# REPORT BY THE CHANNEL TUNNEL INTERGOVERNMENTAL COMMISSION ON SAFETY IN THE CHANNEL TUNNEL FIXED LINK DURING 2009

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#### 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 2009 to 31 December 2009.

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 which includes (para 7) an English language summary.

#### **B** - Introductory Section

3. **Introduction** - The Railway Safety Directive (2004/49/EC as amended) 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 English Welsh & Scottish International Limited (EWSI), DB Schenker Rail (UK) Ltd, 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 2009 were as follows:
  - Completion of repairs to the tunnel following the serious fire which occurred on 11 September 2008 (see paragraph 13(i));
  - The continuance of a serious study of the initial assessment of risks in the tunnel in the light of the fire and consideration of whether evidence of increased risks required changes to the safety regime (see paragraph 13(i));

- Consideration of an RAIB report regarding the uncontrolled movement of a coach on a tourist shuttle which occurred on 4 April 2008 (see paragraph 18);
- Consideration of proposals in relation to Eurotunnel's fleet of HGV shuttle wagons (see paragraphs 13(v) and 13 (vi));
- The review of the specific safety rules relating to passenger trains transiting the tunnel (see paragraph 23(i));
- The authorisation of the infrastructure manager, Eurotunnel, under the provisions of the Railway Safety Directive 2004/49EC as amended (see paragraph 26);
- The incident on 25 August 2009 when a passenger shuttle lost traction in the tunnel and passengers were held in the tunnel for several hours (see paragraph 13(ii));
- The Eurostar failures which occurred on 18/19 December 2009 (see paragraph 13(iii)).

8. **General Trend Analysis** - The IGC and the CTSA continued to monitor Eurotunnel's safety management arrangements and safety performance. Many of the Common Safety Indicators reported on in detail at Annex C remain at zero and the charts show a consistent fall overall in the precursors and specific actions continue to be implemented to continue this improvement. Nevertheless, target frequency rates for both collective and individual safety events were not achieved. For collective events there was an increase during the fourth quarter of the year which can be explained by the particularly harsh weather conditions. Occupational safety performance showed a slight deterioration during 2009 by comparison with 2008. Target frequency rates for lost time accidents for both Eurotunnel staff and contractors were not achieved. (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

There were no safety measures which were triggered by accidents/precursors which occurred in 2009.

The uncontrolled movement of a coach onboard a tourist shuttle train on 4 April 2008 and the fire on an HGV shuttle train on 21 August 2006 both triggered investigations by the UK Rail Accident Investigation Branch (RAIB). Developments in relation to these incidents are reported on under section D 3 of this report.

The fire on an HGV shuttle train on 11 September 2008 which triggered an investigation by the French Bureau d'Enquetes sur les Accidents de Transport Terrestre (BEA-TT) was the subject of on-going work during 2009 which is reported on elsewhere in this report. At the end of the period covered by this report the BEA-TT report had not been received.

Accident	ts/precurso the mea	Safety measure decided	
Date	Place	Description of the event	

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

Where appropriate, triggers for initiatives undertaken in 2009 are described in the text at paragraph 13 below. This table in the ERA template has not therefore been completed.

Safety measure decided	Description of the trigger of the measures

13. Activities and initiatives undertaken during the course of 2009 were as follows:

(i) Fire Onboard an HGV Shuttle train in Running Tunnel North on 11 September 2008 – The final months of 2008 had been dominated by the fire which occurred on 11 September 2008. The fire occurred onboard an HGV shuttle train travelling from the UK to France. It is evident that one of the lorries on the shuttle caught fire although the reason for this still remained unknown at the time of writing this report.

In the immediate aftermath of the fire, attention was focused on the recovery from the incident and the repair of the damaged section of the tunnel. The tunnel was completely closed for two days after which services were restored progressively, initially just through running tunnel south and subsequently through the two undamaged intervals of running tunnel north (firstly between the UK portal and the crossover on the UK side, and then between the two crossovers).

At the beginning of 2009 the section of the tunnel where the damage occurred (situated between the cross-over on the French side and the French portal) remained closed. The damage caused by the fire had been extensive. Two kilometers of running tunnel north required some repair work and re-equipment. Seven hundred metres required complete repair or restoration. The CTSA worked closely with Eurotunnel on this complex project with the objective of ensuring that the original standards for the integrity of the tunnel were maintained in respect of the repaired section, and that those responsible for the major civil engineering work involved in the repairs paid adequate attention to the health and safety of those undertaking the work. These objectives were met. The work was undertaken efficiently and quickly with no major accidents and the tunnel was fully re-opened on 9 February 2009.

Although the fire led to no deaths and only relatively minor injuries, it was recognized that this was a serious accident that required full investigation. A formal investigation into the fire was therefore launched by the French Bureau d'Enquetes sur les Accidents de Transport Terrestre (BEA-TT) assisted by the UK Rail Accident Investigation Branch (RAIB). At the end of the period covered by this report the formal investigation report was still awaited.

In the meantime, as the incidence of serious fires had been materially greater than had been assumed in the risk assessments conducted at the start of operations through the tunnel, the IGC asked Eurotunnel to undertake a serious study to revise its initial assessment of risks in the tunnel and asked the CTSA to consider whether the empirical evidence of increased risk required changes to the safety regime applying to the tunnel. While recognising that the full circumstances of the fire and the detailed operational implications were matters for the BEA-TT and RAIB investigations, the CTSA commenced urgent discussions with Eurotunnel about the wider implications of the incident and the immediate actions required. In response Eurotunnel developed and implemented its "Salamander" action plan in consultation with the CTSA. The action plan comprised of three main strands of activity:

- Reinforced prevention on the departure terminals by increased surveillance of HGVs, together with continuing monitoring of technological developments which might permit the introduction of hot spot detection equipment;
- Modifications to the first line of response (FLOR) procedures to improve the speed and effectiveness of interventions by the FLOR teams in the case of fire. At the end of the period covered by this report Eurotunnel reported that it had reached agreement in principle on new intervention procedures with the UK and French emergency services who provide the FLOR teams under contract. These procedures included catenary earthing being conducted by the FLOR teams;
- Consideration of the establishment of fixed fire suppression stations within the running tunnels in which it will be possible to contain a lorry fire on a freight shuttle while awaiting the arrival of the emergency services. At the end of the period covered by this report the IGC was anticipating a submission from Eurotunnel regarding the construction of a prototype station. In due course Eurotunnel would need to make a further submission to the IGC regarding the operational use of such stations.

The CTSA made an interim report to the IGC in October 2009 and will make a further and final report to the IGC following receipt and consideration of the BEA-TT investigation report.

(ii) Stoppage of a Tourist Shuttle in Running Tunnel South on 25 August 2009 - On 25 August 2009 a tourist shuttle transporting 135 vehicles (around 500 passengers) made an uncontrolled stop in the tunnel which led to a loss of traction to both locomotives. The incident resulted in passengers being at a standstill in the tunnel for a period of over five hours. The IGC was concerned at Eurotunnel's handling of this incident and felt that the delay in getting passengers out of the tunnel could have been avoided by better organised decision taking. The incident, which followed a number of similar incidents in recent years in which trains and passengers have been stuck in the tunnel for several hours, again gave rise to concerns about the adequacy of Eurotunnel's arrangements for crisis management and the efficiency of its procedures for assisting customers caught up in this type of event. The IGC asked Eurotunnel to submit a written enquiry report which was received on 27 November 2009. The Eurotunnel report referred to a number of actions that had been taken. These included arrangements for a Eurotunnel manager to proceed to the site of the incident; the review of the criteria on which a decision to evacuate should be taken; the need to improve passenger assistance and management onboard an incident train; and the need to update crisis management documentation. As the train came to a halt on the UK side of the tunnel, a formal inquiry was also undertaken by the Office of Rail Regulation. In the event, the follow up to this incident was overtaken by and subsumed within the response to the Eurostar failures which occurred on 18/19 December 2009 (see below).

- (iii) The Eurostar failures which occurred on 18/19 December 2009 – On the night of 18/19 December snow fell in the South East of England and in Northern France. A number of roads and motorways in both countries were impassable and the Port of Calais was closed. In these conditions, five Eurostar trains failed in the tunnel and passengers encountered serious delays and problems in completing their journeys. As a result the Board of Eurostar decided to commission an independent review of what had happened. As the seriousness of the disruption became more apparent the Governments of France and the UK also requested an independent inquiry which was announced on Monday 21 December 2009. The joint Anglo French review was conducted by Mr Christopher Garnett and M. Claude Gressier. The IGC held an extra-ordinary meeting on 23 December in the presence of Messrs Garnett and Gressier. The IGC heard initial reports from Eurostar and Eurotunnel on the incidents pending detailed internal inquiry reports which were to be supplied by both companies. The IGC asked the CTSA to take forward the analysis of the safety-related aspects of the events and to provide regular updates on the necessary follow up action. As these events occurred at the very end of the year covered by this report this follow up action would be a priority area for the year ahead and will be reported on fully in the IGC's report for 2010.
- (iv) Discussions with Railway Undertakings and Rolling Stock Manufacturers – During the course of the year the IGC and the CTSA engaged in discussions with railway undertakings and rolling stock manufacturers about the specific safety requirements for operating passenger trains in the tunnel (see paragraph 23(i)).
- (v) Modification of the Arbel Freight Wagons (Eurotunnel HGV shuttles) – During the course of the year Eurotunnel continued with its programme of work to address 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. During 2007 and 2008 the IGC had agreed proposals by Eurotunnel to remove two of the four pagodas from those wagons which were in the most deteriorated condition. In August 2009 the IGC granted Eurotunnel

authorisation to extend the modified configuration to all wagons whose condition might require it on the basis of the same criteria which had been applied up to that date. At the same time the IGC granted Eurotunnel authorisation to install on Arbel wagons in service two new prototype superstructures in order to conduct validation tests.

- (vi) New Floors for Breda Freight Wagons (Eurotunnel HGV shuttles) – In April 2008 Eurotunnel submitted to the IGC proposals to modify the floors of the Breda HGV carrier wagons in view of the accelerated ageing of the existing floors. In June 2008 the IGC informed Eurotunnel that it had no objection to the design and building of one or more prototypes to enable validation tests to be conducted. The IGC made it clear that non objection to the modification of the whole fleet would be conditional on satisfactory completion of the tests and finalisation of the design. Work on the design, construction and testing of the prototype wagons continued throughout 2009.
- (vii) Tactical Radio Throughout the year the CTSA monitored Eurotunnel's project to replace its existing analogue tactical radio system with a digital system. In July 2009 Eurotunnel secured agreement from the British authorities to use the necessary radio frequencies for its new equipment. Testing of the equipment and training in its use took place during the remainder of the year and the new system was expected to be brought into operational use during the first half of 2010.
- (viii) **Operation TAPIS III** Eurotunnel's lengthy programme of work to remedy defects resulting from the deterioration of the upper track bed concrete at its interface with the sleeper blocks was concluded in July 2009. Throughout the programme the CTSA took 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.
- (ix) HGV Refrigeration Units During 2008 the CTSA had agreed a 6month trial of new procedures for managing a situation where an HGV refrigeration unit is left on onboard an HGV shuttle during transit. Eurotunnel had concluded that the existing arrangements whereby the train was stopped, even if already in tunnel, so that the driver of the HGV in question can switch the unit off not only caused disruption to services but also increased risks because of need to detrain the drivers of the HGV vehicles concerned, who are unfamiliar with the risks associated with the tunnel environment, so that they can be taken to their vehicles to turn off the units. Eurotunnel therefore proposed that trains should continue their journeys 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. In April 2009 the CTSA agreed that the trial should be extended for a further 6-months to provide further information about the operation of the new procedures in practice. In October 2009, following receipt of a satisfactory report on the extended trial period the CTSA agreed that the new arrangements should be introduced on a permanent basis and documented procedures modified accordingly.

- (x) STTS Vehicles Eurotunnel's programme of work to maintain and upgrade its special dedicated service tunnel vehicles (Service Tunnel Transportation System vehicles – STTS) continued throughout the year. These vehicles are an essential part of the safety procedures for the tunnel and inspections carried out by CTSA inspectors had led to concerns about an apparent deterioration in both the vehicles themselves and their hands-free guidance system. Eurotunnel's programme of work related to these vehicles continues up to 2012.
- (xi) Transport of Horses In July 2009 Eurotunnel informed the IGC and the CTSA of its intention to transport horses in horse boxes onboard tourist shuttles. At the CTSA's request Eurotunnel confirmed that the carriage of horses would not alter current emergency arrangements for humans in the event of an incident, especially in the case of evacuation. On that basis, the CTSA concluded that these arrangements did not give rise to any safety implications.
- (xii) **Onboard Fire Alarm Procedures** On 13 October 2009 Eurotunnel made a formal submission to the IGC regarding the procedures to be followed in the light of onboard fire alarms from HGV shuttle loading wagons. The submission which had been discussed informally with the CTSA prior to its formal submission was aimed at making better use of all the detection equipment available to Eurotunnel to confirm the nature of a fire alarm onboard an HGV shuttle and to thus avoid unnecessary stoppages and evacuations due to false alarms. In making its submission Eurotunnel confirmed that drivers would continue to inform the rail control centre immediately of any onboard alarm. In the light of the CTSA's advice, the IGC responded to Eurotunnel on 28 October stating that it had no objection to the proposed procedures.
- (xiii) **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 19 BINAT 19, the annual full deployment exercise involving the emergency services and support agencies of both nations, took place on Sunday 11 January 2009. The exercise, which on this occasion was UK led, was based on a scenario with the discovery of seven unconscious passengers on a Eurotunnel passenger shuttle, which was forced to stop in the Tunnel. The exercise was run in two parts; starting as a table top and then moving to There were a number of opportunities for real play. improvement noted during the exercise. Work on the exercise action matrix continued throughout 2009 and was led by a specially appointed working subgroup of the Emergency Planning Committee. The exercise outcomes and identified best practices will be incorporated into future plans.
- Salamander Exercises Following the 2008 fire a review of the fire fighting tactics employed within the Channel Tunnel was conducted as part of Eurotunnel's Salamander action plan (for more information about Salamander see "Fire Onboard an HGV Shuttle train in Running Tunnel North on 11 September 2008" above). This review led to the development of new fire fighting tactics which will be applied during any future fires within the Channel Tunnel. The fire intervention tactics promulgated fiahtina durina the Salamander project, were developed on a partnership basis between Eurotunnel. Kent Fire and Rescue Service and SDIS 62. There were fourteen operational exercises carried out during 2009, which in the main were training and development opportunities for the new intervention tactics. The exercises allowed fine tuning and further development of the procedures. The procedures are supported by a series of operational intervention drawings which have been distributed to both UK and French locations, to ensure that a common understanding and approach is taken at future incident management.
- VALEX Exercises VALEX exercises were carried out on the 9 March, 10 July, 3 August and 12 October. These exercises tested the competence of both UK and French FLOR and SLOR teams and validated the new Salamander intervention procedures.
- COMEX Exercises There were two COMEX exercises in 2009 which were held on the 7th and 22nd October. Both were multi agency CBRN exercise scenarios involving a Eurotunnel Tourist Shuttle within a Running Tunnel.
- TABLEX Exercises A Eurotunnel tablex exercise was conducted on 25 November. This multi agency exercise validated the roles and responsibilities of all Eurotunnel

departments and the Emergency Services in preparation for a major incident.

 BINAT 20 - Planning for the Binat 20 exercise commenced during the latter part of 2009. Binat 20 was delayed due to bad weather and was eventually held in March 2010.

#### D 2 – Detailed Data Trend Analysis

14. Within the terms of the Common Safety Indicators (CSIs) there was only one accident and one injury during 2009. There were no fatalities. 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 2009) is as follows:

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

1

- <u>Accidents</u>: For 2009 there were two recorded accidents in the individual risk category on 4 February 2009 a platform security controller sustained a fractured knee when he lost his footing and fell while stepping down from an HGV cab on the UK terminal and on 12 August 2009 a customer suffered a fractured hip after falling over onboard Passenger Mission 6270 upon its arrival on the FR Terminal. There was one recorded accident in the collective risk category, broken axle of Schöma locomotive n° 32 (Works Train 8008) on 28th September 2009. There were two accidents in 2008 (one individual risk and one collective risk). There was only one accident recorded in 2007 (individual risk). There were two accidents in 2006 (one individual risk and one collective risk); one in 2005 (individual risk); and one in 2004 (collective risk).
- <u>Near-misses</u>: The number of near-misses fell from an average of 17 for 2004-2008 to 13 for 2009 (-24%) for collective risk. The number of near-misses for individual risk decreased with an average of 303 for the period 2004-2008 compared to 213 for 2009 (-30%).
- <u>Precursors</u>: The number of precursor events relating to collective risk remained stable with an average of 349 for 2004-2008 to 343 for 2009 (-

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.

1,72%). For individual risk, it fell from an average of 589 for 2004-2008 to 387 for 2009 (-34%).

- <u>Collective risk analysis</u>: the overall number of accidents, near-misses and precursors fell, in absolute terms, by 2,72% in 2009 compared with the average results for 2004-2008.
- <u>Individual risk analysis</u>: the overall number of accidents, near-misses and precursors fell, in absolute terms, by around 33% in 2009 compared with the average results for 2004-2008.
- <u>Cumulative results</u> (collective and individual safety events together): the 2009 result, in numbers of events, is down 24% compared with the 2004-2008 average figures.

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

• <u>SPADs A (Driver Error)</u> – With two SPADs A occurring in 2009 the low level of incidents of this kind reached since 1999 was maintained.

The first SPAD occurred on Main Track and involved a Works Train where the absence of protection by TVM led to a high level of railway collision risk. It was caused by the unauthorised passing of Marker 6160 by a Works Train from GI RFF following a pilot error (GID SNCF).

The second SPAD occurred on Main Track and involved a Works Train protected by TVM which presented a low level of railway collision risk as the train was stopped by this system. It was linked to the driver's failure to respect TVM indications.

• <u>SPADs C (Operator Error)</u> – With two SPADs C occurring in 2009 the level of incidents stay at an acceptable level.

The first SPAD occurred on a Secondary Track and involved a Works Train where the absence of protection by TVM on this type of track could have led to a high level of railway collision risk. However, as the route was set, the railway collision risk was reduced. It was caused by the closing of a carré violet by an RTM Controller which, by cancellation of subordination-authorisation, also closed the carré violet that the Works Train was just passing.

The second SPAD occurred on a Main Track and involved a commercial train with TVM protection which presented a low level of railway collision

<sup>&</sup>lt;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.

risk. It was linked to the error of a Catenary Technician who had inadvertently operated the "S" key on the wrong set of points.

#### Employee Safety

<u>Number of Lost Time Accidents</u> – The total number of lost time accidents for 2009 was 44 (22 for Eurotunnel staff and 22 for contractors). This compares with 40 in 2008 (15 for Eurotunnel staff and 25 for contractors).

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 three 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. **Fire on an HGV Shuttle Train on 21 August 2006** - A report by the Railway Accident Investigation Branch (RAIB) into the circumstances surrounding the fire which occurred on an HGV shuttle train in running tunnel north on 21 August 2006 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 by Eurotunnel in order to improve the efficiency of any future emergency response. While the 16 recommendations in the report proposed action by Eurotunnel, in keeping with normal practice they were formally addressed to the IGC as the safety authority for the fixed link within the terms of the RAIB website – www.raib.gov.uk.)

17. The IGC asked the CTSA to advise on the report and its recommendations. In the light of the CTSA's advice the IGC wrote to the RAIB on 30 May 2008 with detailed responses to each of the recommendations. The IGC concluded that 11 of the 16 recommendations could be closed either because they had been accepted and where appropriate implemented or because after careful consideration it had been concluded that no further action was appropriate. The IGC informed the RAIB that the remaining 5 recommendations were the subject of further work and that a further progress report would be made in due course. On 7 April 2009 the IGC wrote again to the RAIB to confirm that all the remaining recommendations could now be considered as closed. This was on the basis that further consideration of issues

related to FLOR intervention time and earthing of the catenary would take place in the context of the further fire which occurred on 11 September 2008 (see paragraph 13(i) above).

18. Uncontrolled Movement of a Coach Onboard a Tourist Shuttle Train -On 16 March 2009 RAIB published the final report of its investigation into the operational incident which had occurred on 4 April 2008 involving the uncontrolled movement of a coach in a passenger shuttle wagon. The coach had rolled backwards towards the fire barrier doors of the wagons when the train began its journey towards leading to crush injuries being sustained by the coach driver when he attempted to arrest its movement. There were no other injuries although the position of passengers behind the coach immediately before it rolled backwards gave rise to potential for injury. The RAIB report contained three recommendations relating to a review of procedures to ensure the availability of the correct chocks; a review of communications procedures for drivers of coaches to ensure vehicles are secured; and a review of announcements made to passengers to warn them not to remain in the vehicle roadway during transit. Eurotunnel accepted all three recommendations and established an action group to consider the necessary measures to be taken. At the end of the period covered by this report it seemed likely that the IGC would be able to respond to the RAIB reporting that all three recommendations had been satisfactorily implemented by Eurotunnel and could be considered closed.

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

19. **The Regulation of Safety of the Channel Fixed Link** –The binational regulation, which implements the Railway Safety Directive (2004/49/EC) for the Channel Fixed Link and which was developed by the IGC using powers conferred upon it by the Treaty of Canterbury, came into force on 4 July 2008.

20. The binational regulation transposes 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 operate a formal agreement under which investigations relating to incidents and accidents occurring on the Fixed Link are carried out in cooperation.

21. During the period covered by this report the IGC gave consideration to the transposition of the amended Railway Safety Directive (2008/110/EC) and the new Interoperability Directive (2008/57/EC) for the Fixed Link. This work continued into 2010.

22. **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. During the course of the period covered by this report the following changes were considered:

- (i) Volume E "Internal Operations Plan" of Eurotunnel's Safety Arrangements - Towards the end of 2009 Eurotunnel sent a draft submission of a revised version of Volume E to the CTSA for its comments in advance of making a formal submission to the IGC. As had been anticipated the revision included provisions relating to the removal of a train from the tunnel following an incident; the use of STTS vehicles for evacuation purposes; a protocol for debriefings after incidents; and a procedure to be followed when restarting services after an incident. At the end of the year the CTSA was considering its comments on the document. A formal submission to the IGC was anticipated early in 2010;
- (ii) Volume A "Safety, Health and Environmental Policy" of Eurotunnel's Safety Arrangements – On 10 December 2009 Eurotunnel made a formal submission to the IGC proposing a revision of Volume A of its safety arrangements. The modifications dealt principally with changes in organisation following changes in Eurotunnel's senior management and

update of the text to take account of the documentary evolution of Eurotunnel's safety management system. The IGC was expected to respond early in 2010.

(iii) Volume G "Transport of Passengers with Reduced Mobility" – On 27 February 2009 Eurotunnel made a formal submission to the IGC proposing a revision to Volume G of its safety arrangements. The IGC responded to Eurotunnel on 24 April confirming that it had no objection to the implementation of the revised version subject to a number of comments which had been raised by the CTSA's experts in the light of their analysis of the document being incorporated.

23. 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:

- (i) Review of Specific Safety Rules Relating to Passenger Trains Transiting the Tunnel – In the light of discussions with railway undertakings and rolling stock manufacturers interested in running new passengers services through the tunnel after 1 January 2010, and in view of the continuing evolution of the system of technical standards for Interoperability (TSIs), the IGC undertook an in depth review of the specific safety rules relating to the transit of passenger trains through the tunnel. On 21 July 2009 the IGC wrote to the key stakeholders to seek their views on whether there was a continuing justification for the specific rules that were introduced at the beginning of operations in 1994. These included:
  - continued running of a train on fire for 30 minutes so that it can exit the tunnel;
  - traction requirements;
  - traction systems and extinction of fires in traction units;
  - smoke penetration protection systems and door joints;
  - minimum length of trains;
  - multiple unit trains;
  - the ability for train to be split;
  - electric traction;
  - fire/smoke standards for the design and performance of vehicles and their fittings;
  - call buttons at the end of each coach.

In the light of the various comments received the IGC asked the CTSA to hold a collective meeting to which all respondents were invited. This took place on the 16 November 2009 in London.

At the end of the period covered by this report the IGC was expecting to receive a report from the CTSA making final recommendations and proposing conclusions in the light of consultations. In the light of this exercise it was intended that discussions should take place with the European Railway Agency (ERA) early in 2010 to present the position regarding the specific safety rules which were considered essential for safety in the tunnel in relation to the provisions as set out in the TSIs.

Taking forward the outcomes of consultations on this subject and the associated discussions with the ERA will be a key priority for the IGC and the CTSA in the year ahead and will be reported on fully in the IGC's report for 2010.

- (ii) GSM-R Eurotunnel continued to develop its plans for the installation of a GSM-R communications system throughout the tunnel and the CTSA and its experts continued to engage in discussions with Eurotunnel about the project. In December 2009 Eurotunnel announced that it had selected Alcatel-Lucent to install the new system. At the end of the year covered by this report Eurotunnel had yet to take a decision on a host network and had not appointed a notified body as required under the requirements of the Interoperability Directive. The delays which were continuing to occur with this project meant that it was likely that the CTSA would need to seek assurances from Eurotunnel about the robustness and adequacy of its existing radio systems.
- (iii) Power Supply Arrangements On 16 April 2009 Eurotunnel forwarded to the CTSA a comprehensive report on the observation period of arrangements for power supply for the catenary to be drawn solely from the French national grid, in normal situations. The CTSA considered the report to be of an excellent quality and informed Eurotunnel that the new arrangements could be considered as an acceptable permanent operational system.
- (iv) Freight Shuttles In addition to the modifications made or intended to its existing fleets of HGV carrier wagons (see paragraphs 13(v) and 13(vi) above) regarding the modification of the Arbel wagons and the fitment of new floors to the Breda wagons), Eurotunnel has kept the IGC and the CTSA informed of its studies regarding the future design and operation of freight shuttles. Eurotunnel made a presentation of its overall long term strategy to the CTSA in May 2009.

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

(i) 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 has been 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 continued 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. In addition, the IGC and the CTSA continued to give careful consideration to all questionnaires and surveys received from the ERA and made substantive responses wherever it was considered appropriate.

- (ii) Notification of Safety Rules Following the European Commission's rejection of the original notification of the unified safety rules in respect of the Fixed Link as required by Article 8 of the Railway Safety Directive (2004/49/EC), a revised notification was submitted via the UK and French Permanent Representatives to the European Union at the beginning of 2008. During November 2009 the ERA's evaluation of the revised notification was received. While the ERA's evaluation raised a number of comments and questions, it was anticipated that these could easily be addressed and that it would be possible for the ERA to advise the European Commission early in 2010 to accept the notification.
- (iii) **Directive on the Certification of Train Drivers (2007/59/EC)** The IGC decided that the best approach to the transposition of the driver licensing requirements of the Directive to the Fixed Link would be to have coherent and compatible national transpositions applying to the British and French sides of the Fixed Link thereby avoiding the need for any binational regulation. At the end of the year covered by this report the national transpositions had yet to be completed. At that time it would be necessary for the IGC to remind Eurotunnel of its obligations in respect of driver licensing and certification and to prepare an amendment to the guidelines on the binational regulation to set out in detail how the certification requirements of the Directive are achieved for the tunnel both in respect of the Eurotunnel, as infrastructure manager, and railway undertakings that transit the tunnel.

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

25. Under the transitional provisions in the binational regulation to implement the Railway Safety Directive which came into force on 4 July 2008, Eurotunnel's previously accepted safety case was deemed to be a safety authorisation for a period of up to one year (i.e. until 4 July 2009). In the same way the previously accepted safety cases for the railway undertakings which operate through the Fixed Link were deemed to be Part B safety certificates for a period of up to two years (i.e. until 4 July 2010).

26. In January 2009, Eurotunnel submitted to the IGC a request for renewal of its safety authorisation. Eurotunnel's request was supported by its safety management system (SMS) documentation as required by Article 9 of the Railway Safety Directive. In the light of analysis by the CTSA and its experts, the IGC responded to Eurotunnel on 7 April 2009 renewing its safety authorisation for a period of 5 years. At the end of the period covered by this report the IGC had asked Eurotunnel to consider whether recent senior management changes within the company gave rise to the need to revise its SMS documentation.

27. In November 2009, the IGC received applications for Part B certificates from Eurostar International Ltd, EWSI Ltd and DB Schenker Rail (UK) Ltd in respect of their operations in the tunnel. By the end of the period covered by this report the views of Eurotunnel, as the infrastructure manager, had been sought (as required under the binational regulation) and the applications were being considered by the Safety Authority's experts.

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

28. 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.

29. During 2009 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. The current five-year inspection and audit programme has been drawn up to take account of the key elements included in Eurotunnel's Safety Management System (SMS). The programme will cover the lifespan of the SMS during which the inspections and audits will need to lead to positive conclusions so that the SMS can be validated before Eurotunnel submits its next dossier for Authorisation in 2014.

30. The following supervision methods were used during 2009:

- Inspections;
- Flow of information regular reports from Eurotunnel such as the daily Operations 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;
- Meetings with the Railway Undertakings;
- Information from Eurotunnel concerning the interface with the railway undertakings and change management.

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

- Follow-up inspections and fortnightly information meetings in relation to September 2008 fire, including the re-opening of interval 6;
- Crisis management arrangements, particularly in relation to the Eurostar incidents that occurred on 18/19 December 2009;

- The management arrangements of incidents and accidents with the emergency services;
- Competence of Eurotunnel's staff who perform safety critical tasks; and
- Management of Eurotunnel's documentation.

32. The planned inspections undertaken during the course of the year included the following areas:

- Service Tunnel Transport System (STTS) maintenance inspection following rapid deflation incident;
- Familiarisation visit to witness blanking plate/diffuser changeover;
- UK Cross-over inspection;
- Training of staff who perform safety critical tasks and staff skills;
- Trial implementing new arrangements for handling modifications to the fixed link (2 inspections);
- Examination of Eurotunnel's revised platform procedures to check HGV vehicles during loading process;
- Inspection of safety critical systems;
- Inspection of the tunnel lining, that included: TFN CP 2326; the French and UK terminals; and Sangatte shaft;
- UK terminal and associated geotechnical, structural and highway engineering issues;
- Final inspection of TAPIS III;
- Inspection of the electrical systems on the UK side and Main Incoming Sub Station (MISS) UK;
- Inspection of the fire alarm system on the tourist shuttles;
- Verification of Eurotunnel's procedures for the transport of dangerous goods by freight trains, including the inspection of Europorte 2 and DB Schenker Rail's operations;
- Inspection of the service tunnel administration phone;
- Follow-up inspection of outstanding recommendations to STTS vehicles and its guidance system;
- Inspection of MISS UK and testing of the UK stand-by generators;
- Witnessing of the internal communications training.

33. As well as the above inspections, there was an audit undertaken during 2009 by the Etablissement Public de Sécurité Ferroviaire (EPSF) that related to Eurotunnel's Railway Infrastructure Maintenance.

34. The inspections and audits led to a number of recommendations which were formally communicated to Eurotunnel (and where appropriate to the railway undertakings) 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.

35. In addition to the planned inspections listed above, several more ad hoc inspections and visits were undertaken in relation to the repair work following the fire which occurred on 11 September 2008.

36. Overall the inspection programme for 2009 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.

#### H - IGC Conclusions on Year 2009 – Priorities

37. 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. As a 54 kilometre long undersea tunnel, its operation poses specific safety risks, in particular the dangers involved if there is a fire or if passengers are trapped in the tunnel for long periods due to breakdown. It is therefore right that close attention should be paid to the safety regulation of the Fixed Link.

38. The safety standards achieved for the channel tunnel operation in the year 2009 were, overall, satisfactory, though the incidents of 18/19 December when five passenger trains broke down due to the cold weather and many passengers had to be evacuated from the tunnel were of particular concern. These incidents have required close investigation.

39. Priority issues of concern into the future include:

- action to ensure that there is no repetition of the series of breakdowns that occurred in December 2009 when cold weather returns in the winter. A series of expert reports have produced a variety of recommendations. A synthesis of these recommendations has been made and follow-up of their implementation is ongoing
- further action to consider the implications of the fire of 11 September 2008, on which a programme of action is underway. The final report on the fire from the Bureau des Enquetes des Accidents - Transports Terrestre (BEA-TT) will include recommendations that will need to be closely followed up by all parties. A major project to install facilities at certain points in the tunnel to fight fires by dousing is under consideration
- review of safety rules and consideration of any applications to authorise new rolling stock to run through the tunnel and any applications for the certification of railway undertakings proposing to run new services through the tunnel
- discussions with national Governments, in France and the UK, of the most effective method of transposition for the tunnel of new European law, including amendments to the railway safety Directive 2004/49, requirements relating to interoperability and any new requirements arising from the work of the European Railway Agency (ERA) or the further development of the European system of Technical Specifications for Interoperability (TSIs)
- consideration of plans to modify installations and, in particular, rolling stock, in order to maintain its effectiveness despite the deterioration caused by heavy use, and to introduce new rolling stock
- consideration of developments relating to communication systems in the tunnel
- attention to Eurotunnel operations (incidents as well as the health and safety of the workforce)

 the maintenance of preparedness to deal with serious safety incidents, including through the 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, particularly in the run-up to the 2012 Olympic Games in London. Preparations for the Olympic Games is now a major preoccupation.

#### I - Sources of Information

- 40. The following sources were used when drafting this report:
- Eurotunnel Annual Report on Health and Safety for 2009 (submitted 17 August 2010).
- Europorte Channel's Annual Safety Report for 2009 (submitted 4 May 2010)
- Eurostar Annual Safety Report for 2009 (submitted 29 June 2010)
- Rapport de la SNCF sur la sécurité de l'exploitation en 2009 sur la section commune trans-Manche pour ses missions d'entreprise ferroviaire (submitted 1 July 2010)
- EWSI Annual Safety Report for 2009 (submitted 18 August 2010)

#### <u>J - Annexes</u>

- ANNEX A: Railway Structure Information
- ANNEX B: IGC Structure and Relationships
- ANNEX C: Data on Common Safety Indicators
- ANNEX C1: 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

**Network Statement Link – English version:** 

http://www.eurotunnel.com/NR/rdonlyres/D33464CD-4CEC-4152-9523-8C5DA75BA20D/0/2011ETNetworkStatement.pdf

**Network Statement Link – French Version:** 

http://www.eurotunnel.com/NR/rdonlyres/4E07DBF9-0C39-4F29-A694-5FF7986B2AA6/0/2011DocReferenceReseauET.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 2009 were as follows:

Name: DB Schenker Rail (UK) Ltd Address: Lakeside Business Park Carolina Way Doncaster South Yorkshire DN4 5PN Website: www.rail.dbschenker.co.uk \_\_\_\_\_ Name: Eurostar (UK) Ltd Address: Eurostar House **Times House Bravingtons Walk Regent Quarter** London **N1 9AW** Website: www.eurostar.com -----Name: SNCF Address: 34 rue du Commandant Mouchotte 75699 Paris CEDEX 14 Website: <u>www.sncf.com</u>

Name: Europorte Channel

Address: 15 rue des Sablons 75016 Paris, France

Website: www.europorte.com

### 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 2009 is shown in a separate "Excel" file.

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 2009 Eurotunnel transported 769,261 lorries, 1,916,647 cars and 54,547 coaches.

In addition, there were a total of 9,220,233 Eurostar passengers.

## ANNEX C1: SAFETY RELATED INCIDENTS PREVIOUSLY INCLUDED IN REPORTS PUBLISHED BY THE CTSA

Fuel Spillages	=	28
Unscheduled stops greater than 30 minutes	=	26
Track/rail problems	=	7
SPAD As (Driver)*	=	2
SPAD Cs (Operator Error)*	=	2
Catenary trips	=	2
Fire/Smoke	=	5
Injuries	=	2 (See note 2)
Damaged Axle	=	1
Derailment	=	1
Uncoupling	=	1

#### Total number of events reports to the CTSA in 2009 = 77

\* 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.

#### <u>Notes</u>

- (1) Five of the 26 unscheduled stops led to the evacuation of trains. Four of these were related to the evacuation of HGV shuttles and two of the four were caused by false fire alarms. The fifth unscheduled stop event leading to the evacuation of trains related to the Eurostar failures which occurred on night of 18/19 December (see paragraph 13(iii) of report).
- (2) Incidents involving injuries were as follows:
  - On 4 February 2009 a platform security controller driver lost his footing while stepping down from an HGV cab and fell and fractured his left knee
  - On 12 August 2009 a passenger fell on a tourist shuttle as it arrived on the French terminal and suffered a fractured hip.
- (3) Other reported incidents worthy of special note were as follows:
  - On 25 August 2009 a tourist shuttle made an unscheduled stop in the tunnel following a loss of traction on the front locomotive due to a catenary failure. This led to serious disruption to commercial services with passengers being stuck in the tunnel for some hours (see paragraph 13(ii) of report).
  - The derailment related to an incident on 20 September 2009 when a Schöma locomotive derailed in the tunnel causing damage to track and signalling equipment and resulting in serious disruption to commercial services).