

**REPORT BY THE CHANNEL TUNNEL  
INTERGOVERNMENTAL COMMISSION  
ON SAFETY IN THE CHANNEL TUNNEL  
FIXED LINK DURING 2007**

## **Contents**

|   | <b>Paragraphs</b> |
|---|-------------------|
| A Scope of the report   | 1 - 2             |
| B Introductory Section  | 3 – 8             |
| C Organisation  | 9 – 12            |
| D The Development of Railway Safety   | 13 – 18           |
| E Important Changes in Legislation and Regulation   | 19 – 23           |
| F The Development of Safety Certification and Authorisation                               | 24 – 25           |
| G Supervision of Railway Undertakings and<br>Infrastructure Managers                      | 26 – 35           |
| H Conclusions   | 36 - 38           |
| I Sources of Information  | 39                |
| J Annexes   |                   |
| Annex A: Railway Structure Information  |                   |
| Annex B: IGC Structure and Relationships  |                   |
| Annex C: Data on Common Safety Indicators   |                   |
| Annex D: Safety related incidents previously included in reports published<br>by the CTSA |                   |

## **A - Scope of the report**

1. This report contains information relating to the activities of the Channel Tunnel Intergovernmental Commission (IGC) in its role as the safety authority for the Channel Fixed Link (the Channel Tunnel) within the terms of the European Railway Safety Directive (2004/49/EC). The IGC's responsibilities extend only to the area of the Fixed Link as described in the Treaty of Canterbury between the United Kingdom and France and the Concession Agreement between the two Governments and the Concessionaires. This report covers the period from 1 January 2007 to 31 December 2007. The events of 2008, in particular the incident involving a coach travelling on a tourist shuttle on 4 April 2008 and the fire that occurred on 11 September 2008, will be covered in the next report relating to the period from 1 January 2008 to 31 December 2008.

2. As this report was written in English the optional summary in that language has not been prepared. A French translation has been prepared and submitted to ERA together with the English document as it is the policy of the IGC to make all of its documents which are in the public domain available in both English and French. Readers of the French version who wish to consult the optional summary in English are invited to refer to the full English version.

## **B - Introductory Section**

3. **Introduction** - The Railway Safety Directive (2004/49/EC) makes provision for a binational body entrusted by Member States to ensure a unified safety regime for specialised cross-border infrastructures to take on the tasks of a “safety authority”. This provision has been applied in respect of the Channel Tunnel Fixed Link and the United Kingdom and France have agreed that the IGC should be the “safety authority”. This report is prepared in accordance with Article 18 of the Directive and, so far as possible, conforms to the template and guidance issued by the European Railway Agency (ERA) with a view to providing a common structure and content for such reports. It is submitted to the ERA as required by the Directive but its intended audience is anybody with an interest in the safety of the Fixed Link or similar infrastructures.

4. **Railway Structure Information** - The railway infrastructure of the Channel Tunnel comprises the twin bored tunnel rail link under the English Channel between Cheriton in Kent and Fréthun in the Pas-de-Calais, together with the terminal areas on either side. The terminal areas include the high speed lines linking the tunnel with the UK and French national networks; the loops and the platforms used for the loading and unloading of the tourist and HGV shuttle trains; and the yards and maintenance facilities and their associated links to the rest of the infrastructure.

5. **Infrastructure Manager** A network map and information about Eurotunnel, the infrastructure manager for the Channel Tunnel, is at **Annex A**.

6. **Railway Undertakings** - The railway undertakings which operated trains through the Channel Tunnel during the period covered by this report were EWS, SNCF, Eurostar (UK) Ltd and Europorte 2. The address and websites for these companies is at Annex A.3. More detailed information about them appears in the annual reports of the French and UK safety authorities as appropriate.

7. **Summary** - Key events in 2007 were as follows:

- Follow up action on the fire which occurred on a Eurotunnel freight shuttle in the north running tunnel on 21 August 2006 (see paragraphs 16 -18);
- Consideration of proposals to modify Eurotunnel’s Arbel freight wagons (see paragraph 13);
- Incidents which led to trains being stuck in the tunnel for several hours and which highlighted the need for Eurotunnel to improve its crisis management arrangements (see paragraph 13);

- Continuing action to transpose the Railway Safety Directive in relation to the Channel Tunnel (see paragraphs 19 & 20).

**8. General Trend Analysis** - The new organisation and associated reduced staffing levels put in place in 2006 following Eurotunnel's DARE project ("Delivering Actions to Revitalise Eurotunnel") was consolidated and developed during 2007. The IGC and the CTSA continued to monitor the impact of the organisational changes on safety management and performance. Notwithstanding the changes, data on various safety indicators which Eurotunnel provides on a regular basis to the IGC and the CTSA showed a generally satisfactory outcome during the year. The progressive and continuing improvement trend in relation to passenger collective safety and passenger individual safety which was reported in 2006 was strengthened during 2007. Unfortunately, employee safety indicators again showed a slight deterioration. (More detailed information about trend analysis appears at paragraph 14)

## **C - Organisation**

9. The IGC was established by the Treaty of Canterbury to supervise, in the name and on behalf of the Governments of the UK and the French Republic, all matters concerning the construction and operation of the Channel Tunnel. The functions of the IGC include drawing up, or participating in the preparation of, regulations applicable to the Channel Tunnel. Each Government appoints half the members of the IGC which comprises a maximum of 16 members including at least two representatives of the Channel Tunnel Safety Authority (CTSA) – see paragraph 10 below.

10. The Treaty of Canterbury also established the CTSA to advise and assist the IGC on all matters concerning safety in the construction and operation of the Channel Tunnel. The functions of the CTSA also include ensuring that the safety measures and practices applicable to the Fixed Link comply with the national and international laws in force; enforcing such laws and monitoring their implementation; and examining reports concerning incidents affecting safety, making investigations and reporting to the IGC. The composition of the CTSA is determined by the two Governments by agreement and each Government appoints half of its members.

11. UK and French Secretariats arrange for the preparation and execution of the IGC and the CTSA's decisions.

12. Charts showing the structure of the IGC and its relationships with other bodies are at Annexes B.1 and B.2 respectively.

## D - The Development of Railway Safety

### D1 – Initiatives to maintain/improve safety performance

**Table D.1.1 - Safety measures triggered by accidents/precursors to these**

*No initiative undertaken in 2007 was triggered by accidents or precursors within the meaning of the Railway Safety Directive. This table in the ERA's template for the structure of annual safety reports has not therefore been completed.*

| <b>Accidents/precursors which triggered the measure</b> |              |                                 | <b>Safety measure decided</b> |
|---|--------------|---------------------------------|-------------------------------|
| <b>Date</b>   | <b>Place</b> | <b>Description of the event</b> |                               |
|   |              |                                 |                               |
|   |              |                                 |                               |

**Table D.1.2 - Safety measures with other triggers**

*Where appropriate triggers for initiatives undertaken in 2007 are described in the text at paragraph 13 below. This table in the ERA template has not therefore been completed.*

| <b>Safety measure decided</b> | <b>Description of the trigger of the measures</b> |
|-------------------------------|---|
|                               |   |
|                               |   |

13. Initiatives undertaken during the course of 2007 were as follows:

- **Modification of the Arbel Freight Wagons** – Towards the end of 2006 Eurotunnel had informed the IGC of problems posed by the cracking of the superstructures on its fleet of Arbel freight wagons. As originally designed the superstructure of each of these wagons consists of a row of four “pagoda-style” structures. Following discussions with the CTSA Eurotunnel submitted proposals to the IGC to remove two of the four pagodas from the 40 wagons which

were in the most deteriorated condition. The IGC expressed its opposition to modified wagons being put into service without restriction in the absence of validation trials. The IGC delegated to the CTSA the responsibility for authorising suitable trials to determine whether the proposed modification was acceptable. This led initially to the modification of two wagons for trialing purposes and subsequently to the modification of a further 27 wagons. At the end of the year covered by this report the IGC was awaiting recommendations from the CTSA in the light of the trials to enable it to take a decision on the Eurotunnel proposals.

- **Crisis Management** - A number of incidents in recent years in which trains have been stuck in the tunnel for several hours, in particular an incident which occurred on 3 August 2007 when a catenary collapse led to trains being stuck in the tunnel for around 5 hours, have drawn attention to the need for Eurotunnel to improve its arrangements for crisis management and the efficiency of its procedures for assisting customers caught up in this type of event. This led to a great deal of discussion between Eurotunnel and the CTSA about the steps that it would be appropriate to take. Eurotunnel decided to undertake a fundamental review of its current organization and procedures for dealing with such situations. At the end 2007 the IGC and the CTSA were waiting to receive the report on the Eurotunnel review and its new crisis management procedures and supporting documentation.
- **Tactical Radio** – During the course of the year Eurotunnel informed the CTSA that it intended to improve the performance of its tactical radio system by replacing the equipment held onboard the special dedicated service tunnel communications vehicles (Service Tunnel Transportation System Command and Communication vehicles – STTS/CC). Following consideration of Eurotunnel’s technical specification document, the CTSA advised Eurotunnel that the project could proceed subject to it being monitored by the CTSA’s experts in close liaison with the emergency response organisations in the UK and France who are the principal users of the equipment. At the end of the period covered by this report work on this dossier was continuing.
- **Operation TAPIS III** - During the course of the year Eurotunnel continued its lengthy programme of work to remedy defects resulting from the deterioration of the upper track bed concrete at its interface with the sleeper blocks. As in 2006 the CTSA continued to take a keen interest in this work both in relation to the effectiveness of the repairs and the risks to the health and safety of those undertaking the work. The TAPIS III operations are due to be completed in April 2009.



- **Electrical Incidents** – Towards the end of 2006 the CTSA had expressed concern to Eurotunnel about a number of electrical incidents involving workers which had occurred and which gave rise to concerns about the competence of the workers themselves and the adequacy of procedures, training and supervision. During the course of the year covered by this report Eurotunnel developed and discussed with the CTSA a plan describing a range of actions designed to prevent further such incidents. At the end of the period covered by this report the CTSA was continuing to monitor Eurotunnel's implementation of its plan.
- **CBRN** – Throughout the year the CTSA continued to monitor Eurotunnel's preparedness to respond to a CBRN incident in the tunnel or on the terminals of the Fixed Link. There continued to be close liaison between Eurotunnel and the emergency response organisations with regard to these issues. Particular attention was given to training and familiarisation of Eurotunnel staff and ventilation issues.
- **Refrigeration Units** – Towards the end of the year covered by this report, Eurotunnel raised with the CTSA a possible change in its procedure for managing a situation where an HGV refrigeration unit is left on onboard an HGV shuttle during transit. Under current arrangements where an active refrigeration unit is discovered the shuttle is instructed to stop so that the driver of the HGV in question can switch the unit off. These arrangements cause disruptions to services and Eurotunnel therefore intended to propose that such shuttles should continue their transit through the tunnel but that they should be specifically monitored by the Rail Control Centre, in particular the Fire Detection, Fixed Equipment and Rail Traffic Management Controllers. At the end of the year the CTSA was discussing with Eurotunnel the risk analysis and additional mitigating measures that might be necessary to support such a change.
- **Catenary Earthing** – One of the key issues arising from the fire on 21 August 2006 (see paragraphs 16-18 below) was the length of time that it took Eurotunnel's technicians to earth the catenary. Indeed, one of the recommendations of the RAIB report was that Eurotunnel, in consultation with the emergency services in France and the UK, should carry out a study to assess the feasibility of decreasing the time taken to carry out this procedure in an emergency situation. During the course of the year there was some informal dialogue between Eurotunnel and the CTSA on this matter and Eurotunnel undertook some initial discussions with the emergency services who provide the French and UK First Line of Response (FLOR) teams. At the end of the year these discussions had not led to any firm proposals for modifying the current

arrangements. The CTSA had made it clear that any proposals would need to be supported by a robust risk assessment and evidence of a safe system of work.

- **STTS Vehicles** – During the course of the year inspections carried out by the CTSA's inspectors led to concern about an apparent deterioration in the condition of the special dedicated service tunnel vehicles (Service Tunnel Transportation System vehicles – STTS) and their hands-free guidance system which are important to the safety of the tunnel. At the end of the year discussions between the CTSA and Eurotunnel were continuing and further inspections were planned. Eurotunnel had indicated that the vehicles would undergo a programme of major overhauls commencing in 2008.
  
- **Emergency Exercises** – As usual the IGC and the CTSA monitored carefully Eurotunnel's exercise regime designed to test emergency plans and procedures in a practical way. During the period covered by this report the following exercises took place:
  - **Exercise BINAT 17** – BINAT 17, the annual full deployment exercise, took place during the early hours of Sunday 14 January 2007. The exercise, which involved all the emergency services of both nations, was planned around an incident involving the derailment of a Eurotunnel freight shuttle leading to a number of casualties and the outbreak of two fires on carrier wagons. All of the exercise objectives were met except the 90 minute evacuation rule. As always with an exercise of this size and complexity, there were a number of learning points that were identified during the debriefing process. These were subsequently dealt with as part of an Action Matrix;
  
  - **VALEX** – A VALEX (Validation Exercise) was held on the 11th June 2007. This involved a response by FLOR and the Channel Tunnel Police Unit to a simulated incident in pumping station W2, where maintenance staff had fallen from a ladder sustaining both fatal and serious injuries. This provided an opportunity for the Emergency Response Organisations (EROs) to train in the environment of the service tunnel;
  
  - **COMEX** – On the 26th April 2007 the COMEX (Command) Exercise provided an opportunity for the EROs and Eurotunnel to review the Incident Control Centre procedures. This was developed and tested during a VALEX exercise and at BINAT 18;

- **VALEX** – The second Validation exercise was split into two and was carried out on the 30<sup>th</sup> October and the 30<sup>th</sup> November 2007. These exercises were used to test the changes to the information flow procedures in the UK ICC following work on the outcomes from the COMEX in April of that year.
- **Exercise BINAT 18** – The BINAT 18 exercise took place on Sunday 13 January 2008 and was therefore outside the period covered by this report. However, planning for it was concluded during 2007. The exercise, which was French led, was based on a vehicle fire in a Eurotunnel passenger shuttle causing panic leading to the shuttle having to stop. Once again there were a number of opportunities for improvement noted during the exercise as can be expected with the scale of the evacuation and numbers of casualties involved. Work will continue to address these throughout 2008.

## D 2 – Detailed Data Trend Analysis

14. Within the terms of the Common Safety Indicators (CSIs) there were no accidents, fatalities or injuries during 2007 and there were relatively few recorded precursors. A detailed trend analysis related to the CSIs would not therefore be meaningful. A trend analysis based on the definitions and information contained in the Eurotunnel Annual Report on Health and Safety (January to December 2007) is as follows:

### Passenger Safety<sup>1</sup>

- **Accidents:** The only accident recorded in 2007 fell into the individual risk category, and involved a customer falling from his lorry cab and sustaining a broken wrist. There were two accidents in 2006 (one individual risk and one collective risk); one in 2005 (individual risk); and one in 2004 (collective risk). No accidents occurred between 2000 and 2003.

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<sup>1</sup> Safety-related events (passenger or personnel/collective or individual) are classified as follows:

Accident (A): an undesired event: collision/derailment/major fire/serious injury or fatality;

Near-miss (NM): an accident situation, but one in which the undesired event has been avoided due to a favourable circumstance e.g. overrun without collision/broken rail without derailment;

Precursor (P): an event that does not carry any major risk but which highlights a fault in the safety system or which would be likely to affect it if the necessary action was not taken e.g. SPAD A with ATP/broken rail event with TVM information/major fuel spillage.

- **Near-misses**: The number of near-misses fell from an average of 24 for 2000-2006 to 12 for 2007 (-50%) for collective risk, and fell from an average of 415 for 2000-2006 to 241 for 2007 (-42%) for individual risk.
- **Precursors**: The number of precursor events relating to collective risk fell from an average of 604 for 2000-2006 to 335 for 2007 (-45%). For individual risk, it fell from an average of 947 for 2000-2006 to 490 for 2007 (-48%).
- **Collective risk analysis**: the overall number of accidents, near-misses and precursors fell, in absolute terms, by 45% in 2007 compared with the average results for 2000-2006.
- **Individual risk analysis**: the overall number of accidents, near-misses and precursors fell, in absolute terms, by around 46% in 2007 compared with the average results for 2000-2006.
- **Cumulative results (collective and individual safety events together)**: the 2007 result, in numbers of events, is down 46% compared with the 2000-2006 average figures.
- **Overall**: There was a significant improvement in 2007 across all categories in comparison with the previous year, except for the number of individual risk accidents which remained constant over these 2 years. These results appear globally to be the best since 1998.

### **Signals Passed At Danger (SPADs)<sup>2</sup>**

- **SPADs A (Driver Error)** – Following a continuously improving trend since 2001, the number of SPADs A had shown a slight increase during 2006 with four events occurring during that year. Only one such event occurred in 2007. This was the lowest level achieved since 1997. This significant improvement was largely due to the train crew action plan for shuttle drivers which Eurotunnel had initiated at the end of 2006 and which continued during 2007.
- **SPADs B (Technical – Zero Impact of safety of train Movements)** - A total of nine events occurred in 2007. This was the best result since 2001. Eleven such events were recorded in 2006.
- **SPADs C (Operator Error)** – Having increased consistently since 2003 the seven events recorded in 2006 were the highest number since 1997. A significant improvement was achieved in 2007 with four events being

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<sup>2</sup>

Only SPAD As and SPAD Cs are included in the UIC definition of SPADs. In addition, Eurotunnel, unlike many national railways, includes in its statistics all SPADs occurring on the infrastructure, including those on secondary track and track under possession.

recorded. Nevertheless, this figure remains higher than results achieved between 1997 and 2003.

### **Employee Safety**

- **Number of Lost Time Accidents** – The total number of lost time accidents for 2007 was 41 (23 for Eurotunnel staff and 18 for contractors). This compares with 39 in 2006 (23 for Eurotunnel staff and 16 for contractors). In response to this slight deterioration, interactive training courses relating to safety behaviour of staff at work were defined by Eurotunnel during 2007 and will be delivered during 2008.

15. **Common Safety Indicators (CSIs)** – Data relating to the CSIs as defined in the Railway Safety Directive (2004/49/EC) is at Annex C.1. Annex C.2 shows trends in CSI on the basis of an average over the past two years. Annual reports relating to safety on the Fixed Link published by the CTSA prior to 2006 have included information about a greater variety of incidents than those required by the Railway Safety Directive. For the sake of continuity this information is summarised in Annex D.

### **D 3 – Results of Safety Recommendations**

16. The circumstances surrounding the fire which occurred in running tunnel north on 21 August 2006 were reported in the 2006 report. As the incident occurred on the UK side of the tunnel formal investigations were launched by the Railway Accident Investigation Branch (RAIB) and Her Majesty's Railway Inspectorate (HMRI).

17. The report of the RAIB investigation was published on 23 October 2007. The report confirmed that the immediate cause of the accident was a fire in the load compartment of a lorry on the penultimate wagon of an HGV shuttle. The investigation did not reveal any evidence of a requirement for change in the existing safety strategy following the detection of fire on an HGV shuttle nor any need for modification of the rolling stock. However, the RAIB investigators identified a number of issues that should be addressed in order to improve the efficiency of any future emergency response. The report made 16 recommendations all of which were formally addressed to the IGC. In acknowledging receipt of the report and its recommendations, the IGC expressed its gratitude for the cooperative and effective working methods which had been employed by RAIB. The IGC informed RAIB that it expected to be able to advise it in June 2008 of the follow-up action it would take on each of the recommendations. At the end of the period covered by this report, detailed consideration of the recommendations was continuing. (The complete investigation report is available on the RAIB website – [www.raib.gov.uk](http://www.raib.gov.uk).)

18. The formal investigation into the accident by HMRI was conducted in parallel to the RAIB investigation. The HMRI report had still to be finalised at the end of the period covered by this report.

## **E - Important Changes in Legislation and Regulation**

19. **The Railway Safety Directive** – During 2006, using powers conferred upon it by the Treaty of Canterbury, the IGC had worked on the development of a binational regulation to implement the Railway Safety Directive (2004/49/EC) in relation to the Channel Tunnel. The regulation was finalised at the very beginning of 2007 and was signed by the heads of the UK and French IGC Delegations on 24 January. Throughout the remainder of 2007 work continued on the development of instruments required in both Member States to give legal effect to the regulation. At the end of the period covered by this report this work had still to be completed.

20. The binational regulation will transpose all the requirements of the Directive with the exception of the requirements relating to independent accident investigation. These provisions are transposed in French and UK national legislation with the national investigation bodies – BEATT for France and RAIB for the UK – having the power to carry out investigations in their respective halves of the Fixed Link. In line with the procedure described in Article 22 of the Directive, the two bodies have produced a formal agreement under which investigations relating to incidents and accidents occurring on the Fixed Link are carried out in cooperation.

21. **Formal Submissions to the IGC** - Under the provisions of the Concession Agreement under which Eurotunnel operates the Fixed Link, it is required to submit to the IGC for approval the operating rules and safety arrangements for the Fixed Link which the company proposes be introduced. As the Concession Agreement is a binding contractual agreement these rules have a legal basis. Changes in the rules considered during the course of the period covered by this report were as follows:

- **Volume A “Safety, Health and Environmental Policy” of Eurotunnel’s Safety Arrangements** – Eurotunnel made a formal submission to the IGC proposing a revision of Volume A of its safety arrangements. Eurotunnel’s proposals were considered by the CTSA and were found to be acceptable. The IGC wrote to Eurotunnel on 7 May 2007 confirming its approval. In responding to Eurotunnel the IGC pointed out that this volume would need to be further revised when the binational regulation to implement the Railway Safety Directive entered into force. This further update was expected to be part of the process leading to Eurotunnel receiving its safety authorisation;
- **Volume E “Internal Operations Plan” of Eurotunnel’s Safety Arrangements** - During 2007 Eurotunnel made two formal submissions to the IGC proposing revision of Volume E of its safety arrangements which includes arrangements for managing emergency situations. The first submission was received on 6 March. In the light of the CTSA’s favourable advice, the IGC wrote to Eurotunnel on 29 March confirming its approval. The second submission was received on 23 November and only involved the introduction of a new paragraph relating to the interpretation of a clause in the Concession Agreement that deals with arrangements in the case of trains becoming immobilised in the Channel Tunnel.

In the light of advice from the CTSA, the IGC wrote to Eurotunnel on 28 December confirming its approval subject to the correction of typographical errors in the submitted text.

22. **Other Significant Regulatory Issues Considered by the IGC and CTSA** - Other important issues considered by the IGC and the CTSA during the course of the year were as follows:

- **EWS “Open Access” Safety Case** – Under the same arrangements as those described above, Eurotunnel submitted to the IGC a proposed safety case for EWS as an open access operator. In the light of advice from the CTSA, the IGC wrote to Eurotunnel on 5 October 2007 confirming its acceptance of the safety case as a supporting document to the Eurotunnel safety case.
- **Europorte 2 “Open Access” Safety Case** – During 2005 Eurotunnel had submitted to the IGC a proposed safety case for Europorte 2, a subsidiary company created by Eurotunnel to develop new traction services through the Fixed Link in a manner independent from Eurotunnel’s infrastructure manager activities (Europorte 2 is now a railway undertaking part of “Group Eurotunnel SA” and independent from the “Concessionaires” who are the infrastructure manager for the Channel Tunnel). In the light of advice from the CTSA, the IGC was able to advise Eurotunnel of its favourable opinion subject to a number of issues which would need to be addressed before the safety case could be formally accepted. On 4 October 2007 Eurotunnel wrote to the IGC informing it that all of these issues had now been addressed. The IGC therefore wrote to Eurotunnel on 25 October confirming its acceptance of the safety case as a supporting document to the Eurotunnel safety case.
- **GSM-R** – During the course of the year Eurotunnel continued to develop its functional and technical specification for the installation of a GSM-R communications system throughout the tunnel. The CTSA and its experts continued to engage in discussions with Eurotunnel about this project and developed a log of issues which would need to be properly addressed. At the end of the year Eurotunnel was finalising its tender enquiry document which would be sent to the CTSA for comment. As this project is covered by the requirements of the Interoperability Directives Eurotunnel will need to appoint a notified body at the appropriate time.
- **Principle for Bringing an Incident Train Out of the Tunnel** – The events surrounding the fire on 21 August 2006 (see paragraphs 16 – 18 above) led to discussions between the IGC and Eurotunnel about the need for a principle to guide the arrangements for the removal of an incident from the tunnel. In order to avoid jurisdictional difficulties the intention would be that trains should always be removed to the side where the incident occurred after a major incident unless there were overriding safety considerations. At the end of the period covered by this report the final wording of the principle had still to be finalised. In due course it seems likely that the wording will be incorporated in Volume E “Internal Operations Plan” of Eurotunnel’s Safety Arrangements and in the binational emergency plan.
- **Power Supply Arrangements** – During the course of the year Eurotunnel decided for commercial reasons that the power supply for the catenary should be drawn solely from the French national grid. This appeared to be contrary to a



clause in the Concession Agreement which states that “power supplied to the Concessionaires for the fixed link shall be delivered by two separate circuits from each of the British and French National Grids.” At the IGC’s request Eurotunnel confirmed that its new arrangements were fully compliant with the terms of the Concession Agreement. That is, it remained perfectly feasible for power to be delivered simultaneously from both countries and Eurotunnel had secured agreement with UK suppliers that in the event of a disruption to power supplies from France sufficient supplies would be readily available from the UK side. At the end of the year, the new arrangements were the subject of an extended observation period at the end of which a comprehensive report would be made to the CTSA.

- **Cash in Transit Vehicles** – During the course of the year Eurotunnel made a submission to the IGC regarding the unsegregated transport of cash-in-transit vehicles onboard passenger shuttles. In the light of advice from the CTSA the IGC was able to grant the requested authorisation subject to a number of conditions which were subsequently addressed by Eurotunnel to the satisfaction of the CTSA.
- **Wind Farm on the French Terminal** – During the year Eurotunnel considered again some earlier plans to install a number of wind turbines on the Coquelles terminal. Recognising that the technology involved was now well-established and supported by international standards, the CTSA sought and received from Eurotunnel information about the applicable standards and how they would be complied. At the end of the year Eurotunnel remained in discussion with the relevant French authorities regarding this project.
- **New Floor for Breda Wagons** – During the year Eurotunnel informed the CTSA of its intention to bring forward a submission regarding the installation of a new design of floor on its fleet of Breda HGV carrier wagons in view of the accelerated ageing of the existing floors. At the end of the year Eurotunnel’s formal submission was awaited.
- **Future Design of Freight Shuttles** – In addition to the modifications made or intended to its existing fleets of HGV carrier wagons (see above regarding the Breda fleet and paragraph 13 regarding the Arbel fleet), Eurotunnel informed the IGC and the Safety Authority that it was undertaking technical studies to design a new generation of wagons. At the end of the period covered by this report Eurotunnel had not yet submitted formal proposals. The IGC and the CTSA attach considerable importance to the development of a more permanent solution to the problems that have arisen from the ageing and deterioration of the two existing fleets.

23. **Other IGC and CTSA Activities** – Significant activities by the IGC and CTSA during the year were as follows:

- **Participation in the Work of European Railway Agency and Its Working Groups** – The IGC and the CTSA continued to play a full part in the work of the European Railway Agency (ERA) and its various working groups. Given their limited resources it was necessary for the IGC and the CTSA to participate directly in those activities which were of the greatest interest and, for other activities, to rely on liaison with, and feedback from, experts from the UK and French safety authorities. Nevertheless, the IGC and CTSA were able to play an

active part in meetings of the ERA Network of National Safety Authorities and in working groups dealing with common safety methods, common safety indicators, authorisation and certification, and national safety rules.

- **Change Management - Handling Future Submissions** – During the course of the year the IGC gave its agreement to the trialling of new procedures developed by the CTSA for determining when modifications to Eurotunnel’s existing arrangements were sufficiently significant to require the involvement and agreement of the IGC and the CTSA. This work is considered to be particularly important in relation to the requirements relating to “substantial change” in the Railway Safety Directive. Unfortunately, at the end of the year, the start of the trial was delayed in view of difficulties being experienced in accessing Eurotunnel’s secure online portal via which the CTSA and its experts were to be able to scrutinise electronic versions of the relevant Eurotunnel documentation.
- **Impact of the Interoperability Directives and the TSIs on the Fixed Link** – The IGC and the CTSA have continued to give consideration to the impact of the Interoperability Directives and the TSIs on the arrangements which apply in respect of safety on the Fixed Link.

With regard to the TSIs none of the current standards take account of any specific cases in relation to the Fixed Link. An urgent task for 2008 will be to carry out a detailed inventory of the TSIs and develop a suitable strategy in relation to the Fixed Link.

More specifically, during the course of the year the CTSA reviewed the TSI on Safety of Railway Tunnels and concluded that the arrangements in respect of the Fixed Link were generally in conformity with the standard. The CTSA noted that tunnels of more than 20kms in length (the Channel Tunnel is approximately 50kms long) require “a special safety investigation that may lead to the specification of additional safety measures not included in this TSI in order to admit interoperable trains in an acceptable fire-safety environment”.

- **Notification of Safety Rules** – During the course of the year the IGC and the CTSA gave further consideration to the notification and availability of the unified safety rules in respect of the Fixed Link as required by Article 8 of the Railway Safety Directive (2004/49/EC). This work was made necessary by the European Commission’s decision to reject the original notification. At the end of the year the IGC reached agreement on a revised notification which was to be submitted to the European Commission via the UK and French Permanent Representatives to the European Union.
- **Directive on the Certification of Train Drivers (2007/59/EC)** – At the end of the year the IGC and the CTSA started to give consideration to the transposition in respect of the Fixed Link of the Directive on the Certification of Train Drivers which was adopted on 23 October 2007 and came into force on 4 December 2007. Further consideration of possible transposition options will be a priority issue for 2008.

## **F - The Development of Safety Certification and Authorisation**

24. As the binational regulations to implement the Railway Safety Directive were not in force during 2007 no safety authorisations or certificates were issued by the IGC during that period. However, in anticipation of the regulations coming into effect, the IGC and the CTSA continued to give consideration to the procedures that would need to be put in place to handle applications and the essential details against which they would be considered. These will be included in guidance on the binational regulations which will be issued by the IGC in due course. In addition, Eurotunnel and experts from the CTSA continued to engage in discussions about the development of Eurotunnel's SMS documentation.

25. In due course the IGC expects to receive an application for authorisation from Eurotunnel and applications for Part B certificates from EWS, Eurostar UK, SNCF and Europorte 2.

## **G - Supervision of Railway Undertakings and Infrastructure Managers**

26. The 1986 Treaty of Canterbury places responsibility on the CTSA to ensure that the safety measures and practices applicable to the Fixed Link comply with the national or international laws in force, to enforce such laws, to monitor their implementation and to report to the Intergovernmental Commission. It also states that for the purpose of carrying out its functions, the Safety Authority may invoke the assistance of the authorities of each Government or any body or expert of its choice and that the two Governments shall grant to the Safety Authority and its members and agents such powers of investigation, inspection and direction as are necessary for the performance of its functions. The Concession Agreement states that the Concessionaires shall afford access to all parts of the Fixed Link to persons duly authorised by the IGC or, under its supervision, by the CTSA, for the purposes of any of their functions, to inspect the Fixed Link and to investigate any matter relating to its construction or operation and shall afford such persons the facilities necessary for the performance of these functions.

27. During 2007 the safety performance of Eurotunnel and the railway undertakings operating on the Fixed Link was assessed against the regulatory arrangements which preceded those prescribed by the Railway Safety Directive. These arrangements were based on monitoring compliance with the Eurotunnel safety case, which included the safety cases of the railway undertakings as supporting documents. The following methods were used:

- Inspections;
- Flow of information – regular reports from Eurotunnel such as the daily Operational Duty Manager (ODM) reports; monthly summaries of safety events (known as “Flash Reports”), Safety Committee Minutes; Operating Performance reports etc;
- Information gained from the investigation of accidents and incidents;
- Audit reports (both internal and external);
- Ad-hoc meetings between Eurotunnel and Safety Authority experts;
- Information from Eurotunnel concerning the interface with the railway undertakings and change management.

28. Planned inspection activity continued to be based on areas identified by the CTSA’s experts during their analysis of the Eurotunnel safety case. However, inspection plans retained sufficient flexibility to respond to areas which emerged from Eurotunnel’s activities during the course of the year. Priorities included:

- Crisis management arrangements;
- Track and rolling stock maintenance;
- Competence of Eurotunnel’s staff and contractors;
- In-tunnel systems – including power, control and communications equipment;

- Incident and accident investigation;
- Risk assessment, particularly the adequacy of risk assessments associated with change management.

29 Inspections undertaken during the course of the year included the following areas:

- Catenary collapse incident and catenary reinforcement;
- Re-railing campaign and terminal tracks;
- TAPIS III and re-railing site;
- Dangerous goods;
- Local fire detection unit maintenance;
- HGV loading procedures;
- Track incidents;
- Arbel wagons;
- Lighting installations.

30. In addition to the above inspections, various ad-hoc meetings were held between the Authority's experts and Eurotunnel to discuss such topics as: track incidents; catenary failure; standby generators; UK terminal monitoring strategy; modifications to and trialling of Arbel wagons etc.

31. The above activities led to a number of recommendations which were formally communicated to Eurotunnel by the CTSA. The recommendations were added to a consolidated log of recommendations to enable the CTSA to monitor and review with Eurotunnel its progress in taking suitable action in response to them.

32. Some of the main conclusions and corrective measures/actions arising from the inspections were as follows:

- Arbel Wagons: There were two inspections carried out during 2007. Eurotunnel was asked to urgently complete a risk analysis relating to the removal of defective parts of the superstructure of the wagons (the "pagodas") that would include a comparison between risks of damage as a result of a pagoda becoming detached; the risk of drivers coming into contact with the catenary; and the risk from detached HGV tarpaulins.
- TAPIS III: There were three follow-up inspections of the site carried out during 2007. At the initial inspection, Eurotunnel was advised that the STTS vehicle used for service tunnel access needed to be overhauled. Corrective measures relating to health and safety issues needed to be addressed at the site i.e. suitable Personal Protective Equipment; lack of signage; rotation of workforce; lighting for enclosures and connectors for main electrical cables etc.
- Inspection of track incidents: Eurotunnel was encouraged to keep defects under close surveillance and to consider bringing forward the rail renewal programme at Folkestone.
- HGV loading procedures: The need for joint training between train crew and the First Line of Response teams was identified.
- Electrical incidents: Inspectors recommended that Eurotunnel would need to check the skills of its technicians; review existing procedures; and establish a timetable for taking necessary actions. Overall Eurotunnel must ensure electrical technicians have adapted to the new maintenance policy.

- Local fire detection unit maintenance: This follow-up inspection recommended that Eurotunnel investigates any trends in faults occurring in the system and examines the quality assurance system.
- UK terminal tracks: The inspection highlighted that welds continued to fail, therefore Eurotunnel was asked to carry out an assessment of staffing needs for the UK track maintenance departments.

33. Overall the inspection programme for 2007 and other monitoring activities undertaken during the course of the year indicated that while there was a continuing need for vigilance, the operation of the Fixed Link continued to be acceptably safe.

34. Looking to the future, once the binational regulations which implement the Railway Safety Directive are in force (see paragraphs 19 & 20 above), the CTSA intends to draw up an inspection and audit programme which takes account of the elements included in, and covers the lifespan (i.e. 5 years) of, Eurotunnel's Safety Management System (SMS).

35. Finally, the IGC is pleased to report that in August 2007 an agreement was signed between the French Delegation to the IGC and the Établissement Public de Sécurité Ferroviaire (EPSF - the French safety authority) regarding the latter's contribution to the railway safety of the Fixed Link. It was anticipated that this agreement would lead to the EPSF undertaking a number of audits within Eurotunnel on behalf of the IGC during 2008. This was a very welcome development and should add significantly to the effectiveness of the IGC and CTSA's monitoring of Eurotunnel's activities.

## **H - IGC Conclusions on Year 2007 - Priorities**

36. The channel tunnel railway is of immense importance, carrying over ten million passengers between Britain and France each year and connecting Britain to the high speed rail network of the European mainland. It is therefore right that close attention should be paid to the safety regulation of the Fixed Link. To that end, action to implement the EU rail safety Directive (2004/49) for the Fixed Link was a particular preoccupation of 2007.

37. The safety standards achieved for the channel tunnel operation in the year 2007 were satisfactory. There were, however, safety incidents that required investigation to ensure lessons were learned, and there was a longer term discussion, that continues, on the replacement of infra-structure that inevitably becomes worn after thirteen years of heavy use. In 2007 the particular focus of attention was the measures necessary to keep the Arbel shuttle wagons operating safely.

38. Priority issues of concern into the future include:

- Follow-up action on the EU rail safety Directive, including consideration of applications for authorisation of Eurotunnel as the manager of the infrastructure and applications for certification of the railway undertakings that use the tunnel ;
- consideration of the most effective method of implementation for the Fixed Link of further initiatives from the European Union and from the European Railway Agency (ERA), including new provisions that are expected relating to interoperability, common safety methods, common safety indicators, and requirements for the licensing of international train drivers ;
- maintaining our understanding and implementing as necessary other measures that are part of the European system of rail regulation, including new Technical Standards for Interoperability (TSIs) ;
- consideration of continuing plans to modify installations and rolling stock, and to develop new rolling stock, in order to maintain its effectiveness despite the deterioration caused by heavy use ;
- to consider any applications relating to new rolling stock that railway undertakings wish to use for services transiting the tunnel ;
- to consider developments relating to communication systems in the tunnel, including the installation of GSM-R, the upgrading of the radio system used by the emergency services, and longer term plans ;
- consideration of those recommendations in the report of the UK Rail Accident Investigation Branch (RAIB) relating to the fire of 21 August 2006 that have not yet been fully closed, and on any further reports from the RAIB or the French investigatory body (BE-ATT).
- attention to the health and safety of the workforce, particular issues for attention including those who drive in the service tunnel and those who work alone at remote parts of the site ;
- the maintenance of preparedness to deal with serious safety incidents, including through the maintenance and annual rehearsal of the binational emergency plan, which provides the framework for the co-operation of the emergency response organisations of both countries in the event of an accident or incident in the tunnel.

## **I - Sources of Information**

39. The following sources were used when drafting this report:

- Eurotunnel annual report on Health and Safety (January to December 2007) issued 12<sup>th</sup> June 2008.
- Eurostar annual safety report of 2007 (submitted 31/12/2007)
- EWSI ltd annual safety report of 2007 (submitted June 2008)
- Rapport de la SNCF sur la sécurité de l'exploitation en 2007 sur la section commune trans-Manche pour ses missions d'entreprise ferroviaire (edition du 26/06/2008 version 01)

## **J - Annexes**

ANNEX A: Railway Structure Information

ANNEX B: IGC Structure and Relationships

ANNEX C: Data on Common Safety Indicators

ANNEX D: Safety related incidents previously included in reports by the CTSA



## **ANNEX A: Railway Structure Information**

### **A.1. Network map**

Network maps showing the layout of the UK and French terminals and a condensed layout of the running tunnels, including the two crossovers are included overleaf.

### **A.2 Information about Eurotunnel - The Infrastructure Manager for the Channel Tunnel Fixed Link**

**Name:** Eurotunnel

**Address:** UK Terminal, Ashford Road, Folkestone, Kent CT18 8XX

**Website:** [www.eurotunnel.com](http://www.eurotunnel.com)

**Network Statement Link – English version:**

[http://www.eurotunnel.com/NR/rdonlyres/9D386462-1F63-4625-AF20-C2279604B9B8/0/NS\\_20061108.pdf](http://www.eurotunnel.com/NR/rdonlyres/9D386462-1F63-4625-AF20-C2279604B9B8/0/NS_20061108.pdf)

**Network Statement Link – French Version:**

[http://www.eurotunnel.com/NR/rdonlyres/FD692F25-02B7-4B4D-9B40-4964C7700BFF/0/DDR\\_20061108.pdf](http://www.eurotunnel.com/NR/rdonlyres/FD692F25-02B7-4B4D-9B40-4964C7700BFF/0/DDR_20061108.pdf)

**Start Date of Commercial Activity:** May 1994

**Total Track Length:** 159 km main tracks plus 50 km secondary tracks

**Track Gauge:** UIC

**Electrified Track Length:** All track both main and secondary is electrified

**Voltages:** 25,000 volts alternating current

**Total Double/Single Length Track:** 100% double track

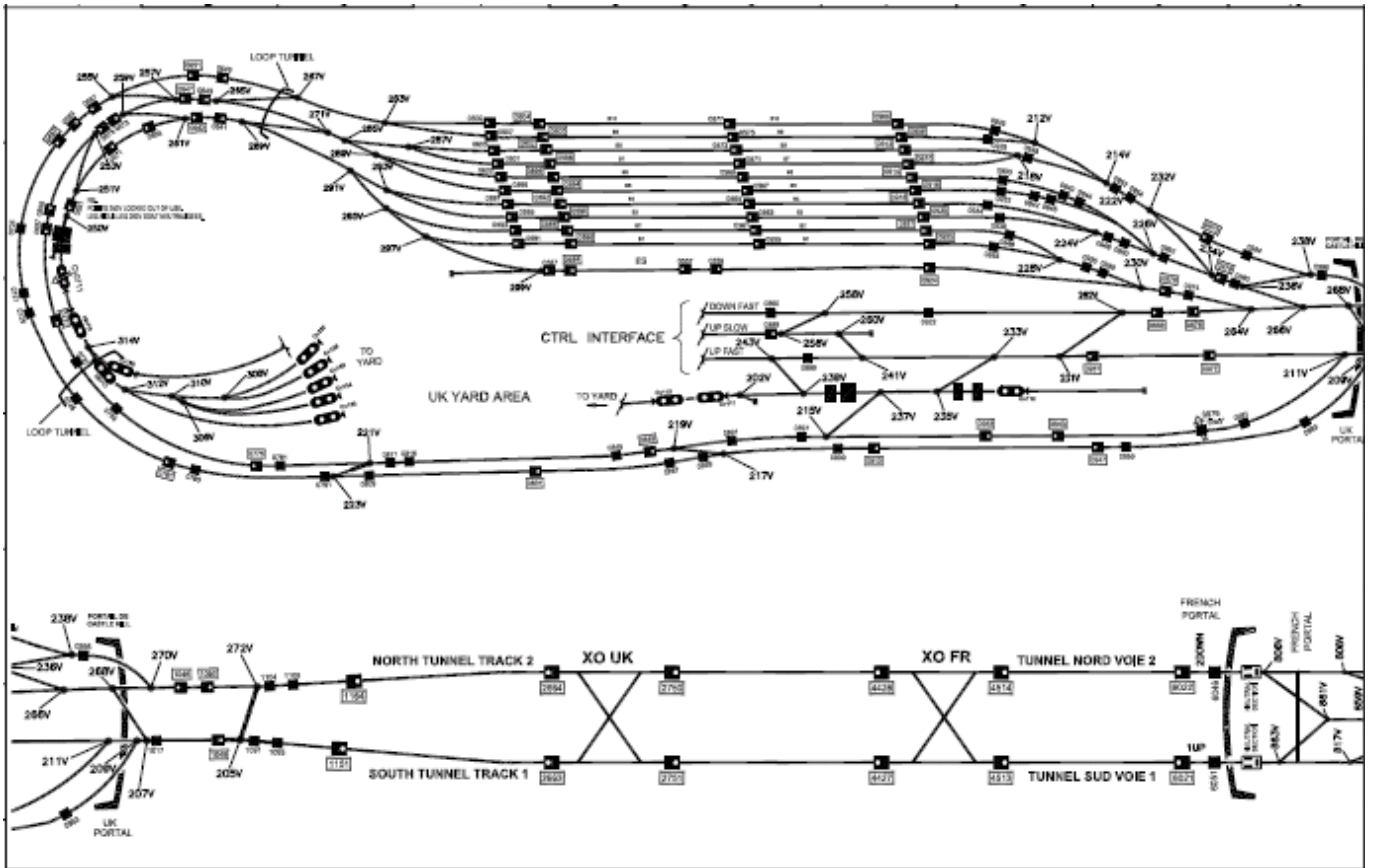
**Total Track Length – High Speed Line:** 108 km

**Automatic Train Protection Equipment Used:** TVM 430

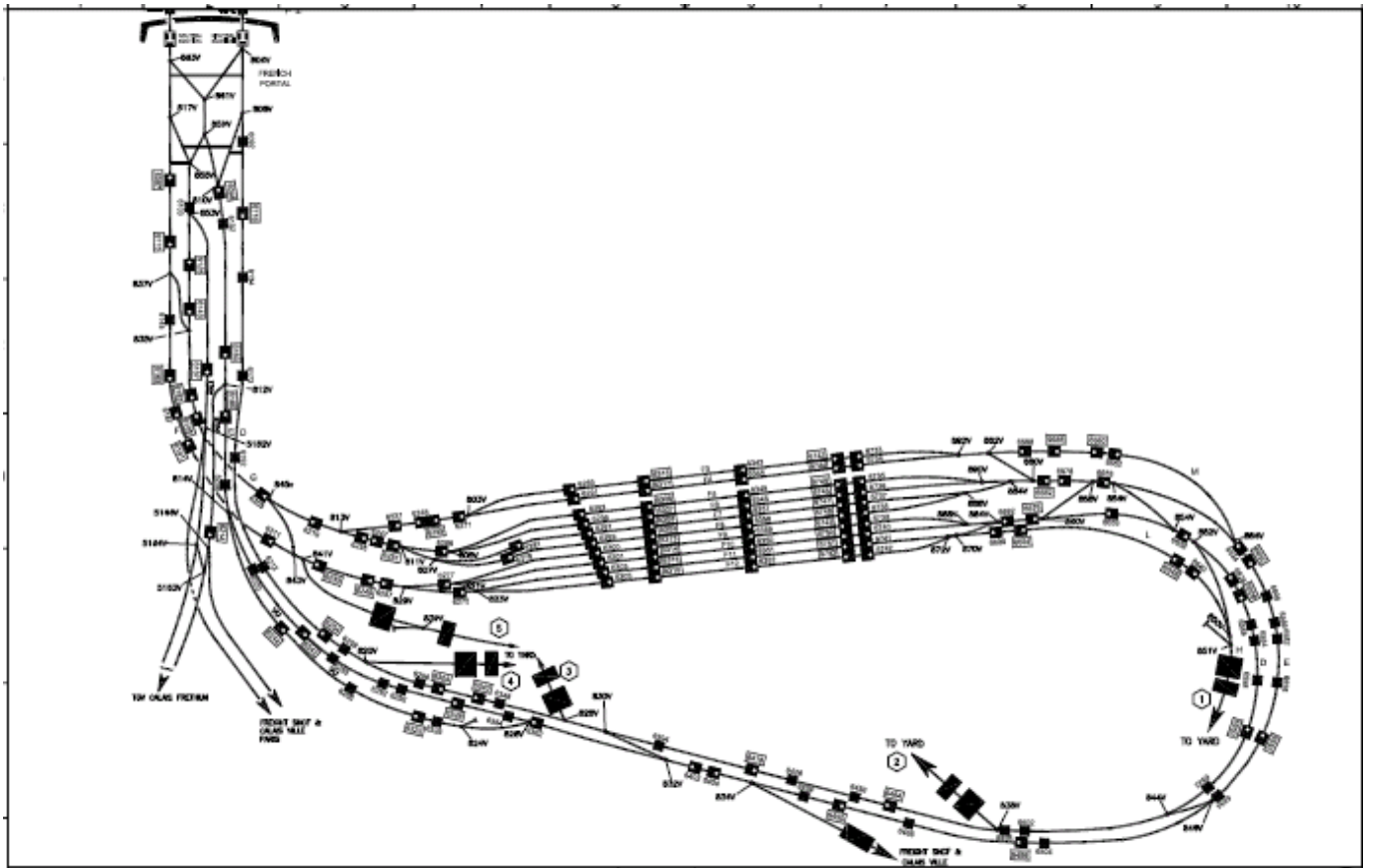
**Number of Level Crossings:** None on main tracks

**Number of Signals:** 655

**Network Map Showing Layout of UK Terminal and Running Tunnels**



**Network Map Showing Layout of French Terminal**



### A.3 Information about the Railway Undertakings

The railway undertakings which operated trains through the Fixed Link in 2007 were as follows:

**Name:** English Welsh and Scottish International Ltd

**Address:** National Business Centre  
Lakeside Business Park  
Carolina Way  
Doncaster  
South Yorkshire  
DN4 5PN

**Website:** [www.ews-railway.co.uk](http://www.ews-railway.co.uk)

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**Name:** Eurostar (UK) Ltd

**Address:** Eurostar House  
Times House  
Bravingtons Walk  
Regent Quarter  
London  
N1 9AW

**Website:** [www.eurostar.com](http://www.eurostar.com)

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**Name:** SNCF

**Address:** 34 rue du Commandant Mouchotte  
75699 Paris CEDEX 14

**Website:** [www.sncf.com](http://www.sncf.com)

**Name:** Europorte 2

**Address:** c/o Eurotunnel  
19 Boulevard Malesherbes  
75008 Paris,  
France

## **ANNEX B: IGC STRUCTURE AND RELATIONSHIPS**

[Annexes B.1 and B.2 included in separate "Powerpoint" file]

## **ANNEX C: DATA ON COMMON SAFETY INDICATORS**

Data on Common Safety Indicators for 2007 is shown in Annex C.1. The 2007 data has been reproduced alongside the data for 2006 at Annex C.2 to allow comparison between the two years. [The data is contained in a separate "Excel" files]

It should be noted that no information is available about total number of passenger kilometres or passenger journeys. Eurotunnel only has information about numbers of vehicles transported.

In 2007 Eurotunnel transported 1,414,709 lorries, 2,141,573 cars and 65,331 coaches.

In addition, there were a total of 18,225 Eurostar transits carrying 8,260,980 passengers.

## **ANNEX D: SAFETY RELATED INCIDENTS PREVIOUSLY INCLUDED IN REPORTS PUBLISHED BY THE CTSA**

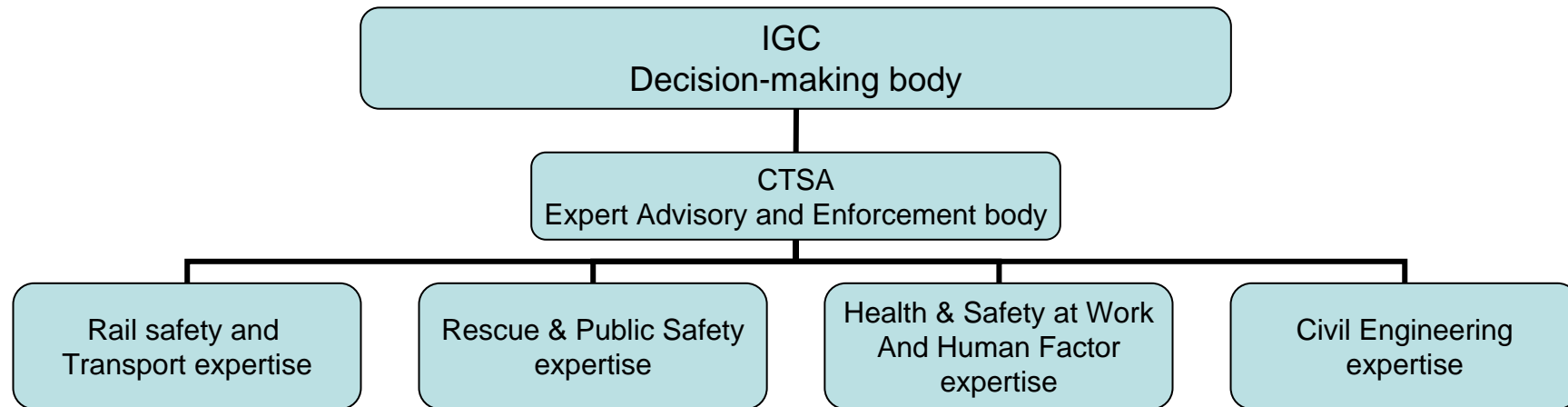
|  |   |                 |
|--|---|-----------------|
| Fuel Spillages                                     | = | 74              |
| Unscheduled stops greater than 30 minutes          | = | 29 (See note 1) |
| Track/rail problems                                | = | 13              |
| SPAD As (Driver)*                                  | = | 1               |
| SPAD Bs (Technical)*                               | = | 9               |
| SPAD Cs (Operator Error)*                          | = | 4               |
| Catenary trips                                     | = | 3               |
| Catenary isolation error                           | = | 1               |
| Collision of works train with buffer               | = | 1               |
| Injuries   | = | 4 (See note 2)  |
| Non-compliance with Minimum Operating Requirements | = | 1 (See note 3)  |

\* Only SPAD As and SPAD Cs are included in the UIC definition of SPADs. In addition, Eurotunnel, unlike many national railways, includes in its statistics all SPADs occurring on the infrastructure, including those on secondary track and track under possession.

### **Notes**

- (1) Four of the 29 unscheduled stops led to evacuation of HGV shuttles. A fifth evacuation was caused by an emergency call from the Agent de feu on the platform reporting the presence of smoke as a train departed. One of the unscheduled stops was caused by an electrical fire in the French supply station which led to the south running tunnel becoming de-energised. Two of the unscheduled stops occurred on works trains.
- (2) Incidents involving injuries were as follows:
- On 23 April a maintenance technician suffered burns to his left hand and face from an electric arc generated between an electrical cabinet box and an earthing rod;
  - On 18 July a technician dislocated his left collar bone during cabling bracket works in the service tunnel;
  - On 7 September two people were injured when a Ladog vehicle overturned in the service tunnel;
  - On 8 October a worker suffered a broken wrist and bruising to knee and foot after being knocked down by a reversing service vehicle during the loading of an HGV shuttle.
- (3) The Minimum Operating Requirements set out requirements for normal commercial service. On 9 July 2007 during rail grinding works, three fire detection units in the running tunnel where commercial services were operating, instead of in the tunnel where works was taking place, were inhibited. The error was rectified after 40 minutes.

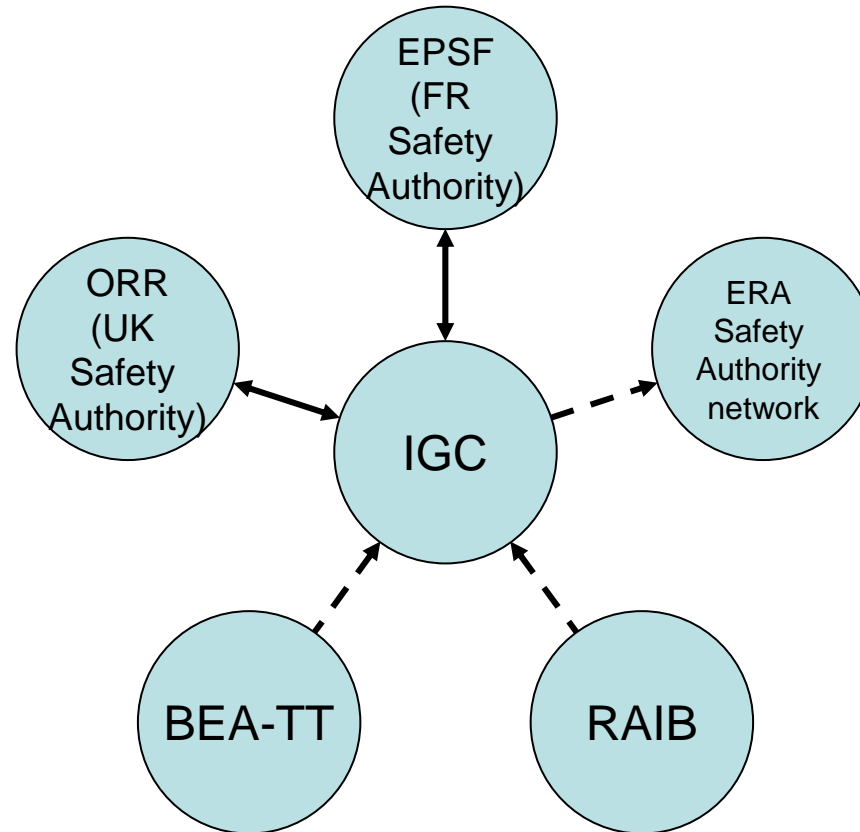
# IGC Structure



(This relates solely to the IGC's role as Safety Authority for the Channel Tunnel)



# IGC Relationships with Other Bodies



Arrows indicate main direction of communication and substantive links.

## Common Safety Indicators (CSI)

## 1. Indicators relating to accidents

## 1.1a. Total number of accidents and a break-down into the following types of accidents

## 1.1b. Relative to train kilometres number of accidents and a break-down into the following types of accidents

|                           | Total number of all accidents, excluding suicides | Collisions of trains, including collisions with obstacles within the clearance gauge | Derailments of trains | Level-crossing accidents, including accidents involving pedestrians at level-crossings | Accidents to persons caused by rolling stock in motion, with the exception of suicides | Fires in rolling stock | Others |
|---------------------------|---|--|-----------------------|--|--|------------------------|--------|
| code of variable          | N00   | N01  | N02                   | N03  | N04  | N05                    | N06    |
| 1.1a. Number of accidents | 0   | 0  | 0                     | 0  | 0  | 0                      | 0      |

| code of variable  | N10   | N11   | N12   | N13   | N14   | N15   | N16   |
|---|-------|-------|-------|-------|-------|-------|-------|
| 1.1b. "Relative" Number of accidents (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

|                                | Suicides |
|--------------------------------|----------|
| code of variable               | N07      |
| 1.1a. Total number of suicides | 0        |

| code of variable  | N17   |
|---|-------|
| 1.1b. Relative to "billion" train kilometres number of suicides | 0,000 |

## 1.2a. Total number of persons seriously injured by type of accident divided into the following categories

## 1.2b. Relative to train kilometres total number of persons seriously injured by type of accident divided into the following categories

## 1.2c. Relative to passenger kilometres total number of persons seriously injured by type of accident divided into the following categories (for passengers only)

|                               | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|-------------------------------|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable              | TS00  | TS01  | TS02                     | TS03  | TS04  | TS05                      | TS06      |
| 1.2a. Total seriously injured | 0   | 0   | 0                        | 0   | 0   | 0                         | 0         |

|   | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|---|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable  | TS10  | TS11  | TS12                     | TS13  | TS14  | TS15                      | TS16      |
| 1.2b. "Relative" Total seriously injured (per billion train km) | 0,000   | 0,000   | 0,000                    | 0,000   | 0,000   | 0,000                     | 0,000     |

|                  | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|------------------|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable | PS00  | PS01  | PS02                     | PS03  | PS04  | PS05                      | PS06      |
| 1.2a. Passengers | 0   | 0   | 0                        | 0   | 0   | 0                         | 0         |

| code of variable                                   | PS10  | PS11  | PS12  | PS13  | PS14  | PS15  | PS16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.2b. "Relative" Passengers (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                                       | PS20  | PS21  | PS22  | PS23  | PS24  | PS25  | PS26  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.2c. "Relative" Passengers (per billion passenger km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                                   | SS00 | SS01 | SS02 | SS03 | SS04 | SS05 | SS06 |
|--|------|------|------|------|------|------|------|
| 1.2a. Employees including the staff of contractors | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable                                  | SS10  | SS11  | SS12  | SS13  | SS14  | SS15  | SS16  |
|---|-------|-------|-------|-------|-------|-------|-------|
| 1.2b. "Relative" Employees (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable           | LS00 | LS01 | LS02 | LS03 | LS04 | LS05 | LS06 |
|----------------------------|------|------|------|------|------|------|------|
| 1.2a. Level-crossing users | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable   | LS10  | LS11  | LS12  | LS13  | LS14  | LS15  | LS16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.2b. "Relative" Level-crossing users (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                               | US00 | US01 | US02 | US03 | US04 | US05 | US06 |
|--|------|------|------|------|------|------|------|
| 1.2a. Unauthorised persons on railway premises | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable   | US10  | US11  | US12  | US13  | US14  | US15  | US16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.2b. "Relative" Unauthorised persons (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable | OS00 | OS01 | OS02 | OS03 | OS04 | OS05 | OS06 |
|------------------|------|------|------|------|------|------|------|
| 1.2a. Others     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable                               | OS10  | OS11  | OS12  | OS13  | OS14  | OS15  | OS16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.2b. "Relative" Others (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

## Common Safety Indicators (CSI)

## 1.3a. Total number of persons killed by type of accident divided into the following categories

## 1.3b. Relative to train kilometres total number of persons killed by type of accident divided into the following categories

## 1.3c. Relative to passenger kilometres total number of persons killed by type of accident divided into the following categories (for passengers only)

|                    | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|--------------------|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable   | TK00  | TK01  | TK02                     | TK03  | TK04  | TK05                      | TK06      |
| 1.2a. Total killed | 0   | 0   | 0                        | 0   | 0   | 0                         | 0         |

|  | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|--|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable                                     | TK10  | TK11  | TK12                     | TK13  | TK14  | TK15                      | TK16      |
| 1.2b. "Relative" Total killed (per billion train km) | 0,000   | 0,000   | 0,000                    | 0,000   | 0,000   | 0,000                     | 0,000     |

|                  | Total number in all accidents, excluding suicides | In collisions of trains, including collisions with obstacles within the clearance gauge | In derailments of trains | In level-crossing accidents, including accidents involving pedestrians at level-crossings | In accidents to persons caused by rolling stock in motion, with the exception of suicides | In fires in rolling stock | In others |
|------------------|---|---|--------------------------|---|---|---------------------------|-----------|
| code of variable | PK00  | PK01  | PK02                     | PK03  | PK04  | PK05                      | PK06      |
| 1.3a. Passengers | 0   | 0   | 0                        | 0   | 0   | 0                         | 0         |

| code of variable                                   | PK10  | PK11  | PK12  | PK13  | PK14  | PK15  | PK16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.3b. "Relative" Passengers (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                                       | PK20  | PK21  | PK22  | PK23  | PK24  | PK25  | PK26  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.3c. "Relative" Passengers (per billion passenger km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                                   | SK00 | SK01 | SK02 | SK03 | SK04 | SK05 | SK06 |
|--|------|------|------|------|------|------|------|
| 1.3a. Employees including the staff of contractors | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable                                  | SK10  | SK11  | SK12  | SK13  | SK14  | SK15  | SK16  |
|---|-------|-------|-------|-------|-------|-------|-------|
| 1.3b. "Relative" Employees (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable           | LK00 | LK01 | LK02 | LK03 | LK04 | LK05 | LK06 |
|----------------------------|------|------|------|------|------|------|------|
| 1.3a. Level-crossing users | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable   | LK10  | LK11  | LK12  | LK13  | LK14  | LK15  | LK16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.3b. "Relative" Level-crossing users (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable                               | UK00 | UK01 | UK02 | UK03 | UK04 | UK05 | UK06 |
|--|------|------|------|------|------|------|------|
| 1.3a. Unauthorised persons on railway premises | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable   | UK10  | UK11  | UK12  | UK13  | UK14  | UK15  | UK16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.3b. "Relative" Unauthorised persons (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

| code of variable | OK00 | OK01 | OK02 | OK03 | OK04 | OK05 | OK06 |
|------------------|------|------|------|------|------|------|------|
| 1.3a. Others     | 0    | 0    | 0    | 0    | 0    | 0    | 0    |

| code of variable                               | OK10  | OK11  | OK12  | OK13  | OK14  | OK15  | OK16  |
|--|-------|-------|-------|-------|-------|-------|-------|
| 1.3a. "Relative" Others (per billion train km) | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 | 0,000 |

## 2. Indicators relating to incidents and near-misses

## 2.1a. Total number of incidents and near-misses and a break-down into the following types

## 2.1b. Relative to train kilometres number of incidents and near-misses and a break-down into the following types of accidents

|                           | Total number of incidents and near-misses | Total number of broken rails | Total number of track buckles | Total number of wrong-side signalling failures | Total number of signals passed at danger | Total number of broken wheels on rolling stock in service | Total number of broken axles on rolling stock in service |
|---------------------------|---|------------------------------|-------------------------------|--|--|---|--|
| code of variable          | I00                                       | I01                          | I02                           | I03  | I04                                      | I05   | I06  |
| 2.1a. Number of incidents | 18  | 13                           | 0                             | 0  | 5  | 0   | 0  |

| code of variable  | I10       | I11       | I12   | I13   | I14     | I15   | I16   |
|---|-----------|-----------|-------|-------|---------|-------|-------|
| 2.1b. "Relative" Number of incidents (per billion train km) | 2 755,242 | 1 989,897 | 0,000 | 0,000 | 765,345 | 0,000 | 0,000 |

## Common Safety Indicators (CSI)

## 3. Indicators relating to consequences of accidents

## 3.1a. Total costs in euro of all accidents

## 3.1b. Relative to train kilometres total costs in euro of all accidents

## 3.2a. Total number of working hours of staff and contractors lost as a consequence of accidents

## 3.2b. Relative to number of hours worked number of working hours of staff and contractors lost as a consequence of accidents

|                        | Total costs of all accidents | Costs of deaths | Costs of injuries | Costs of replacement or repair of damaged rolling stock and railway installations | Costs of delays, disturbances and re-routing of traffic, including extra costs for staff and loss of future revenue |
|------------------------|------------------------------|-----------------|-------------------|---|---|
| code of variable       | C00                          | C01             | C02               | C03   | C04   |
| 3.1a. Costs (in Euros) | €0                           | €0              | €0                | €0  | €0  |

| code of variable   | C10 | C11 | C12 | C13 | C14 |
|--|-----|-----|-----|-----|-----|
| 3.1b. "Relative" Costs (in Euros) (per billion train km) | €0  | €0  | €0  | €0  | €0  |

|   | Total number of working hours of staff and contractors lost as a consequence of accidents |
|---|---|
| code of variable                                    | W00   |
| 3.2a. Total number of working hours lost            | 0   |
| code of variable                                    | W10   |
| 3.2b. "Relative" Total number of working hours lost | 0,000%  |

## 4. Indicators relating to technical safety of infrastructure and its implementation

|                  | Percentage of tracks with Automatic Train Protection (ATP) in operation | Percentage of train kilometres using operational ATP systems | Total number of level crossings | Total number of level crossings per line kilometre | Percentage of level crossings with active (automatic or manual) protection |
|------------------|---|--|---------------------------------|--|--|
| code of variable | T01   | T02  | T03                             | T04  | T05  |
| 4. Number        | 100,00%   | 100,00%  | 0                               | 0,000  | n/a  |

## 5. Indicators relating to the management of safety

Internal audits accomplished by infrastructure managers and railway undertakings as set out in the documentation of the safety management system.

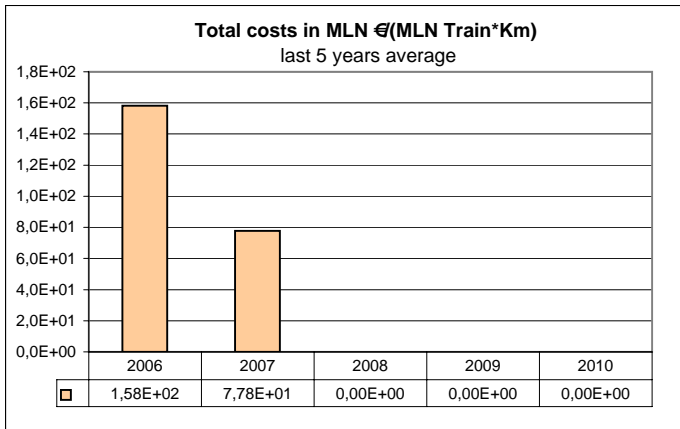
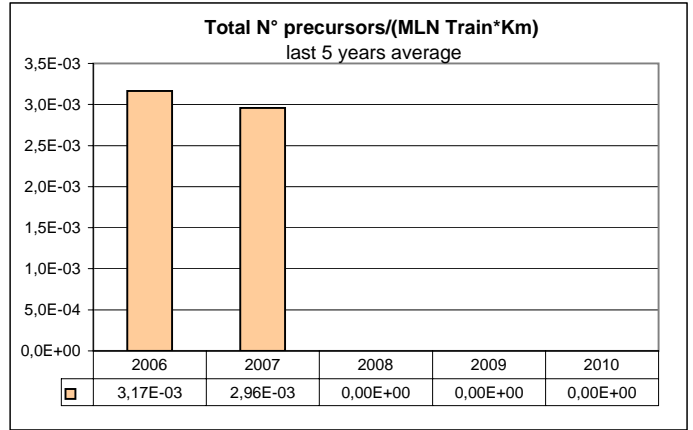
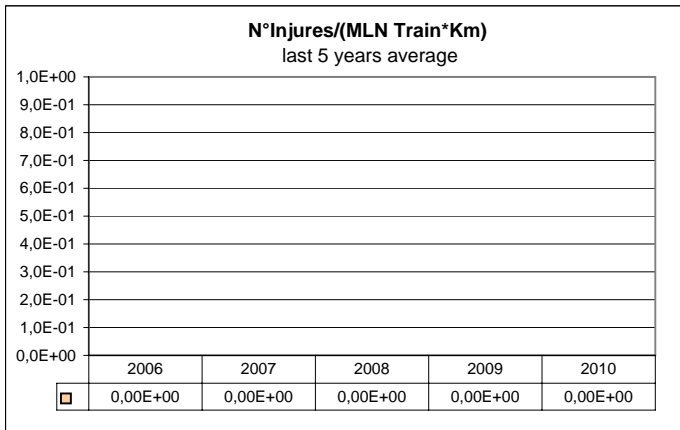
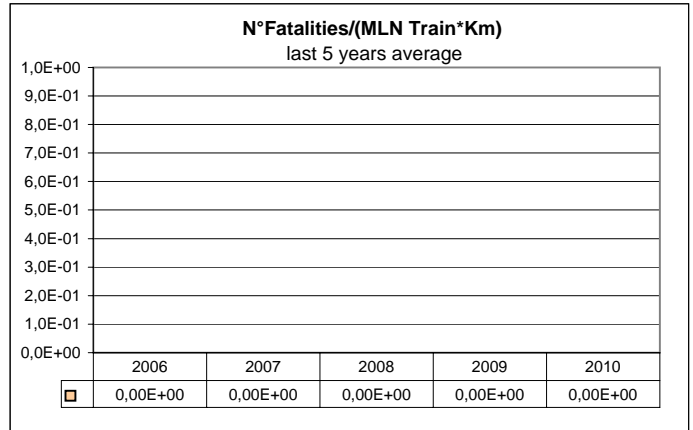
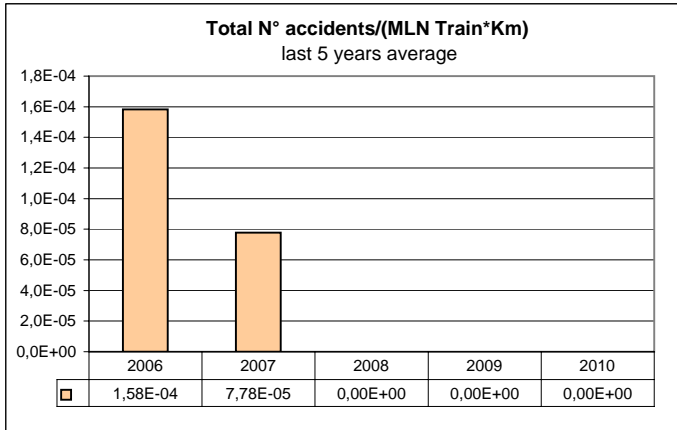
|                  | Total number of accomplished audits | Percentage of audits accomplished /required (and/or planned). |
|------------------|-------------------------------------|---|
| code of variable | A01                                 | A02   |
| 5. Number        | 25                                  | 85,0%   |

## 6. Reference data

|                  | Number of Train kilometres (millions) | Number of Passenger kilometres (millions) | Number of passenger journeys (millions) | Tonnes of freight carried (millions) | Number of line kilometres | Total number of working hours (thousands) |
|------------------|---------------------------------------|---|---|--------------------------------------|---------------------------|---|
| code of variable | R01                                   | R02                                       | PaxJ                                    | TonF                                 | R03                       | R04                                       |
| 6. Number        | 6,533                                 | See notes overleaf                        | See notes overleaf                      | 1,214                                | 159,000                   | 3 400,235                                 |

# C.1. CSIs data

Performances at a glance



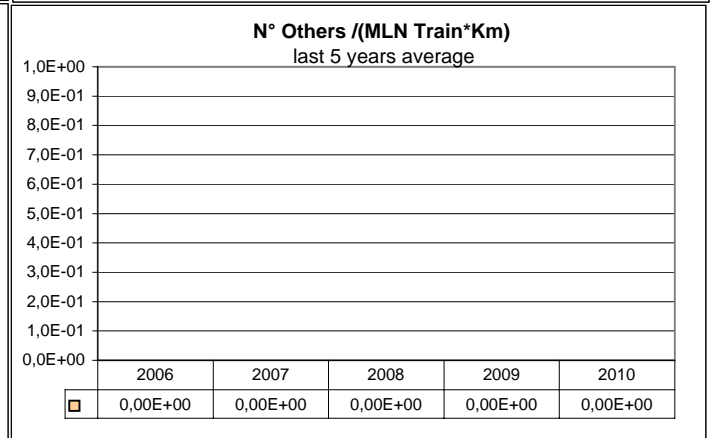
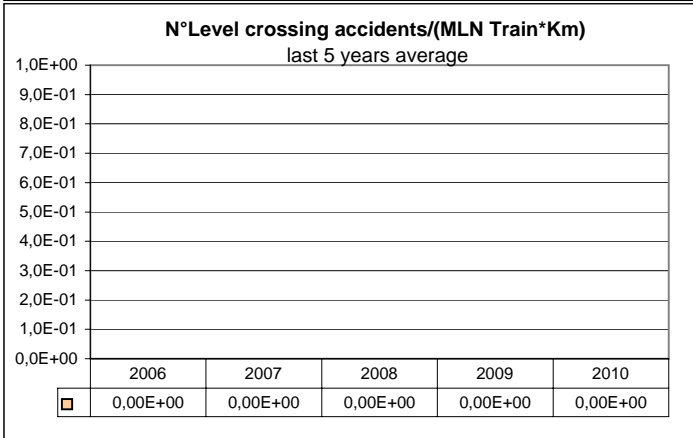
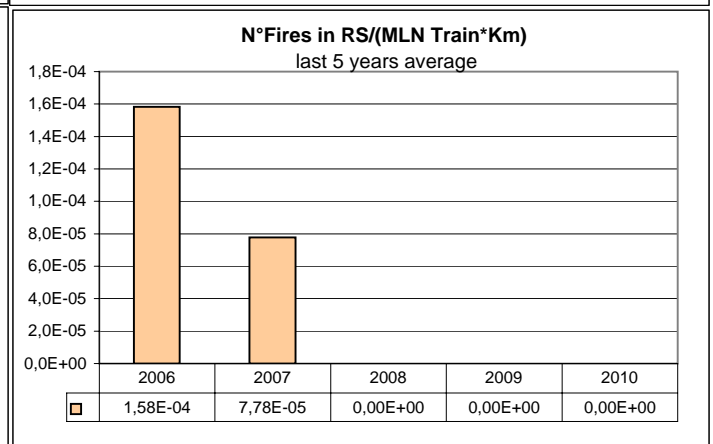
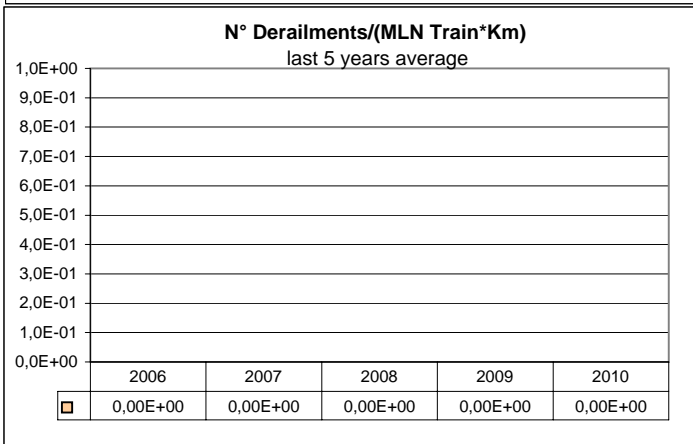
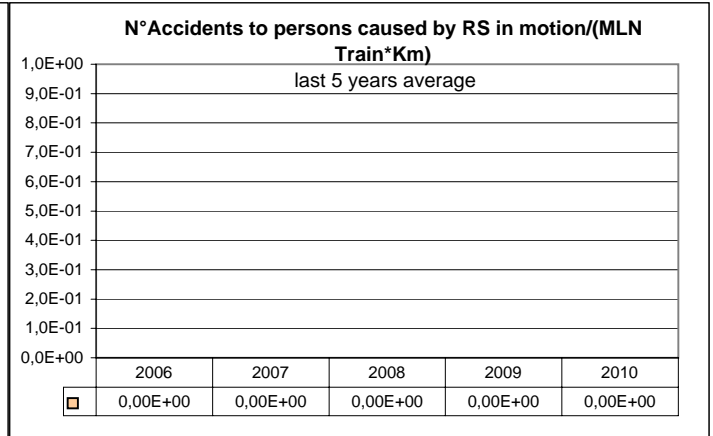
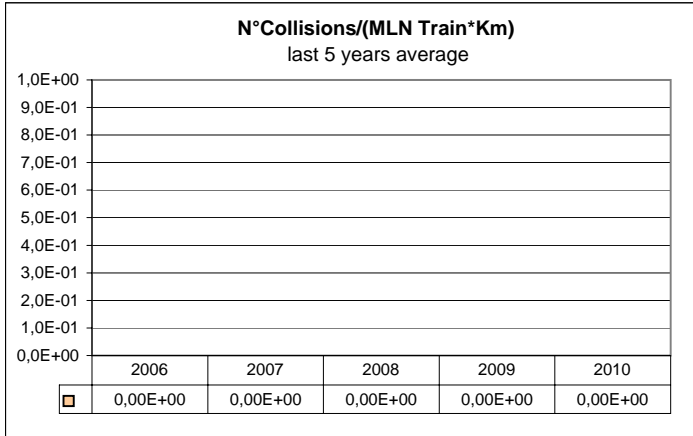
2007 report: values related to 2006.

2008 report: values related to the average between 2006 and 2007.

2008 report: values related to the average among 2006, 2007 and 2008.

2009 report: values related to the average among 2006, 2007, 2008 and 2009.

Accidents divided by type



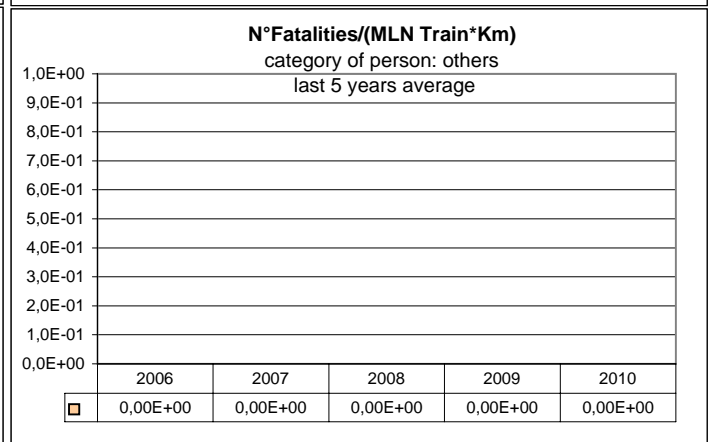
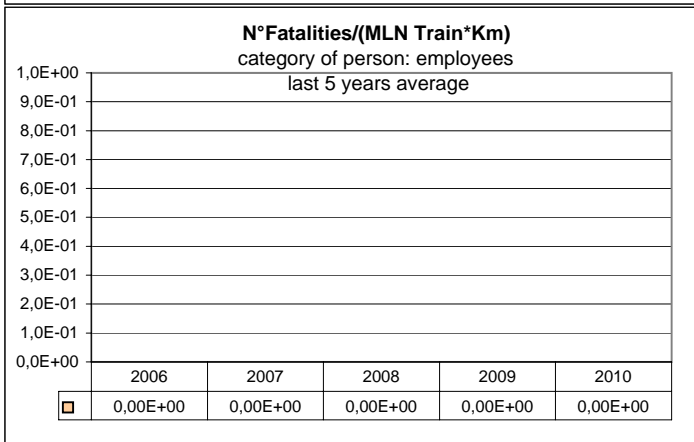
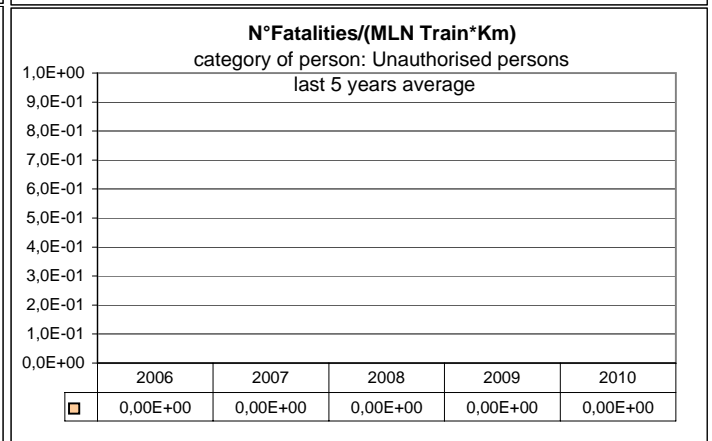
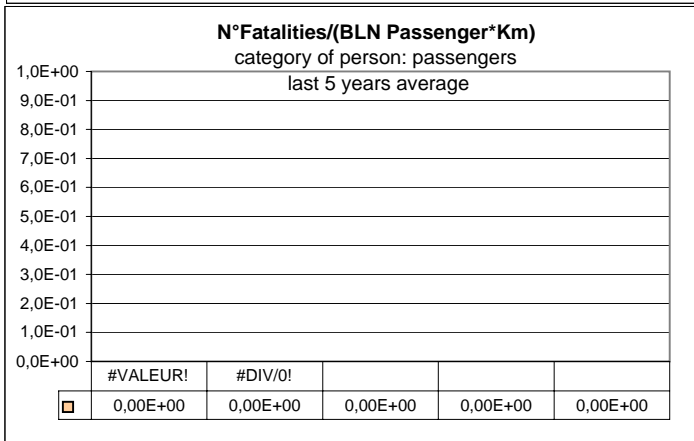
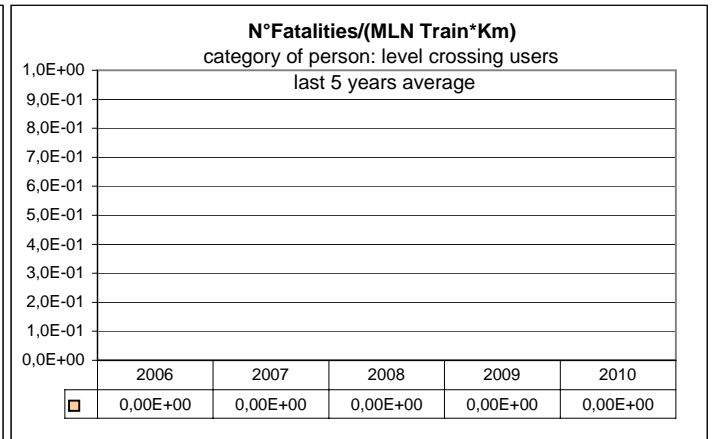
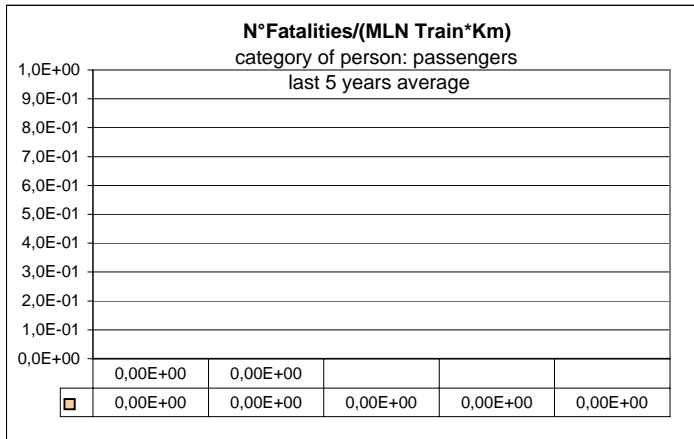
2007 report: values related to 2006.

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2008 report: values related to the average among 2006, 2007 and 2008.

2009 report: values related to the average among 2006, 2007, 2008 and 2009.

Fatalities divided by category of people involved



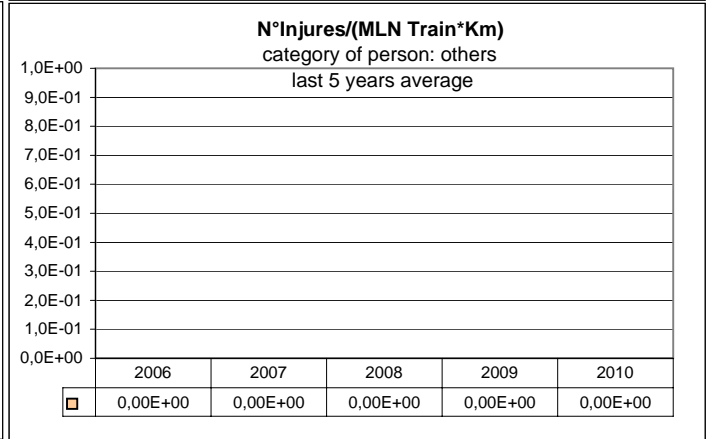
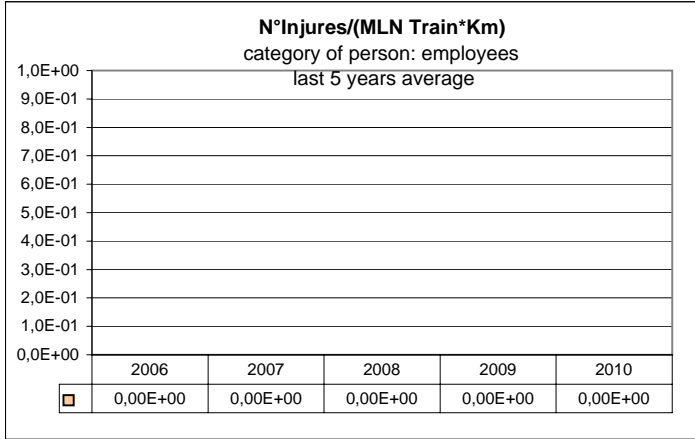
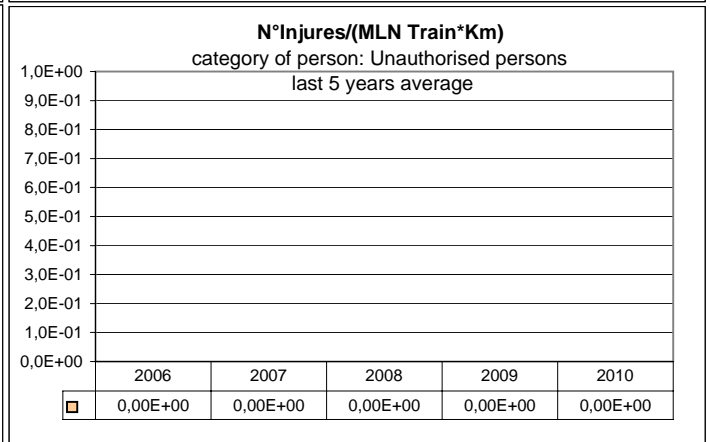
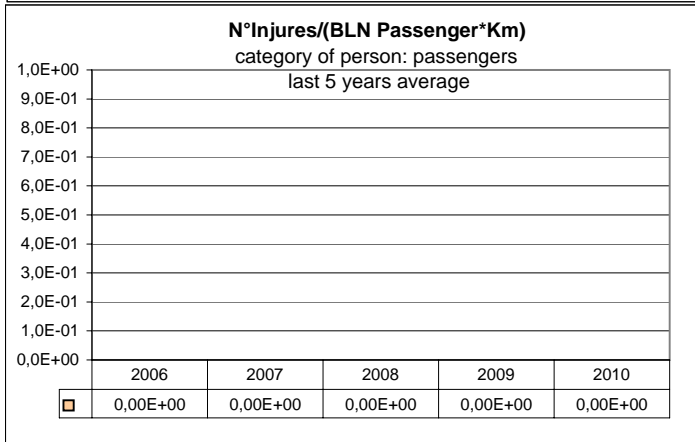
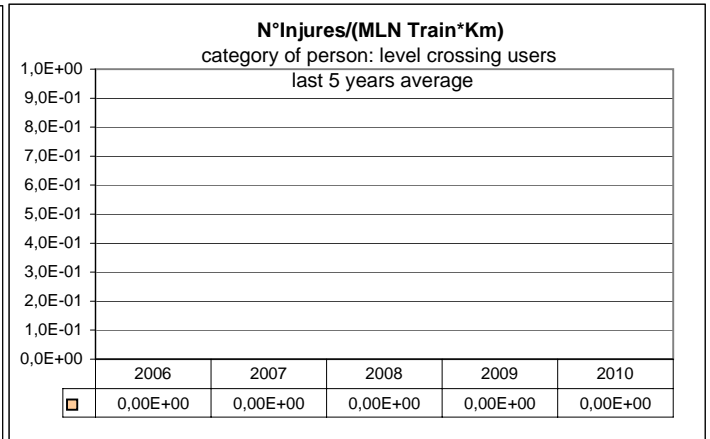
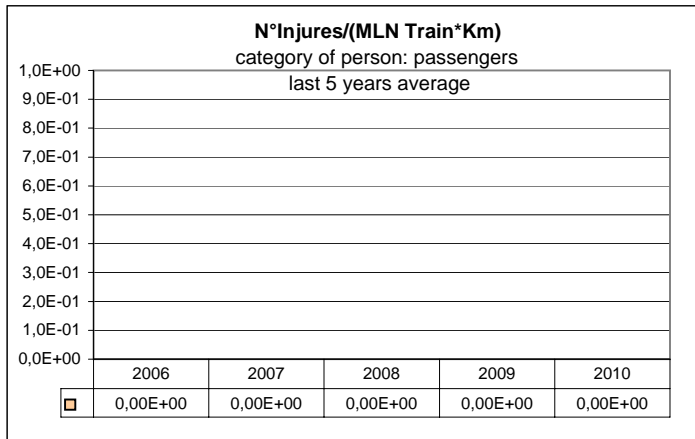
2007 report: values related to 2006.

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2009 report: values related to the average among 2006, 2007, 2008 and 2009.

*Injures divided by category of people involved*



2007 report: values related to 2006.

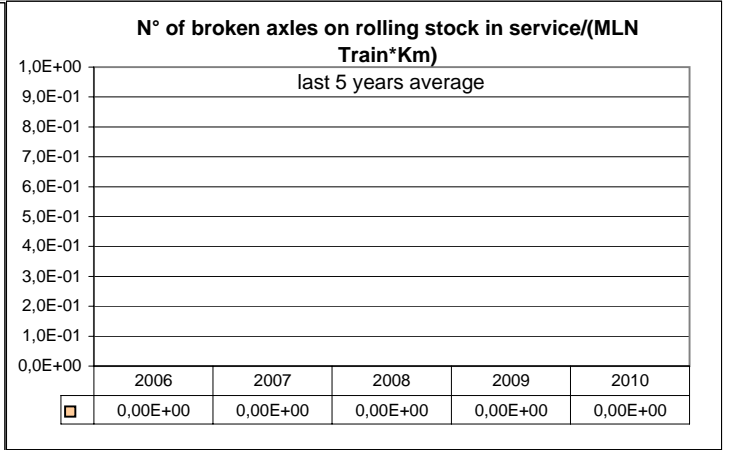
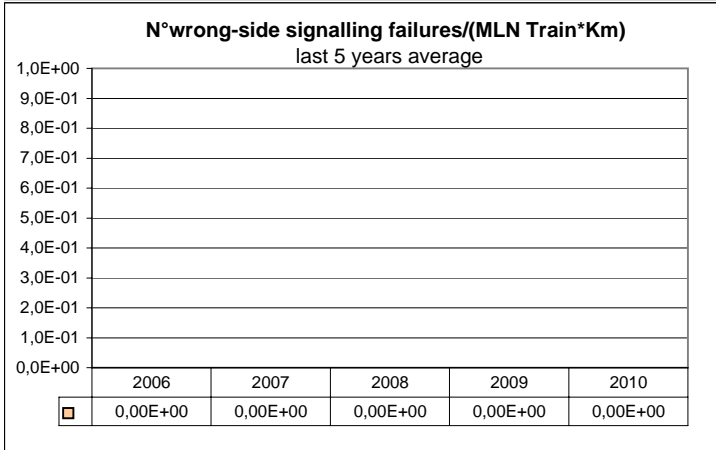
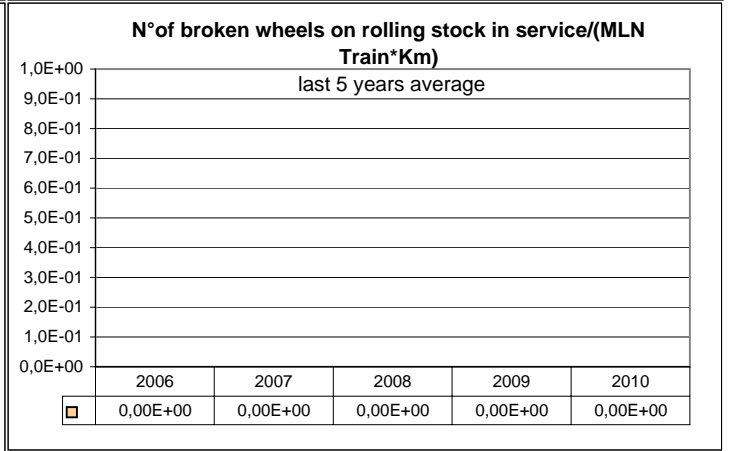
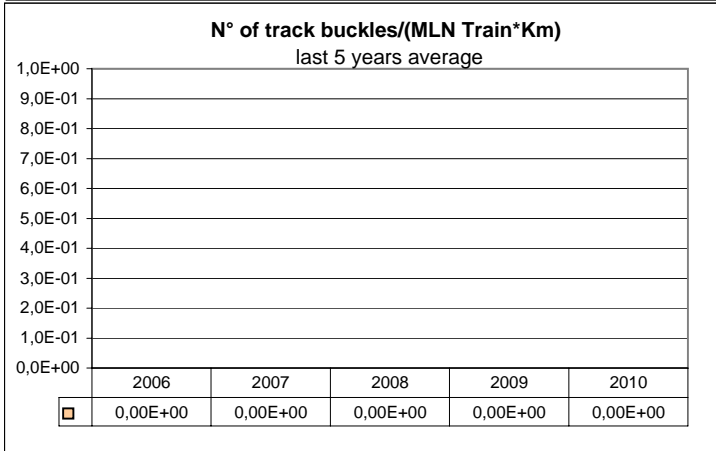
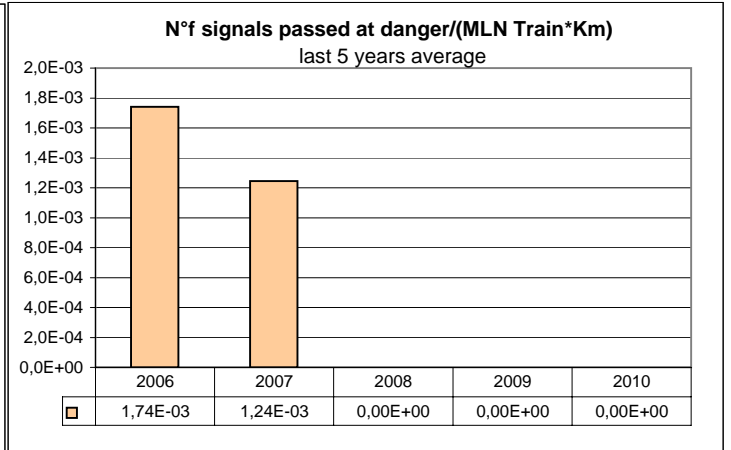
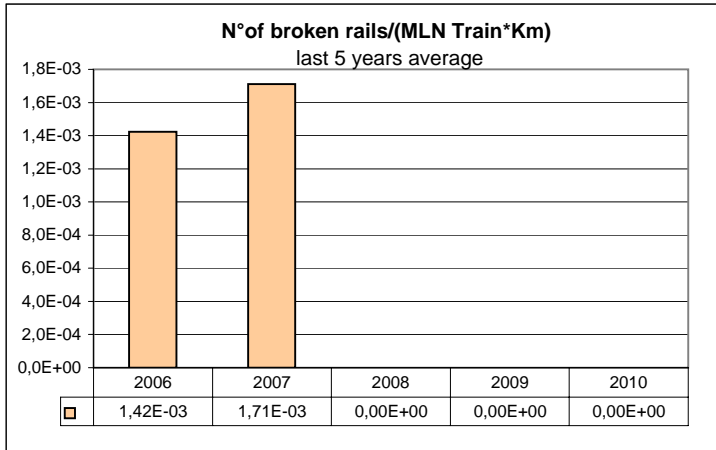
2008 report: values related to the average between 2006 and 2007.

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2009 report: values related to the average among 2006, 2007, 2008 and 2009.



Precursors to accidents



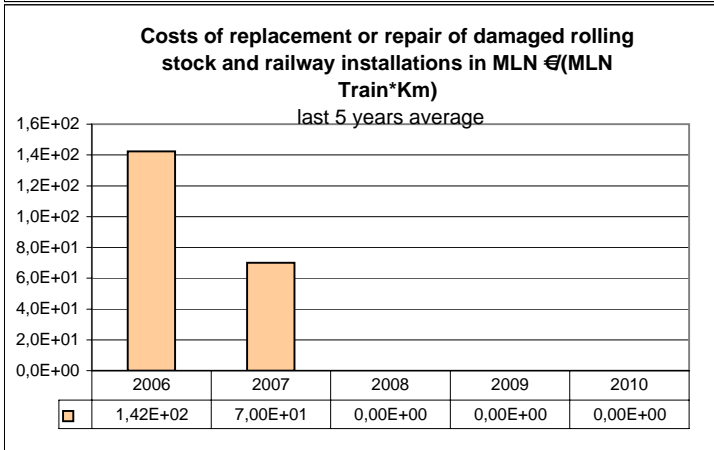
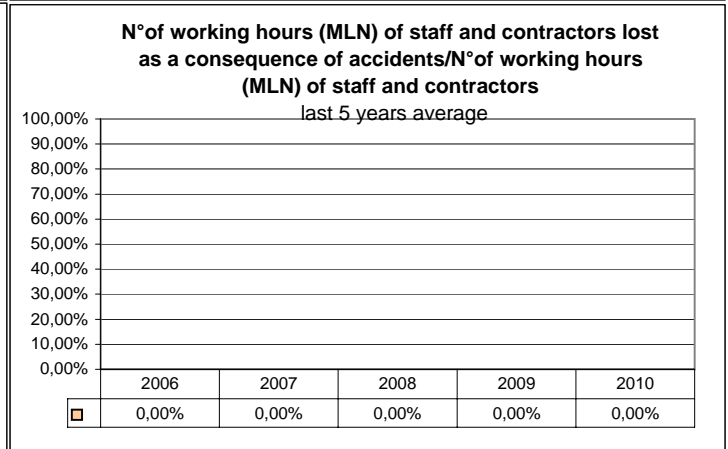
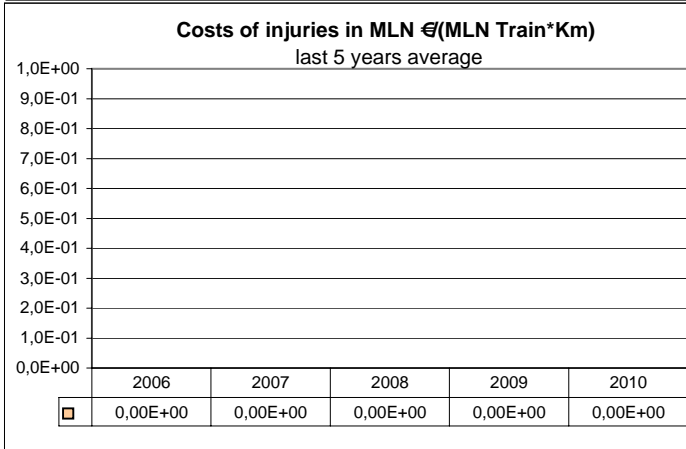
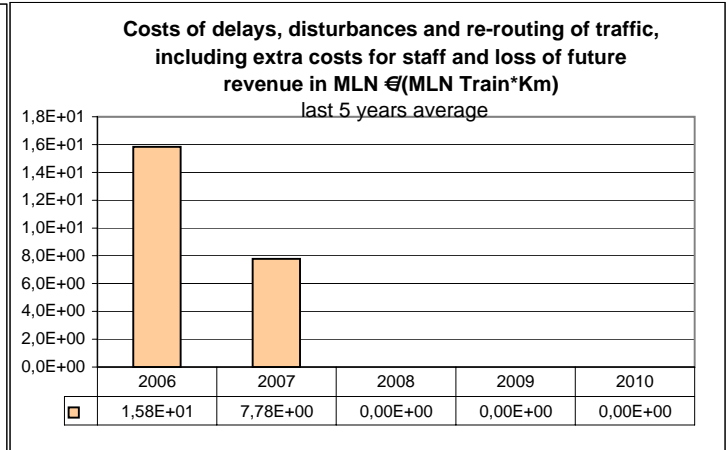
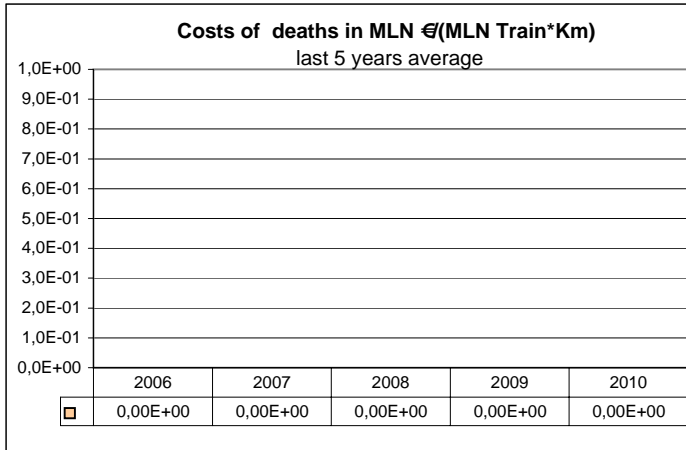
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Cost of all accidents, number of working hours of staff and contractors lost as a consequence of accidents



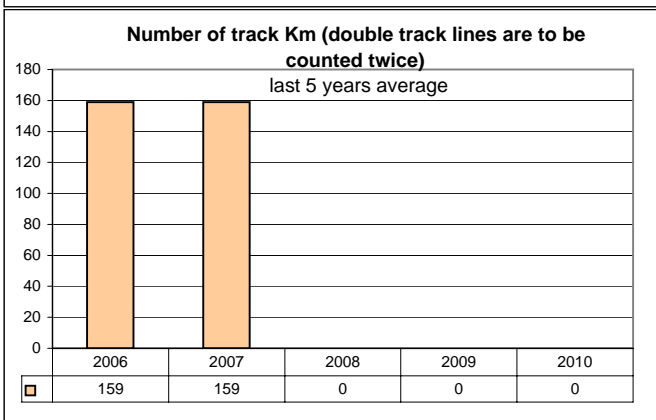
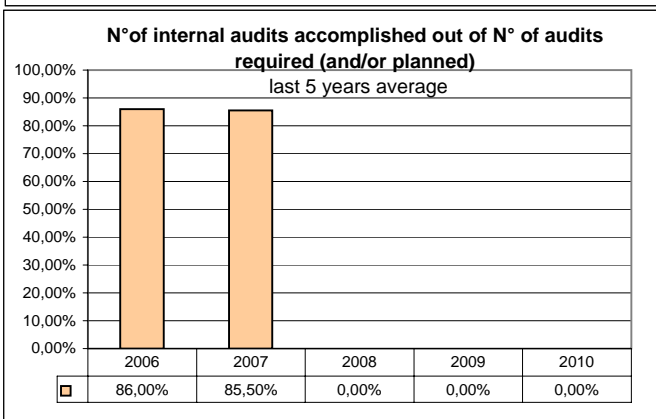
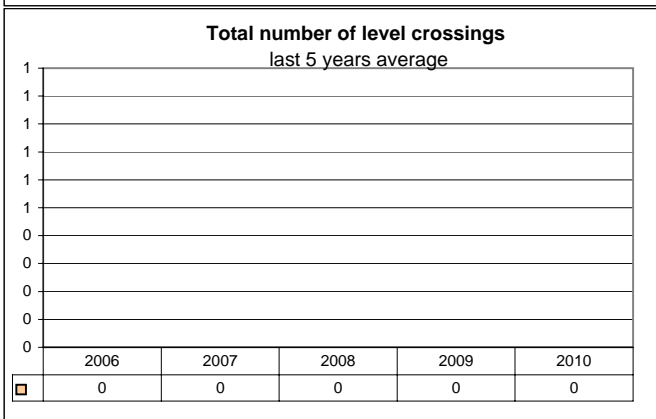
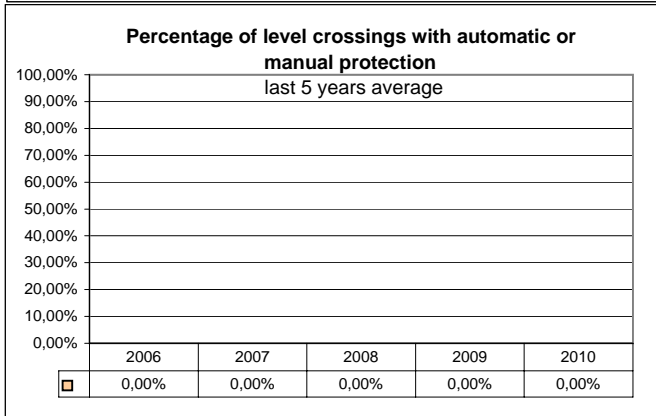
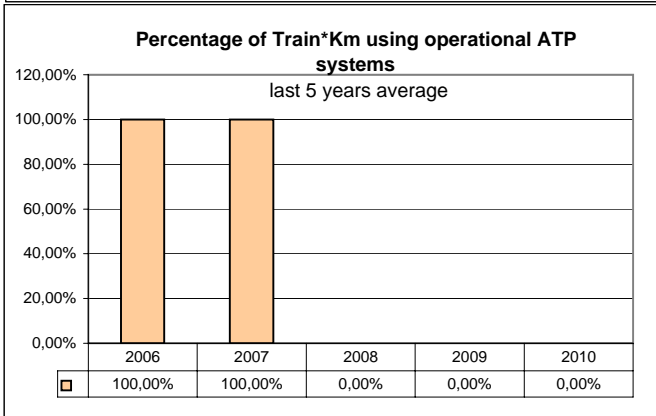
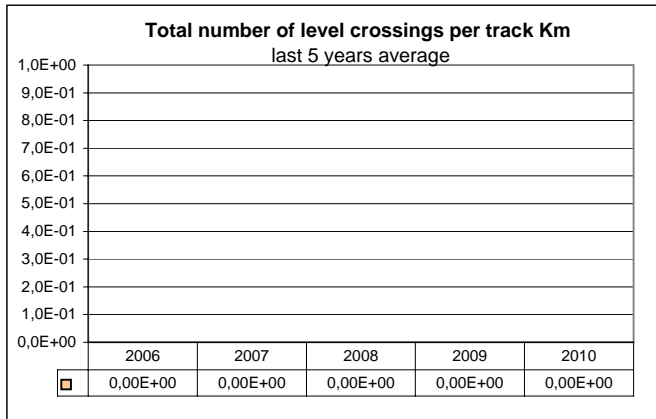
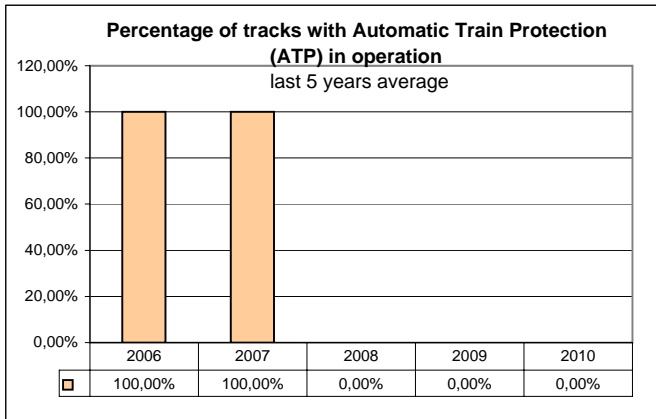
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Technical safety of infrastructure and its implementation, management of safety



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