

**CHANNEL TUNNEL INTERGOVERNMENTAL COMMISSION  
COMMISSION INTERGOUVERNEMENTALE AU TUNNEL SOUS LA MANCHE**

**Secretariat  
Office of Rail Regulation  
One Kemble Street  
LONDON WC2B 4AN  
Direct line: 020 7282 3926  
Facsimile: 020 7282 2041  
E-mail: [ctsa@orr.gsi.gov.uk](mailto:ctsa@orr.gsi.gov.uk)**

**M.E.E.D.D.A.T  
Secrétariat général au Tunnel sous la Manche  
Tour Voltaire, 1 Place des Degrés  
92055 PARIS LA DÉFENSE CEDEX  
Telephone: 01.40.81.78.73  
Fax: 01. 40.81.78.79**

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To all consultees

**CHANNEL TUNNEL INTERGOVERNMENTAL COMMISSION CONSULTATION ON THE  
SPECIFIC SAFETY RULES RELATING TO PASSENGER TRAINS TRANSITING THE  
TUNNEL**

The Channel Tunnel Intergovernmental Commission (IGC) is the safety authority for the channel tunnel, as provided for in the European Directive 2004/49 (the railway safety directive) and the binational regulations on the safety of the Channel Tunnel. The Intergovernmental Commission has received from the Channel Tunnel Safety Authority (CTSA) and from interested members of the rail transport industry suggestions and recommendations to undertake a review of the safety rules relating to train movements through the tunnel in the light of discussions with train manufacturers and railway undertakings interested in running new services through the tunnel after 1 January 2010, and the continuing evolution of the system of Technical Specifications for Interoperability (TSIs). The CTSA is a binational body established under Article 11 of the Treaty of Canterbury in order to "advise and assist the IGC on all matters concerning safety...". The IGC has received specific advice from the CTSA on the matters set out in this letter.

Therefore, the IGC has agreed, prior to considering any formal decision, to consult the stakeholders in the operation of traffic through the channel tunnel. The objective of this letter is to advise you of, and take your view on, the recommendations and suggestions received by the Intergovernmental Commission.

The subject matter of this letter is the need to review those safety rules for the tunnel that impact on the rolling stock design. There are in addition certain technical requirements related to the technical compatibility with the infrastructure that trains will have to meet to pass through the tunnel, such as gauge requirements, and also detailed operational requirements such as those related to on board staffing, including numbers and training of staff and language competencies, which will be in the safety management system of each undertaking. These are not covered by this consultation.

At the outset, the CTSA noted that the channel tunnel is, in general, safe and the conventional railway risks, such as risk of collision or derailment, are relatively low compared to many other railways.

However, many of Europe's worst transport accidents have been tunnel fires, and the risks associated with a fire in a passenger train in a 54 kilometre long undersea tunnel, albeit consisting of two running tunnels and one service tunnel, need to be recognised. They may justify special safety measures. It should also be noted that the Intergovernmental Commission, as a safety authority, is required by the Directive to ensure that safety is maintained and, where that is reasonably practicable, improved. Consequently, in undertaking this review, it will seek to ensure that the overall level of safety is maintained.

The Intergovernmental Commission is seeking and will continue to seek, working in conjunction with the relevant Ministries in France and the UK, specific cases in the relevant Technical Specifications for Interoperability (TSIs) where the rules regarded as essential to maintain the safety of the tunnel go beyond what is in a TSI.

### **Continued running of a train that is on fire for 30 minutes**

The CTSA regards it as essential that passenger trains that enter the tunnel have the capacity to drive through, in the event of fire breaking out, so that passengers can be evacuated and the fire fought in the emergency sidings. The number of people in a passenger train (up to 750 passengers) would make in-tunnel evacuation, in a smoky environment, very difficult and an option of last resort. This requires that a passenger train that is on fire can, in the worst case, continue running for 30 minutes, the time taken to exit the tunnel and reach the emergency sidings<sup>3</sup>.

Therefore the Intergovernmental Commission has received a recommendation to ensure that it continues to be the case that all passenger trains entering the tunnel have demonstrated a minimum of 30 minutes fire resistance. Matters that relate to this requirement include in particular provisions concerning the fire protection of the bulkheads for the engine compartments, protection of the driver, fire resistance of passenger coaches, and protection of pipework and cabling.

When an application is received to run new rolling stock through the tunnel, the CTSA when it considers the application would also wish to consider such matters as battery autonomy (full autonomy for 30 minutes if the battery charger fails) and the arrangement of pantographs to avoid being stranded in a "neutral" section, to ensure a train can continue running for 30 minutes and reach the emergency sidings.

### **Traction requirements**

Given dangers that can arise if the tunnel is blocked by a train and there is a fire, passenger trains and locomotives that transit the tunnel must be capable of:

- operating on gradients up to 11 %
- bringing a train of the same type requiring assistance out of the Tunnel<sup>4</sup>
- hauling its own train out from the tunnel from a stand with 50% of its traction power available.

The CTSA regards it as essential that trains transiting the tunnel should continue to be required to meet these specifications taking into account their power architecture. However, they are aware that moderns rolling stock design (i.e. distributed traction) might justify the amendment of this rule to simply require the capacity to deal with the failure of any one of the critical elements of the traction system.

### **Traction systems and extinction of fires in traction units**

At present, all trains that transit the tunnel take power from two locomotives, one at each end of the train. Some modern trains do not take power from a locomotive, but have power units at certain points distributed along the length of the train. The CTSA is of the view that:

- It is not necessary to have a locomotive at each end,
- However, there should always be a driving position at each end, enabling the train to be driven in either direction,

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<sup>3</sup> Eurotunnel freight shuttle trains are currently subject to a "stop and evacuate" procedure

<sup>4</sup> A freight train must be able to bring a train requiring assistance out of the tunnel, provided that the hauled weight does not exceed 2100 tonnes

- Distributed power and power supply converter units increase the risk of fire as the traction unit (or the power supply converter unit) is a possible source of an outbreak of fire very near to the passengers' compartments. Consequently, each unit should be protected by a fire detection and extinction system. The technology exists to fit such traction units, which is a requirement in certain countries. In relation to power supply converter units, the CTSA is aware that this is a complex issue and would welcome input from the manufacturing industry on the most efficient ways to prevent a power supply converter unit fire in a train."

### **Smoke Penetration Protection Systems and Door Joints**

Current requirements include a smoke penetration protection system (relating to the ventilation dampers and outside doors of the carriages) and a related provision for inflatable door joints. The CTSA considers that this should continue to be required, given the possible effect of a fire in the tunnel on the preceding train, but it would be available to discuss with any RU or manufacturer how acceptable standards of resistance to smoke penetration can be achieved.

### **Minimum length of trains**

At present all passenger trains that transit the tunnel are at least 375m long, equal to the distance between cross-passage doors, as this aids evacuation in the event of fire. If, as a last resort, a controlled stop has to be made, the train can stop with each end opposite a cross-passage door. If an uncontrolled stop has to be made, in any case a train door, somewhere, will be close to a cross-passage door. The benefits of this requirement only arise if there is a through passage along the entire length of the train (see discussion below of multiple unit trains).

The CTSA has suggested that, rather than insisting that all trains that pass through the tunnel are at least 375m long, the IGC might advise railway undertakings that, if a railway undertaking wishes to run a shorter train through the tunnel, it will need to set out its arrangements for the evacuation of passengers from this train in a "worst case" emergency situation. Under such an approach, the provision of the associated Part B safety certificate would not be possible unless these arrangements are acceptably safe.

### **Multiple Unit Trains**

A multiple unit train consists of shorter trains coupled together to form a longer train. Consequently it does not have necessarily a through corridor. If a fire breaks out in the middle of one unit some passengers might not be in a position to detrain through a door located at one end of the train and might be trapped near the centre of the train due to the absence of a through corridor from one end of the train to the other. All passenger trains that currently transit the tunnel have a through corridor, to aid evacuation in the event of fire.

The CTSA has suggested that such trains should not be banned from using the tunnel, but that, if a railway undertaking wishes to run a multiple unit train through the tunnel, it will need to set out, after consultation with the infrastructure manager (i.e. Eurotunnel) arrangements that are acceptably safe for the evacuation of all passengers from this train in a "worst case" emergency situation. Under such an approach, the provision, by the Intergovernmental Commission, of a Part B safety certificate for such a service to transit the tunnel would not be possible unless this was demonstrated.

### **"Splittability"**

The safety rules adopted for the tunnel at the outset, in 1994, included a requirement that all trains be equipped with two locomotives, one situated at the head and the other at the rear of the train, enabling the train to be split and to reverse direction. The passenger trains that currently transit the tunnel can, consequently, be split in the event of an incident, with passengers evacuated by transferring to the undamaged part of the train, which is then driven out. The CTSA has considered that this method of evacuation, which has never been used in practice, would be unusual and would raise practical difficulties. They have suggested that the requirement be discontinued, though, as mentioned above, there

should be a driving position at each end enabling the train to be driven out in either direction. The IGC would welcome any supplementary advice on this subject.

### **Electric traction**

At present, only electric trains pass through the tunnel. A specific concern regarding admitting diesel locomotives has been the risk of fire and that CO2 emissions from the train may render the in-tunnel fire detection system ineffective. However, the technology of diesel locomotives continues to be improved and it is not inconceivable that, in the future, a diesel train might be able to transit the tunnel without such an effect. The CTSA has suggested that use of diesel locomotives should not be entirely ruled out but that if a railway undertaking wished to run a diesel powered train through the tunnel this train would need to have obtained a rolling stock authorisation in the tunnel demonstrating that its passage through the tunnel would not conflict with the standard conditions for safe tunnel operations. Were the suggestion to accept transit of diesel trains accepted, under this approach, a Part B safety certificate for such a service could not be issued unless the requirements indicated above were demonstrated

### **Standards for the Design and Performance of Vehicles and their Fittings**

At present the safety rules notified by the IGC to the European Commission include fire/smoke standards NF F 16-101, 16-102 and 16-103. The Intergovernmental Commission recognizes that, these are French standards, and that the relevant TSI allows for conformity to a choice of families of national standards thought to be equivalent namely French British, Italian and Polish standards. The CTSA regards it as acceptable to use those families of standards mentioned in the TSI, though it would not be in the interest of safety to mix and match between different national standards for different elements, as each family of national standards have their own internal logic. In the long term, use of harmonised European standards (such as EN 45-545) will be encouraged by the Intergovernmental Commission.

### **Call Buttons at the end of Each Coach**

Current provisions require a communication system for passengers with call buttons that, when activated, do not cause the train to automatically brake. The CTA considers it is essential that the driver remains in control of the train and can over-ride any automatic braking associated with triggering an alarm. This is consistent with the requirements in the relevant TSIs.

## **CONCLUSIONS**

In developing the safety rules, the Intergovernmental Commission is obliged by the Directive to consult parties with an interest. The Intergovernmental Commission would welcome your views on the suggestions, recommendations and observations received from the CTSA and set out above.

These can be in writing, to either or both of the addresses at the top of this letter, by letter or email, and in English or French (or both languages). In addition, we would be happy to meet you to discuss points that concern you. This could be:

- by meeting each of our consultees individually, or
- by a collective meeting.

We would welcome your views on this. A collective meeting, with interpretation services in French and English, would obviously be less resource intensive from our point of view, could consequently be organised more quickly, and would ensure everyone has the same information. Two such meetings (but without interpretation), one in London and one in Paris, would also be an option.

The objective of the IGC is to be in a position to reach conclusions and initiate any required consequential

amendments to the tunnel's rules by the end of 2009, with a view to having completed any necessary legal steps and implementing any revision to the rules by the end of 2010.

Please respond by 15 September with your comments, but it would be useful to have a quick response on the suggestions above concerning a meeting.

Yours sincerely



CHRISTIAN PARENT  
Chairman, Intergovernmental Commission