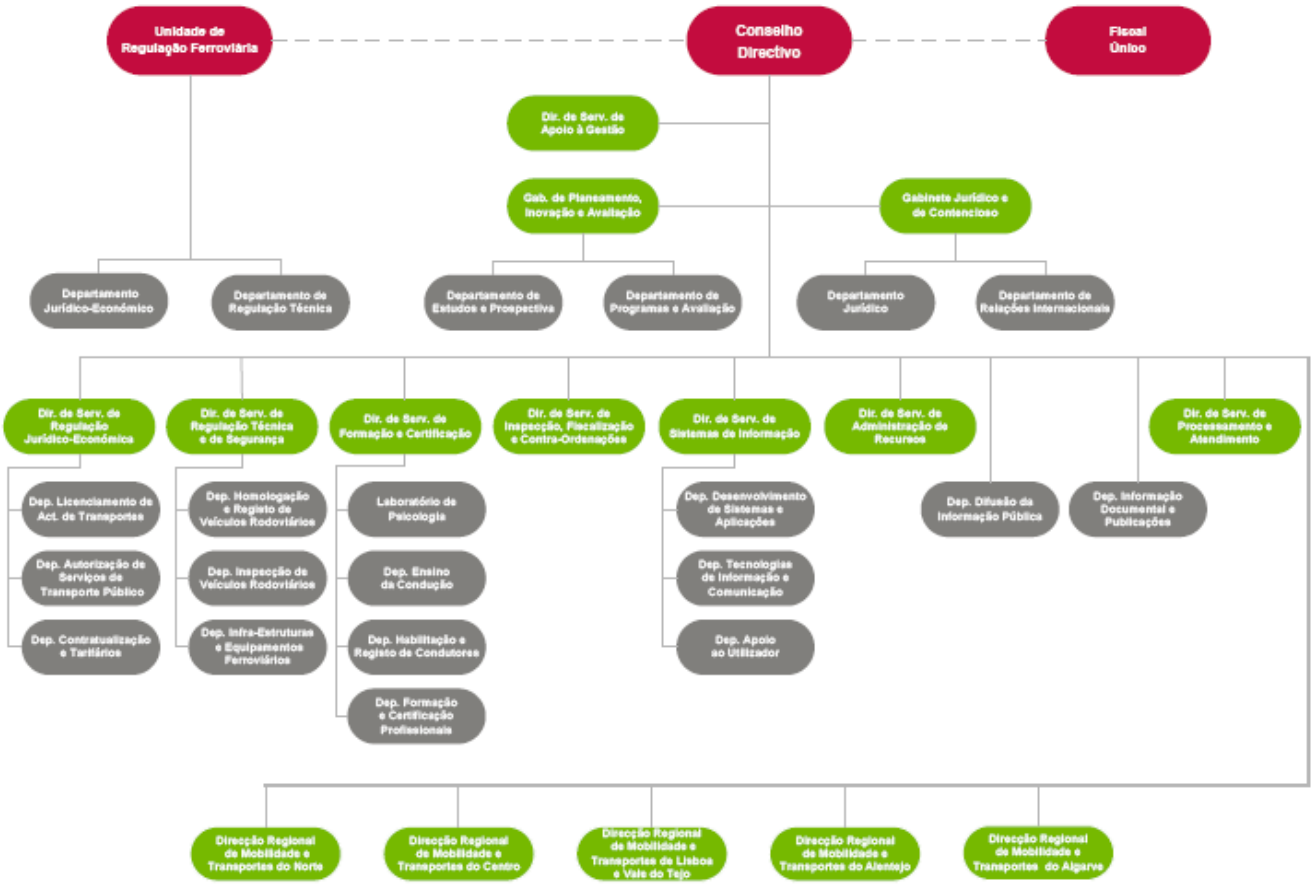
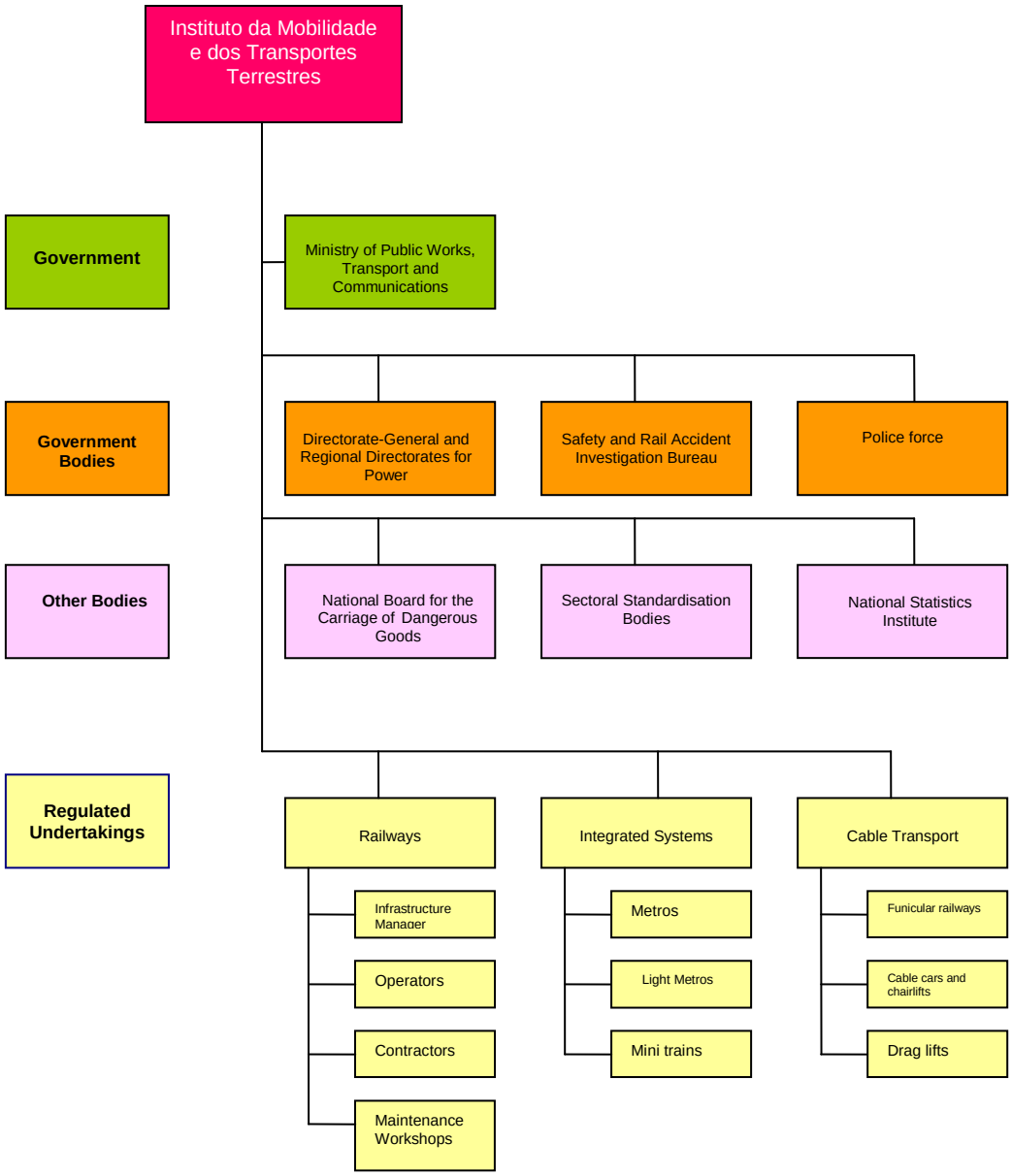
B.1 – Organisational Structure of the IMTT



Unidade de Regulação Ferroviário	Railway Regulatory Unit
Conselho Directivo	Board of Directors
Fiscal Unloo	Inspectors
Div. de Serv. de Apoyo à Gestão	Management Support Division
Gab. de Planeamento, Inovação e Avaliação	Planning, Innovation and Assessment Bureau
Gabinete Jurídico e de Contencioso	Legal Affairs and Litigation Office
Departmento Jurídico-Económico	Department for Legal and Economic Affairs
Departmento de Regulação Técnica	Technical Regulatory Department
Departmento de Estudos y Prospectiva	Department for Research and Future Development
Departmento de Programas e Avaliação	Programme and Assessment Department
Departmento Jurídico	Legal Department
Departmento de Relações Internacionais	Department for International Relations
Div. de Serv. de Regulação Jurídico-Económico	Legal and Economic Affairs Regulatory Services Division
Div. de Serv. de Regulação Técnica e de Segurança	Technical and Safety Regulatory Services Division
Div. de Serv. de Formação e Certificação	Training and Certification Division
Div. de Serv. de Inspecção, Fiscalização e Contra-Ordenações	Inspection, Monitoring and Administrative Offences Division
Div. de Serv. de Sistemas de Informação	Information Systems Division
Div. de Serv. de Administração de Recursos	Resources Administration Division
Div. de Serv. de Processamento e Atendimento	Processing and Customer Services Division
Dep. Licenciamento de Act. de Transportes	Transport Licensing Department
Dep. Homologação e Registo de Veículos Rodoviários	Road Vehicle Authorisation and Registration Department
Laboratório de Psicologia	Psychology Laboratory
Dep. Desenvolvimento de Sistemas e Aplicações	Department of Systems and Applications Development
Dep. Difusão de Informação Pública	Public Information Department
Dep. Informação Documental e Publicações	Documentary Information and Publications Department
Dep. Autorização de Serviços de Transportes Públicas	Public Transport Services Authorisation Department
Dep. Inspecção de Veículos Rodoviários	Road Vehicle Inspection Department
Dep. Ensino da Condução	Driver Training Department
Dep. Tecnologías de Informação e Comunicação	Information and Communication Technology Department
Dep. Contratualização e Tarifários	Department of Contracting and Pricing
Dep. Infra-Estruturas e Equipamentos Ferroviários	Railway Infrastructure and Equipment Department
Dep. Habilitação e Registo de Condutores	Driver Testing and Registration Department
Dep. Apoio ao Utilizador	User Support Department
Dep. Formação e Certificação Profissionais	Vocational Training and Certification Department
Direcção Regional de Mobilidade e Transportes do Norte	Regional Directorate for Mobility and Transport (North)
Direcção Regional de Mobilidade e Transportes do Centro	Regional Directorate for Mobility and Transport (Centre)
Direcção Regional de Mobilidade e Transportes de Lisboa e Vale do Tejo	Regional Directorate for Mobility and Transport (Lisboa e Vale do Tejo)
Direcção Regional de Mobilidade e Transportes do Alentejo	Regional Directorate for Mobility and Transport (Alentejo)
Direcção Regional de Mobilidade e Transportes do Algarve	Regional Directorate for Mobility and Transport (Algarve)

B.2 – IMTT relations with other bodies in connection with railway safety



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ANNEX C

COMMON SAFETY INDICATORS AND DEFINITIONS USED

2008

C.1 – Common Safety Indicators 2008

Number and type of accidents		Per million tk
Total number of all accidents	73	1.75
Train collisions	0	0
Collisions with objects	3	0.07
Train derailments	20	0.48
Accidents at LCs, including accidents involving pedestrians	49	1.17
Accidents to persons caused by rolling stock in motion, excluding suicides	0	0
Fires in rolling stock	1	0.02
Other accidents	1	0.02

Total number of suspected suicides		Per million tk
Suicides	50	1.22

Number of fatalities and breakdown by type of person		Per million tk	Per million pk
Total number of fatalities	42	1.01	
Passengers	3	0.07	0.001
Employees (including the staff of contractors)	1	0.02	
LC users	15	0.36	
Unauthorised persons on railway premises	23	0.55	
Others	0	0	

Number of fatalities and breakdown by type of accident		Per million tk
Total number of persons killed	42	1.01
In train collisions	0	0
In train derailments	1	0.02
In accidents at LC, including accidents involving pedestrians	15	0.36
In accidents to persons caused by rolling stock in motion, excluding suicides	26	0.62
In fires in rolling stock	0	0
In other accidents	0	0

Number of serious injuries and breakdown by type of person		Per million tk	Per million pk
Total number of serious injuries	39	0.93	
Passengers	6	0.14	0.0014
Employees (including the staff of contractors)	2	0.05	
LC users	10	0.24	
Unauthorised persons on railway premises	20	0.48	
Others	1	0.02	

Total number of serious injuries and breakdown by type of accident		Per million tk
Total number of serious injuries	39	0.93
In train collisions	0	0
In train derailments	4	0.1
In accidents at LC, including accidents involving pedestrians	10	0.24
In accidents to persons caused by rolling stock in motion, excluding suicides	23	0.55
In fires in rolling stock	0	0
In other accidents	2	0.05

Number of incidents and near-misses and breakdown by type		Per million tk
Total number of incidents and near-misses	94	2.25
Broken rails	0	0
Track buckles	0	0
Wrong-side signalling failures	0	0
Signals passed at their most restrictive aspect	24	0.57
Wheels broken in rolling stock in operation	33	0.79
Faulty axles in rolling stock in operation	37	0.89

Cost of accidents (million euros)		Per million tk
Total cost	47.70	1.14
Cost of fatalities	40.54	0.97
Cost of injuries	5.03	0.12
Cost of replacing or repairing damaged rolling stock or infrastructure	0.75	0.02
Cost of delays, disturbance and rerouting of traffic, including additional personnel expenditure and loss of profits	1.376	0.03

No of hours lost by personnel as a result of accidents		Per million hours worked
Total number of hours lost by personnel as a result of accidents	n.a.	n.a.

Indicators relating to technical safety of infrastructure and its implementation	
% of lines with Automatic Train Protection systems (ATP) in operation	51.3%
% tk travelled using ATP systems in operation	90.0%
Total number of LC	1229
No of LC per kilometre of track	0.35
No of LC per kilometre of line	0.43
% LC with automatic or manual protection	37.3%

Reference data	
No of train km (million tk)	41.760
No of passenger km (million tk)	4 153.860
No of km of track (km of multiple lines multiplied by no of tracks)	3 527.724
No of km of line used	2 841.588
Total number of hours worked	16 005 591

Table C.1.1 – Summary of Common Safety Indicators

C.2 – Definitions used

The definitions and methods developed by the European Railway Agency's 'Safety Performance and Monitoring' Working Group were used to determine the Common Safety Indicators. This set of definitions includes those set out in Regulation (EC) No 91/2003 (Railway Statistics) and in Directive 2004/49/EC (Safety).

Suspected suicides were used for the suicides indicator because, although the record of the circumstances in which the fatality occurred suggested an 'act to deliberately injure oneself resulting in death', the competent authorities had not at that time classified the act as suicide.

The costs of accidents resulting in persons killed and injured were calculated using the method developed under a Community project (HEATCO – Developing Harmonised European Approaches for Transport Costing and Project Assessment), which takes account of the value society attributes to preventing deaths and injuries in railway accidents.

The method used in the HEATCO project, which is based on the value of time, for both passenger and goods transport, was also adopted for valuing delays.

Definitions of accidents

'Significant accident' means any accident involving at least one rail vehicle in motion, resulting in at least one killed or seriously injured person, or in significant damage to stock, track, other installations or environment, or extensive disruptions to traffic. Accidents in workshops, warehouses and depots are excluded. (Regulation (EC) No 91/2003)

'Accident' means an unwanted or unintended sudden event or a specific chain of such events which have harmful consequences; accidents are divided into the following categories: collisions, derailments, level-crossing accidents, accidents to persons caused by rolling stock in motion, fires and others. (Directive 2004/49/EC (Safety))

Definitions for calculating Common Safety Indicators for accidents

1. **'Train'** means one or more railway vehicles hauled by one or more locomotives or railcars, or one railcar travelling alone, running under a given number or specific designation from an initial fixed point to a terminal fixed point. A light engine, i.e. a locomotive travelling on its own, is not considered to be a train. (Regulation (EC) No 1192/2003)

After discussion with the CSI WG, *Eurostat* proposed an amendment to this definition:

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

The latter definition was adopted for determining CSIs.

2. **'Collisions of trains, including collisions with obstacles within the clearance gauge'** means a collision which may be: head-on between trains; between the front and rear of two trains; between a train and any part of another train within the clearance gauge; or the collision of a train involving:

a. shunting movements;
b. fixed objects such as catch points;
c. objects temporarily present at or near the track (except at level crossings, if lost by a road vehicle or pedestrian), such as stones, landslides, trees, parts

lost by railway vehicles, road vehicles and machinery or equipment used in maintaining railway lines.

3. **'Derailment'** means any situation in which at least one wheel of a train leaves the rails.

4. **'Accidents at level crossings'** means accidents at level crossings involving: at least one rail vehicle and one or more road vehicles; other level crossing users such as pedestrians or objects at or near the track, if lost by a vehicle or LC user.

5. **'Accidents to persons caused by rolling stock in motion'** means accidents to one or more persons who are either hit by a railway vehicle or by an object attached to it or that has become detached from the vehicle. Persons who fall from railway vehicles are included, as well as persons who fall or who are hit by loose objects when travelling on trains.

6. **'Suicide'** means an act to deliberately injure oneself resulting in death, as recorded and classified by the competent national authority. (Regulation (EC) No 1192/2003)

7. **'Fires in rolling stock'** means fires or explosions occurring in railway vehicles (including their load), when they are running between the departure station and the destination, including both, and during intermediate stops and re-marshalling operations during the journey.

8. **'Other types of accidents'** means all accidents other than those classified as: collisions; derailments at LC; accidents to persons caused by rolling stock in motion; fires in rolling stock; suicides.

9. **'Rail passenger'** means any person, excluding members of the train crew, who makes a trip by rail. For accident statistics, passengers trying to embark/disembark onto/from a moving train are included. (Regulation (EC) No 1192/2003)

10. '**Employee (the staff of contractors are included)'** means any person whose employment is related to the railway and who is on duty at the time of the accident. This includes train crew and persons working with rolling stock or infrastructure installations.

11. **'LC users'** means all persons using a level crossing to cross the railway line by any means of transport or on foot.

12. **'Unauthorised persons on railway premises'** means any person present on railway premises where such presence is forbidden, with the exception of LC users.

13. **'Others (third parties)'** means all persons not defined as 'passengers', 'employees including the staff of contractors', 'LC users' or 'unauthorised persons on railway premises'.

14. **'Deaths (killed person)'** means any person killed immediately or dying within 30 days as a result of an accident, excluding suicides. (Regulation (EC) No 1192/2003)

15. **'Injuries (seriously injured person)'** means any person injured who was hospitalised for more than 24 hours as a result of an accident, excluding attempted suicides. (Regulation (EC) no 1192/2003)

16. **'Incident'** means any occurrence, other than accident or serious accident, associated with the operation of trains and affecting the safety of operation.

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

18. **'Track buckles'** means faults related to the continuum and the geometry of track, requiring track obstruction or immediate reduction of speed to maintain safety.

19. **'Wrong-side signalling failure'** means any failure of a signalling system (either to infrastructure or to rolling stock), resulting in signalling information less restrictive than that demanded.

20. **'Signal passed at danger' (SPAD)** means any occasion when any part of a train proceeds beyond its authorised movement.

21. **Broken wheels and axles'** means a break affecting the essential parts of the wheel or the axle and creating a risk of accident (derailment or collision).

Definitions and methods for calculating indicators relating to the consequences of accidents

22. Cost of persons killed and injured (Value of Preventing a Casualty – VPC)

The methodology developed by the HEATCO project (Developing Harmonised European Approaches for Transport Costing and Project Assessment) is recommended for calculating indicators relating to the impact of accidents (persons killed and injured). This uses the concept of **VPC** (**V**alue of **P**reventing a **C**asualty), the two components of which are:

a) **Value of safety *per se***: Willingness to Pay (WTP) – values based on stated preference studies carried out in the Member State for which they are applied.

b) **Direct and indirect economic costs**: cost values appraised in the Member State, composed of:

- medical and rehabilitation cost;
- legal court cost, cost for police, private crash investigations, the emergency service and administrative costs of insurance;
- production losses (value to society of goods and services that could have been produced by the person if the accident had not occurred).

Local values must be used whenever possible for a) and b), provided they have been developed by means of an appropriate methodology. If these are not available, the figures in Table 1 can be used, as in this report.

The reference year for the figures in Table 1 is 2002. These figures must be updated on a linear basis in accordance with growth in per capita GDP for the year of calculation.

	a) Value of safety per se			b) Direct and indirect costs			VPC (a+b)		
Country	Fatality	Severe injury	Slight injury	Fatality	Severe injury	Slight injury	Fatality	Severe injury	Slight injury
Austria	1 600 000	208 000	16 000	160 000	32 300	3 000	1 760 000	240 300	19 000
Belgium	1 490 000	194 000	14 900	149 000	55 000	1 100	1 639 000	249 000	16 000
Cyprus	640 000	83 000	6 400	64 000	9 900	400	704 000	92 900	6 800
Czech Republic	450 000	59 000	4 500	45 000	8 100	300	495 000	67 100	4 800
Denmark	2 000 000	260 000	20 000	200 000	12 300	1 300	2 200 000	272 300	21 300
Estonia	320 000	41 000	3 200	32 000	5 500	200	352 000	46 500	3 400
Finland	1 580 000	205 000	15 800	158 000	25 600	1 500	1 738 000	230 600	17 300
France	1 470 000	191 000	14 700	147 000	34 800	2 300	1 617 000	225 800	17 000
Germany	1 510 000	196 000	15 100	151 000	33 400	3 500	1 661 000	229 400	18 600
Greece	760 000	99 000	7 600	76 000	10 500	800	836 000	109 500	8 400
Hungary	400 000	52 000	4 000	40 000	7 000	300	440 000	59 000	4 300
Ireland	1 940 000	252 000	19 400	194 000	18 100	1 300	2 134 000	270 100	20 700
Italy	1 300 000	169 000	13 000	130 000	14 700	1 100	1 430 000	183 700	14 100
Latvia	250 000	32 000	2 500	25 000	4 700	200	275 000	36 700	2 700
Lithuania	250 000	33 000	2 500	25 000	5 000	200	275 000	38 000	2 700
Luxembourg	2 120 000	276 000	21 200	212 000	87 700	700	2 332 000	363 700	21 900
Malta	910 000	119 000	9 100	91 000	8 800	400	1 001 000	127 800	9 500
Netherlands	1 620 000	211 000	16 200	162 000	25 600	2 800	1 782 000	236 600	19 000
Norway	2 630 000	342 000	26 300	263 000	64 000	2 800	2 893 000	406 000	29 100
Poland	310 000	41 000	3 100	31 000	5 500	200	341 000	46 500	3 300
Portugal	730 000	95 000	7 300	73 000	12 400	100	803 000	107 400	7 400
Slovakia	280 000	36 000	2 800	28 000	6 100	200	308 000	42 100	3 000
Slovenia	690 000	90 000	6 900	69 000	9 000	400	759 000	99 000	7 300
Spain	1 020 000	132 000	10 200	102 000	6 900	300	1 122 000	138 900	10 500
Sweden	1 700 000	220 000	17 000	170 000	53 300	2 700	1 870 000	273 300	19 700
United Kingdom	1 650 000	215 000	16500	165 000	20 100	2100	1 815 000	235 100	18 600

Developing Harmonised European Approaches for Transport Costing and Project Assessment (for details about the deliverable 5, of interest for the CSIs WG - Proposal for Harmonised Guidelines: http://heatco.ier.uni-stuttgArticlede/)

Items are valued as if no indirect taxation or subsidy were applied

Source: European Railway Agency Safety Performance and Monitoring WG/HEATCO project

Table 1 - Value of Preventing a Casualty (VPC) – 2002 values

Source: European Railway Agency Safety Performance and Monitoring WG/HEATCO project

23. **'Cost of replacing or repairing damaged rolling stock or infrastructure'** means the cost of introducing new rolling stock or infrastructure with the same functionalities and technical parameters when it cannot be repaired, or the cost of restoring rolling stock or infrastructure to its condition prior to the accident. Both must be estimated on the basis of the experience of the operator/infrastructure manager. Any costs of leasing rolling stock because the damaged stock is not available must be included.

24. **'Cost of damage caused to the environment'** means the cost the operator/IM estimates will have to be met, based on their experience, to restore the area damaged to its condition prior to the accident.

25. **'Cost of delays'** means the monetary value of delays incurred by users of rail transport (passengers and freight customers) as a consequence of accidents, calculated by the following model:

VT = Value of travel time savings

The principle underlying VT is that each country's values are used wherever possible, provided an appropriate methodology has been devised.

If these values are not available, the values in **Tables 2 and 3** can be used, which are based on HEATCO project values and assumptions.

The reference year for the values in Tables 2 and 3 is 2002, and these values must be updated on a linear basis in accordance with growth in per capita GDP for the year of calculation.

For passengers not travelling on business, the VT is approximately one third of the values shown in Table 2. Passengers travelling to or from their workplace are not considered to be on business.

- **Value of time for a train passenger (per hour)**

VT_1 = [$VT_{(Table\ 2)}$] * [annual average percentage of business passenger trips] + 1/3 * [$VT_{(Table\ 2)}$] * [annual average percentage of non-business passenger trips]

	Business		
Country	Air	Bus	Car, Train
Austria	39.11	22.79	28.4
Belgium	37.79	22.03	27.44
Cyprus	29.04	16.92	21.08
Czech Republic	19.65	11.45	14.27
Denmark	43.43	25.31	31.54
Estonia	17.66	10.3	12.82
Finland	38.77	22.59	28.15
France	38.14	22.23	27.7
Germany	38.37	22.35	27.86
Greece	26.74	15.59	19.42
Hungary	18.62	10.85	13.52
Ireland	41.14	23.97	29.87
Italy	35.29	20.57	25.63
Latvia	16.15	9.41	11.73
Lithuania	15.95	9.29	11.58
Luxembourg	52.36	30.51	38.02
Malta	25.67	14.96	18.64
Netherlands	38.56	22.47	28
Poland	17.72	10.33	12.87
Portugal	26.63	15.52	19.34
Slovakia	17.02	9.92	12.36
Slovenia	25.88	15.08	18.8
Spain	30.77	17.93	22.34
Sweden	41.72	24.32	30.3
United Kingdom	39.97	23.29	29.02
EU (25Countries)	32.8	19.11	23.82

Table 2 - Value of time for business passenger trips (VT_1) – 2002 values

- **Value of time for a goods train (one hour):**

VT_2 = [$VT_{(Table\ 3)}$] * tonne.k/tk

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	Per tonne of freight carried	
Country	Road	Rail
Austria	3.37	1.38
Belgium	3.29	1.35
Cyprus	2.73	1.12
Czech Republic	2.06	0.84
Denmark	3.63	1.49
Estonia	1.9	0.78
Finland	3.34	1.37
France	3.32	1.36
Germany	3.34	1.37
Greece	2.55	1.05
Hungary	1.99	0.82
Ireland	3.48	1.43
Italy	3.14	1.3
Latvia	1.78	0.73
Lithuania	1.76	0.72
Luxembourg	4.14	1.7
Malta	2.52	1.04
Netherlands	3.35	1.38
Poland	1.92	0.78
Portugal	2.58	1.06
Slovakia	1.86	0.77
Slovenia	2.51	1.03
Spain	2.84	1.17
Sweden	3.53	1.45
United Kingdom	3.42	1.4
EU (25 Countries)	2.98	1.22

Table 3 - Value of time for goods trains (VT_2) - 2002 values

- **<u>Calculation of the cost of a 1 minute delay of a train (C_m)</u>**

a) Passenger trains (C_{mp})

C_{mp} = 2.5 * (VT_1 / 60) * pk/tk

b) Goods trains (C_{mf})

C_{mf} = 2.15 * (VT_2 / 60)

NB: The factors 2.5 and 2.15 between the VT and the value of the delay have been suggested by the HEATCO project.

Calculation of the cost of train delays due to an accident:

$C_{accident}$ = C_{mp} * (Minutes' delay for passenger trains) + C_{mf} * (Minutes' delay for goods trains)

26. 'Total number of hours lost as a result of accidents' means the number of hours, estimated on the basis of the experience of the operator/infrastructure manager, lost due to absence from work of their own or contractors' staff injured in accidents.

27. Number of hours worked by staff and contractors in a year' means the total number of hours, estimated on the basis of the experience of the operator/ infrastructure manager, worked in a year by their own or service providers' staff in order to carry out all the undertaking's activities, not only those relating to safety.

Indicators relating to the technical safety of infrastructure and its implementation

28. **'Automatic Train Protection' (ATP)** means a system determining compliance with signals and speed limits by monitoring the speed, including automatic stopping at signals.

29. **'Level crossing'** means any level intersection between the road and the railway, if authorised by the infrastructure manager and open to public or private road users.

30. **'Active level crossing'** means a level crossing where the crossing users are protected from or warned of the approaching train by the activation of devices when it is unsafe to cross.

31. **'Passive level crossing'** means a level crossing without any form of activating the train approach protection and/or warning system, when it unsafe to cross.

32. **'Road'** means, for the purposes of data reported under Regulation (EC) No 1192/2003 – Annex H, any private or public road, avenue or motorway, including pedestrian and cycle paths.

Indicators relating to safety management

33. **'Audit'** means a systematic, independent and documented process for obtaining audit evidence and its objective evaluation to determine how well audit criteria are being met. (ISO 9000)

Scale Factors

34. **'Train-km' (tk)** means the unit of measure representing the movement of a train over a distance of one kilometre. The distance used is the distance actually run, if available, otherwise the standard network distance between the origin and destination shall be used. Only the distance on the national territory of the reporting country shall be taken into account (Regulation (EC) No 1192/2003).

35. **'Passenger-km' (pk)** means the unit of measure representing the transport of one passenger by rail over a distance of one kilometre. Only the distance on the national territory of the reporting country shall be taken into account (Regulation (EC) No 1192/2003).

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ANNEX D

RELEVANT AMENDMENTS TO LEGISLATION AND REGULATIONS

2008

National legislation	Legal reference	Date of entry into force	Reason for introduction	Description
Legislation on the national safety authority	-	-	-	-
Legislation on bodies notified, assessors, third parties for registration, investigations, etc.	-	-	-	-
National Railway Safety Rules				
Rules on national safety methods and objectives	-	-	-	-
Rules laying down requirements for safety management systems and safety certification of railway undertakings	-	-	-	-
Rules laying down requirements for safety management systems and safety authorisation of the infrastructure manager	-	-	-	-
Rules laying down requirements for owners of rolling stock	-	-	-	-
Rules laying down requirements for wagon maintenance workshops	-	-	-	-
Rules laying down requirements for authorisation to bring into service and maintain rolling stock or modified stock, including rules for operators to exchange rolling stock, registration systems and requirements for test procedures	-	-	-	-
General traffic rules for the rail network, including rules on signalling and traffic procedures	Addendum 26 to GSR III – Movement of trains	19.10.2008	To improve procedures to reinforce/improve safety	Changes procedures related to traffic records and departures of trains from terminal stations with automatic block systems
	Addendum 31 to GSR V – Train braking	01.01.2008	To improve safety during shunting	Regulates the use of automatic brakes in shunting
	Addendum 32 to GSR V – Train braking	01.03.2008	To avoid derailments caused by the inappropriate use of dynamic braking.	Restricts the use of dynamic braking by goods trains with empty wagons on switches for diverted lines

General traffic rules for the rail network, including rules on signalling and traffic procedures	Addendum 19 to GSR VI – Composition of trains IG 4 – Shunting CSI 01/08 – Immobilisation of rolling stock	29.04.2008 01.01.2008 01.01.2008	To improve and harmonise the identification of vehicles in accordance with European legislation To improve safety during shunting by changing procedures and allocating responsibility for tasks To improve safety conditions on the railways by improving procedures	Establishes rules for identifying rolling stock in accordance with TSI on the Traffic Operation and Management subsystem on the conventional railway network Establishes new procedures and responsibilities for carrying out shunting on national railway network premises Establishes new procedures for the immobilisation of rolling stock on national railway network premises.
Rules laying down requirements for internal operating rules (company rules) to be laid down by the infrastructure manager and operators.	-	-	-	-
Rules relating to requirements for staff carrying out safety-related activities, including selection criteria, physical aptitude and vocational training and certification	-	-	-	-
Rules relating to the investigation of accidents and incidents, including recommendations	-	-	-	-
Rules laying down requirements for national safety indicators, including how to collect and analyse such indicators	-	-	-	-
Rules laying down requirements for authorising the entry into service of infrastructure (lines, bridges, tunnels, power, ATC, radio, signalling, interlock systems, level crossings, platforms, etc.)	-	-	-	-

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ANNEX E

DEVELOPMENT OF SAFETY CERTIFICATION AND AUTHORISATION

2008

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E.1 – Safety Certificates under Directive 2001/14/EC

Table E.1.1		
No of safety certificates issued under Directive 2001/14/EC to:	Undertakings licensed in Portugal	-
	Undertakings licensed in another Member State	-

Table E.1.2		Accepted*	Rejected*	Pending*
No of applications for safety certificates submitted under Directive 2001/14/EC by:	Undertakings licensed in Portugal	-	-	-
	Undertakings licensed in another Member State	-	-	-

NB (*) – Accepted: application accepted and certificate issued
Rejected: application rejected and certificate not issued
Pending: application being examined, certificate not yet issued

E.2 – Safety Certificates under Directive 2004/49/EC

Table E.2.1		New	Amended/Revised	Renewed
No of safety certificates – **Part A** issued in 2008 to:	Undertakings licensed in Portugal	**1**	-	-
	Undertakings licensed in another Member State	-	-	-

Table E.2.2		New	Amended/Revised	Renewed
No of Safety Certificates – **Part B** issued in 2008 to:	Undertakings licensed in Portugal	**1**	**1**	-
	Undertakings licensed in another Member State	-	-	-

Table E.2.3			Accepted*	Rejected*	Pending*
No of applications for Safety Certificates – **Part A** submitted in 2008 by:	Undertakings licensed in Portugal	New Certificates	**1**	-	-
		Amendment/revision of Certificates	-	-	-
		Renewal of Certificates	-	-	-
	Undertakings licensed in another Member State	New Certificates	-	-	-
		Amendment/revision of Certificates	-	-	-
		Renewal of Certificates	-	-	-

Table E.2.4			Accepted*	Rejected*	Pending*
No of applications for Safety Certificates – **Part B** submitted in 2008 by:	Undertakings licensed in Portugal Undertakings licensed in Portugal	New Certificates	**1**	-	-
		Amendment/revision of Certificates	**1**	-	-
		Renewal of Certificates	-	-	-
	Undertakings licensed in another Member State	New Certificates	-	-	-
		Amendment/revision of Certificates	-	-	-
		Renewal of Certificates	-	-	-

NB (*) – Accepted: application accepted and certificate issued
Rejected: application rejected and certificate not issued
Pending: application being examined, certificate not yet issued

E.2.5 – List of countries in which undertakings that applied for the Safety Certificate – Part B obtained the Safety Certificate – Part A:

- Portugal

E.3 – Safety authorisation under Directive 2004/49/EC

Table E.3.1	New	Amended/Revised	Renewed
No of safety authorisations issued to infrastructure management undertakings	-	-	-
	-	-	-

Table E.3.2		Accepted*	Rejected*	Pending*
No of applications for safety authorisation submitted by infrastructure management undertakings	New authorisations	-	-	-
	Amendment/revision of authorisations	-	-	-
	Renewal of authorisations	-	-	-

NB (*) – Accepted: application accepted and certificate issued
Rejected: application rejected and certificate not issued
Pending: application being examined, certificate not yet issued

E.4 – Safety Certificates – Part A: procedures

		New	Amended/Revised	Renewed
Average time in 2008 for issuing a Safety Certificate – Part A, after receipt of all necessary documentation	Undertakings licensed in Portugal	**3 months**	-	-
	Undertakings licensed in another Member State	-	-	-

E.5 – Safety Certificates – Part B: procedures

		New	Amended/Revised	Renewed
Average time for issuing a Safety Certificate – Part B, after receipt of all necessary documentation	Undertakings licensed in Portugal	**1 week**	-	-
	Undertakings licensed in another Member State	-	-	-

E.6 – Safety authorisation: procedures

	New	Amended/Revised	Renewed
Average time for issuing a Safety Authorisation, after receipt of all necessary documentation	-	-	-