

TUNNEL TEST 2004 - DARTFORD TUNNEL

Foreword

Despite improvements since the Dartford Tunnel was last inspected in 2002, in the league table of 28 tunnels inspected this year, Dartford was in the bottom half.

The inspector noted that the Dartford Tunnel was one of the busiest in Europe and so the risk of a crash and fire was greater than in many other European tunnels. That is why greater investment on safety was needed. While there was no criticism of day-to-day operation and management of the Dartford Tunnel which the Inspector judged to be first class, a move in the tunnel's rating from "acceptable" to "good" could be achieved by improvements, such as:

- additional video surveillance cameras
- more frequent maintenance of nearside carriageway edge markings
- insulation against traffic noise of emergency phones
- heat resistant cables in the traffic area
- more frequent systems checks and emergency drills
- improvements to emergency exits

An issue raised by the inspector was Dartford's policy on emergency evacuation of the tunnel. There are cross-connections between the two tunnels every 450 metres but they are inadequately signed as emergency exits. In the worst case of a serious fire road users would have to walk / run 1300 metres which could take up to 14 minutes, whereas the nearest cross-connection exit could be reached in less than five minutes. However, access to the cross-connection tunnels would be difficult in an emergency. The Dartford Tunnel management should carry out a thorough risk assessment of their policy on escape from the tunnel, including a simulated exercise to test how users would best be directed out of the tunnel in a fire.

Money to improve safety is not the problem. Since the Dartford River crossing reverted to public ownership in April 2003, surplus toll revenue of around £60million is sitting unused and unallocated in the bank. The AA Trust believes first call on this revenue should be to bring the Dartford Tunnel up to standards that are now the norm in the rest of Europe; second call should be to improve the safety of the other road tunnels in London; and the third call to build new crossings of the Thames in and around London.

British tunnels have a good safety record. Providing safety systems to modern European standards and making people aware of what they should do in a tunnel emergency would help ensure that Britain does not have a tunnel disaster in the future.

Since the AA Trust began inspecting road tunnels in 2000, tunnel operators have reacted positively and £30million of improvements have been carried out, and more are planned. We urge tunnel operators to continue the programme of safety improvements, and call on the government to unleash the surplus Dartford toll funds to accelerate the progress.

1. Key points summary

- The Dartford Tunnel was inspected in February 2004 along with 27 tunnels across Europe – it was given a rating of “acceptable”, and assessed as “medium” risk potential.
- The project was managed by the ADAC (the German AA) and inspections were carried out by experts from Deutsche Montan Technologie GmbH (DMT).
- Dartford was the only UK tunnel inspected in 2004. It had not been included in the test programme in 2003 with other UK tunnels because it was moving from private to public ownership.
- Dartford was previously tested in 2002, when it was rated “acceptable” and given a “medium” risk potential.
- Since 2000, the Mersey Kingsway and Queensway tunnels, Dartford, Rotherhithe, Tyne, and Blackwall North and South tunnels have been inspected, along with over 100 other road tunnels across Europe.

2. 2004 European Tunnels Inspection

In addition to Dartford, 27 tunnels across Europe were also tested in 2004.

Overall European results - distribution by country

	Andorra	Austria	Croatia	France	Germany	Nether lands	Slovinia	Spain	Switzer land	UK
VG	0	2	0	1	3	0	0	2	1	0
G	1	2	0	1	1	1	1	0	2	0
A	0	1	0	2	0	0	0	1	1	1
P	0	1	0	0	0	0	0	0	0	0
VP	0	0	2	0	1	0	0	0	0	0
Total	1	6	2	4	5	1	1	3	4	1

VG = very good; G = good; A = acceptable; P = poor; VP = very poor

3. Strengths/weaknesses of the Dartford Crossing - Rating: Acceptable

Location:	A 282, Kent – Essex, London - northbound
Start of operation:	1963 (West Tunnel)/1980 (East Tunnel)
Length:	1,430m
Portal height level:	5m below sea level
Number of tubes:	2 – one-way traffic in each
Speed limit:	80kph (50mph)
Vehicles per day:	73,000
Share of HGVs:	11 per cent
Breakdowns in 2003:	190
Accidents in 2003:	36
Fires in 2003:	1
Risk:	Medium

Strengths:

- 😊 Two tubes with cross-connections as additional escape and rescue routes every 450 metres
- 😊 Hazardous goods transports are restricted and have to report to the tunnel control centre
- 😊 Traffic control and management in front of the tunnel
- 😊 Emergency broadcast loudspeakers at the portals and throughout the tunnel
- 😊 Automatic traffic congestion detection
- 😊 Emergency phones provided every 50 metres
- 😊 Fire extinguishers provided every 50 metres
- 😊 Automatic fire alarm system
- 😊 When a fire is reported, fire ventilation is automatically activated and the tunnel is automatically closed
- 😊 Special fire ventilation programmes operate in the event of a fire - taking the longitudinal flow into consideration fire ventilation is of adequate dimensions
- 😊 Well-trained and well-equipped fire brigade

Weaknesses

- 😞 Carriageway edge markings inadequate
- 😞 No continuous emergency lane and no lay-bys
- 😞 Video traffic surveillance cameras too far apart
- 😞 Emergency phones not insulated against traffic noise
- 😞 Correct operation of fire ventilation not confirmed in emergency exercises
- 😞 No emergency lighting; escape direction and distance to the nearest exit not shown
- 😞 Cables in the traffic area are insufficiently protected against heat
- 😞 Emergency drills carried out too infrequently

Plans for the future:

- Installation of fire-proof cables in the traffic area
- Adaptation of tunnel equipment to the new EU directives

4. 2004 Inspection

Results in order of rating

Tunnel	Country	Grade awarded	risk potential
Berg Bock	Germany	Very good	Low
Girsberg	Switzerland	Very good	Low
La Cumbre	Spain	Very good	Very low
Maria de Molina	Spain	Very good	Low
Noitzmühle	Austria	Very good	Medium
Rennsteig	Germany	Very good	Low
Steinhaus	Austria	Very good	Medium
Toulon	France	Very good	Low
Weser	Germany	Very good	Low
Amberg	Austria	Good	Medium
Bad Godesberg	Germany	Good	Low
Caluire	France	Good	Low
Envalira	Andorra	Good	Low
Felbertauern	Austria	Good	Medium
Jasovnik	Slovenia	Good	Low
Les Vignes	Switzerland	Good	Low
Vernier	Switzerland	Good	Medium
Westerschelde	Netherlands	Good	Medium
Belchen	Switzerland	Acceptable	Medium
Bobogny-Drancy	France	Acceptable	Medium
Dartford	GB	Acceptable	Medium
El Padrun	Spain	Acceptable	Medium
Lermoos	Austria	Acceptable	Medium
Orelle	France	Acceptable	Medium
Roppener	Austria	Poor	High
Tuhobic	Croatia	Very poor	Medium
Ucka	Croatia	Very poor	High
Wattkopf	Germany	Very poor	High

The risk potential is assessed on the following factors:

- Traffic volumes
- Proportion of heavy goods vehicles
- Tunnel gradients
- One or two way traffic and traffic density
- Hazardous material on lorries

5. The safety of UK tunnels

All the major tunnels in the UK have been inspected as part of the EuroTest programme. EuroTest is a partnership of Europe's major motoring organisations and The AA Motoring Trust has been a leading member since 2000. The result of inspections since 2000 are shown in the table:

Name of Tunnel	Year tested	EuroTest rating	Risk potential
Blackwall N	2002	Very poor	Medium
Blackwall N	2003	Very poor	Medium
Blackwall S	2002	Very poor	Medium
Blackwall S	2003	Poor	Medium
Dartford	2002	Acceptable	Medium
Dartford	2004	Acceptable	Medium
Mersey Kingsway	2000	Good	Not calculated
Mersey Kingsway	2002	Good	Medium
Mersey Queensway	2000	Acceptable	Not calculated
Mersey Queensway	2002	Acceptable	Medium
Rotherhithe	2003	Poor	Low
Tyne	2000	Poor	Not calculated
Tyne	2002	Poor	Medium
Tyne	2003	Poor	Medium

Since 2000, 107 road tunnels have been inspected and rated across Europe. UK tunnel operators have responded and are investing to improve safety:

- **Mersey Queensway** - currently undergoing a £14 million programme of improvements. The Chairman of the Merseytravel said in 2002 "*Safety is always our top priority, Merseytravel volunteered to take part in this (EuroTest) survey – we need to deal with the legacy of the way in which the tunnels were built in comparison with modern practices*".
- **Mersey Kingsway** – new cross passages to increase emergency exits and provision of automatic traffic congestion detection.
- **Blackwall Tunnel (southbound)** - £15.5 million of improvements will be completed in August 2004. Improvements include new lighting, new road surfaces, and state of the art safety, communication and information systems.
- **Blackwall Tunnel (northbound)** - consultants have reviewed its safety with a view to a major refurbishment and work is expected to start in November 2004.
- **Rotherhithe** – major improvement work will start in June 2005.
- **Tyne** - the public inquiry for a second tunnel finished earlier this year. The AA Motoring Trust's submission made the point that safety must be the paramount consideration in the decision to build a second tunnel. The current two-way tunnel carries heavy goods traffic, including hazardous loads. The EuroTest inspection of the tunnel also included a one-off desk-top assessment commissioned by the tunnel authority of how safety would be improved by the building of the second tunnel.
- **Dartford** - since the last inspection in 2002, the tunnel has returned to public ownership. Automatic fire detection systems have been installed, and more work is planned to improve safety operations, and to conform with the proposed European Directive on tunnel safety.

6. How to act in a tunnel emergency

The UK has an excellent record for tunnel safety. Very few tunnel users have been killed or injured in an accident in a UK tunnel. But in the rest of Europe, tunnel fires have killed around 90 people over the last 10 years. In fires, vehicle occupants in the tunnels are not spectators to an accident, they are participants in a potential disaster.

A fire in a tunnel can be lethal. The heat builds up very quickly. That is why automatic fire detection and ventilation systems, and emergency exits must be provided, the emergency services summoned immediately, and tunnel operators should put emergency plans into operation seamlessly.

Tunnel users also need to know how to behave in road tunnels, and know what to do in an emergency. This includes:

- driving safely at the appropriate speed for conditions leaving plenty of space between their car and the vehicle in front
- not waiting to be told what to do if there is a fire ahead - pulling the vehicle over to the left, switching off the engine, leaving the keys in the ignition, and walking away from the fire to the nearest emergency exit, or to the tunnel entrance.

Categories inspected

APPENDIX

Tunnel systems

- Number of tubes
- One- or two-way traffic in tube
- Layout of emergency lanes and breakdown bays
- Tunnel lane width

Illumination and power supplies

- Lighting
- Power supply guaranteed in case of local breakdown

Traffic and traffic control

- Mix of traffic
- Automatic identification and restriction of transport of hazardous loads
- Special measures for HGVs
- Speed limits
- Traffic management
- Automatic congestion identification
- Existence and staffing of control centre
- Mechanical barriers for closing tunnels
- Signs

Communication

- Loudspeakers
- Radio traffic information
- Emergency phones
- CCTV
- Radio communication between emergency services and control centre

Escape routes

- Provision of escape routes clearly marked
- Emergency lighting
- Fire and smoke resistant escape doors
- External access for rescue personnel

Fire protection

- Equipment
- Extinguishers
- Automatic and manual fire alarm system
- Pressurised fire-fighting water supply availability throughout tunnel
- Distance and time taken for fire brigade to arrive
- Fire brigade training
- Run-off drainage system for dangerous liquids
- Fire-proof cables

Fire ventilation

- Special fire programmes
- Control of air flow and extraction

Crisis management

- Emergency response plan
- Regular emergency drills
- Regular inspection of safety equipment
- Automatic activation of fire ventilation
- Automatic alarm to emergency services and closure of tunnel