

## MAKING EUROPE'S ROAD TUNNELS SAFER FOR USERS

### THE EUROPEAN TUNNEL ASSESSMENT PROGRAMME (EUROTAP) 2005 INSPECTIONS

#### Foreword

Are British and other European road tunnels designed and managed to ensure that they are as safe as possible for users? To find out, a team of experienced inspectors has been undertaking a detailed annual scrutiny of tunnels across Europe since 2000. What the inspectors found in 2005 is highlighted in this report.

The Mersey Kingsway Tunnel, one of 49 inspected in 2005 (see map at end of report), was given a 'good' safety rating. The Kingsway tunnel was one of the busiest in the 2005 survey – about 45,000 vehicles use it every day, of which 7 per cent are heavy goods vehicles. The tunnel has consistently had a 'good' rating since the inspections started in 2000, and a programme of continuing improvement, described later, should see it moving into the top 'very good' category in the near future. The inspector noted the following positive points about the tunnel:

- Around the clock manning with trained personnel;
- Well-marked cross-connector escape route passages between the two bores;
- Escort vehicles for hazardous loads;
- Special fire-resistant lining to tunnels;
- Automatic monitoring and control of ventilation systems; and
- A special ventilation programme to clear smoke away from standing traffic.

The inspector also noted some issues that scored less well:

- No automatic traffic (problem) detection system, and no video recording of traffic incidents;
- Emergency phones not insulated against traffic noise;
- Emergency walkways very difficult to access and use; and
- No automatic fire alarm system.

British tunnels have so far had a good safety record. Good management, the installation of safety systems to the latest European standards, and an information programme to make 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.

UK tunnel operators have responded positively to the programme of tunnel inspections in the last five years, and improvements costing £30 million have been carried out. More are planned. As operators continue their improvement programmes, the safety – and the ratings – of all UK tunnels will rise even higher.

## 1. Key points

- The AA Trust is a leading partner in the European Tunnel Assessment Programme (EuroTAP), established in 2004 and funded by the European Commission and European motoring organisations. EuroTAP evolved from the EuroTest programme, which was set up in 2000 by motoring organisations to inspect and report on road-user facilities across Europe, such as motorway service areas and car ferries. The motoring clubs continue to fund EuroTest.
- The Mersey Kingsway Tunnel was inspected in January 2005, together with 48 other road tunnels elsewhere in Europe. It was given a rating of ‘good’, and assessed as ‘medium’ risk potential.
- The project was managed by the ADAC (the German AA) and the inspections were carried out by experts from Deutsche Montan Technologie GmbH (DMT).
- The other Mersey tunnel (Queensway/Liverpool/Birkenhead) was tested in 2002, when it was rated ‘acceptable’ and awarded 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 151 others across Europe.

## 2. 2005 EuroTAP tunnel inspections

	Austria	Belgium	Switzerland	Germany	Spain	France	Croatia	Italy	Luxembourg	Monaco	Netherlands	Norway	Slovakia	GB	Total
<b>VG</b>	4	1	3	2	3	1	1	0	1	0	0	0	2	0	18
<b>G</b>	1	0	2	2	2	2	0	2	0	1	1	0	0	1	14
<b>A</b>	0	0	1	2	2	1	1	0	0	0	0	1	1	0	9
<b>P</b>	1	0	0	1	1	0	0	0	0	0	0	1	0	0	4
<b>VP</b>	0	0	0	0	0	1	0	3	0	0	0	0	0	0	4
<b>Total</b>	6	1	6	7	8	5	2	5	1	1	1	2	3	1	49

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

### 3. Strengths/weaknesses of the Mersey Kingsway Tunnel

<b>Location:</b>	Liverpool (M53 Wallasey-Liverpool)
<b>Start of operation:</b>	1971
<b>Length:</b>	2,244m
<b>Portal height level:</b>	4m below sea level
<b>Number of tubes:</b>	2 with 2 lanes of one-way traffic in each
<b>Speed limit:</b>	40mph
<b>Vehicles per day:</b>	45,000
<b>Share of HGVs:</b>	7 per cent
<b>Breakdowns in 2004:</b>	143
<b>Accidents in 2004:</b>	16
<b>Fires in 2004:</b>	1
<b>Risk:</b>	Medium

#### Strengths

- 😊 Two tubes with cross-connections as additional escape and rescue routes every 360 metres maximum
- 😊 Escort vehicle for certain classes of hazardous goods, transport of hazardous goods allowed only at certain times
- 😊 Traffic management system in place in front of tunnel
- 😊 Loudspeakers to relay emergency instructions at the portals and in the tunnel
- 😊 Traffic radio broadcasts throughout the tunnel, which can be interrupted for additional messages
- 😊 Bright tunnel walls, helping to create a light environment
- 😊 Automatic monitoring and control of ventilation
- 😊 Full video surveillance

- 😊 Emergency phones provided every 50 metres
- 😊 Emergency exits marked and easy to access, with escape direction and distance to the nearest exit indicated
- 😊 Special fire-resistant lining of the tubes
- 😊 Special ventilation programmes, sufficiently powerful to clear smoke effectively in the event of a fire
- 😊 Fire extinguishers provided every 50 metres
- 😊 Smoke cannot penetrate into escape routes, and emergency exits are fire-proof
- 😊 Rescue service vehicles have special access routes at the portals
- 😊 Radio communication possible for emergency services throughout the tunnel
- 😊 Fire brigade well-equipped
- 😊 Regular emergency drills
- 😊 Tunnel control centre manned around the clock with trained personnel

### **Weaknesses**

- 😞 No automatic traffic detection systems
- 😞 No automatic video recording in the event of an incident
- 😞 Emergency walkways are very difficult to access and use
- 😞 Distance from the lay-bys to the portals – 1,120 metres – is too long
- 😞 Emergency phones not insulated against traffic noise
- 😞 No evacuation lighting for escape route
- 😞 No automatic fire alarm system
- 😞 If a fire alarm is triggered, neither fire ventilation nor tunnel closure are automatically activated

## Plans for the future

- ◆ Barriers at the portals (2005)
- ◆ PA system to be expanded (2005)
- ◆ Installation of evacuation lighting for escape route (2006)
- ◆ Video surveillance to be enhanced by automatic data recording and incident reporting of, for example, use of lay-bys and smoke detection (2006)
- ◆ Variable traffic signs (2006)
- ◆ Emergency exits to be marked by flashing lights and acoustic signals (2007)

## 4. 2005 inspection of 49 tunnels across Europe

Of the 49 tunnels tested this year, 32 (65 per cent) rated 'good' or 'very good', while eight (16 per cent) rated 'poor' or 'very poor'. A total of 18 tunnels scored 'very good': four were in Austria, three in Switzerland and three in Spain.

Following several years of discussion about allowing testers access, a limited number of Italian tunnels were inspected for the first time in 2005. Unfortunately, three of the four 'very poor' scored tunnels were in Italy; the other was in France.

## Results

<b>Tunnel</b>	<b>Country</b>	<b>Grade awarded</b>	<b>Risk potential</b>
Arrissoules	Switzerland	Very good	Medium
Barajas Aeropuerto	Spain	Very good	Medium
Baregg	Switzerland	Very good	High
Belliard	Belgium	Very good	Low
Dekani	Slovenia	Very good	Medium
Emstunnel	Germany	Very good	Medium
Gräbern	Austria	Very good	Medium
Habsburg	Switzerland	Very good	Medium
Kappler Tunnel	Germany	Very good	Medium
Kastelec	Slovenia	Very good	Medium
La Duchère	France	Very good	Low

Markusberg	Luxembourg	Very good	Low
Ottsdorf	Austria	Very good	Medium
Plabutsch	Austria	Very good	High
Plasina	Croatia	Very good	Medium
Semmering	Austria	Very good	Medium
Txorierra-La Salve	Spain	Very good	Low
Txorierra-Ugasko	Spain	Very good	Medium
Benelux II	The Netherlands	Good	High
Dullin	France	Good	Medium
Grenztunnel Füssen	Germany	Good	Medium
La Grand Mare	France	Good	Medium
Mersey Kingsway	GB	Good	Medium
Monte Barro	Italy	Good	Medium
Piedicastello	Italy	Good	Medium
Rainier III	Monaco	Good	Low
Saint-Maurice	Switzerland	Good	Medium
San Juan	Spain	Good	Medium
Santa Maria de la Cabeza	Spain	Good	Low
Sierre	Switzerland	Good	Medium
Spering	Austria	Good	High
Ursulaberg	Germany	Good	High
Bürgerwald	Germany	Acceptable	Medium
Cerrado del Calderón	Spain	Acceptable	Medium
Flughafen Düsseldorf	Germany	Acceptable	Medium
Javorova Kosa	Croatia	Acceptable	Medium
Karawanken	Slovenia	Acceptable	High
Landy	France	Acceptable	High
Miravete	Spain	Acceptable	Medium
Monte Ceneri	Switzerland	Acceptable	Medium
Nordby	Norway	Acceptable	Medium
Barrios	Spain	Poor	Low
Eidsvoll	Norway	Poor	Medium
Ganzstein	Austria	Poor	High

Ruhr Schnellweg	Germany	Poor	Medium
Croix Rousse	France	Very poor	High
Quarto	Italy	Very poor	Medium
Roccaccia	Italy	Very poor	Medium
San Pellegrino	Italy	Very poor	Medium

**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**

The AA Motoring Trust has been a leading supporter of both the EuroTest and EuroTAP tunnel inspections. Under the two programmes, all the major tunnels in the UK have been inspected. The results are shown in the table:

<b>Name of Tunnel</b>	<b>Year tested</b>	<b>EuroTAP rating</b>	<b>Risk potential</b>
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
<b>Mersey Kingsway</b>	<b>2000</b>	<b>Good</b>	<b>Not calculated</b>
<b>Mersey Kingsway</b>	<b>2002</b>	<b>Good</b>	<b>Medium</b>
<b>Mersey Kingsway</b>	<b>2005</b>	<b>Good</b>	<b>Medium</b>
<b>Mersey Queensway</b>	<b>2000</b>	<b>Acceptable</b>	<b>Not calculated</b>
<b>Mersey Queensway</b>	<b>2002</b>	<b>Acceptable</b>	<b>Medium</b>
Rotherhithe	2003	Poor	Low

Tyne	2000	Poor	Not calculated
Tyne	2002	Poor	Medium
Tyne	2003	Poor	Medium

Since 2000, 158 road tunnels have been inspected and rated across Europe. UK tunnel operators have responded positively and are investing to improve safety.

- **Mersey Queensway** Currently undergoing a £14 million programme of improvements, including provision of emergency escape routes. The Chairman of 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** Future plans include the expansion of the PA system, variable traffic signs and provision of automatic traffic congestion detection
- **Blackwall Tunnel (southbound)** Major improvements include state-of-the-art safety, communication and information systems, due for completion in August 2005
- **Blackwall Tunnel (northbound)** Consultants have reviewed its safety with a view to a major refurbishment; building work is expected to start in November 2006.
- **Rotherhithe** Major improvement work will start in May 2007
- **Tyne** The public inquiry for a second tunnel has been completed, but it is reported that legal and procedural issues will delay the opening of the second tunnel until 2009.
- **Dartford** Automatic fire detection systems have been installed, and more work is planned to improve safety operations, and to conform to 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 users have been killed or injured in an accident in a UK tunnel: in the rest of Europe, tunnel fires have killed around 90 people in the last 10 years.

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, why the emergency services must be summoned immediately, and why tunnel operators must be able to put emergency plans into operation seamlessly. If there is a fire, the occupants of the vehicles in a tunnel are not spectators to an accident, they are participants in a potential disaster.

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

- Driving safely at the appropriate speed for the 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, and knowing that they should pull over to the left, switching off the engine, leave the keys in the ignition and move swiftly away from the fire to the nearest emergency exit, or to the tunnel entrance.

MerseyTunnels has produced a leaflet giving clear and simple advice on how to drive safely through both their tunnels and what to do in an emergency. This is shown at the end of the report and copies are also available from MerseyTunnels.

A graphic, entertaining interactive quiz on tunnel safety can be found at <http://adac.3m5.de/eurotest/english.html> (your PC will need Active X and Shockwave). The lessons contained within the quiz may help to save lives in the event of a tunnel incident.

*\* The AA Motoring Trust is a leading member of the EuroTAP consortium, established in 2004. The programme is funded jointly by the European Commission and European motoring organisations and has evolved from the EuroTest programme, established in 2000 by Europe's motoring organisations, with an annual programme of inspections of services used by tourists across Europe. Since 2000 EuroTest has carried out inspections of more than 200 motorway service areas, 107 road tunnels and 60 car ferries. The inspections have identified shortcomings and dangerous practices, and have led to improvements that benefit road-users across the European Union.*

*The EuroTAP consortium acknowledges the support of the European Commission in helping to make it possible to continue to conduct tunnel inspections; the content of this report is not the responsibility of the European Commission, however.*

*Reports of tunnel inspections undertaken under the EuroTest banner, as well as other consumer tests, may be found at [http://www.AAtrust.com/aamotoringtrust/consumer\\_policyarchive.cfm](http://www.AAtrust.com/aamotoringtrust/consumer_policyarchive.cfm)*

## Categories inspected

### 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

# Mersey Tunnel Safety Leaflet

**EMERGENCY NUMBERS**

Tunnels Police: 0151 236 8602 ext 452

Emergency Services: 999

Local Traffic & Travel Information:  
 Radio Merseyside 95.8 FM  
 Radio City 96.7 FM

**OTHER INFORMATION**

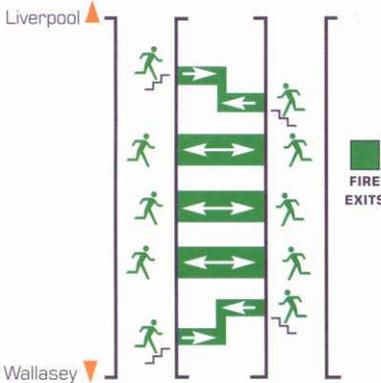
Fast Tag: 0151 236 8602

This information  
is available in  
other formats





Head Office: George's Dock Building,  
Pier Head, Liverpool L3 1DD



**KINGSWAY (Wallasey)**

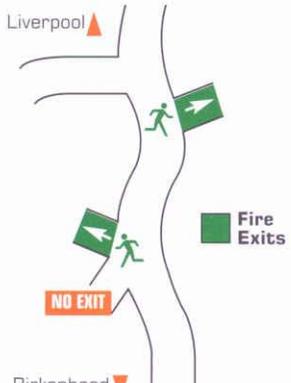
As you pass through the Tunnel note the location of Fire Exits marked by a Green Running Man sign. 

 Listen to Local radio, Tunnel Police can interrupt broadcast with safety information and instruction.

In the event of a breakdown stay in your vehicle - you will be monitored via CCTV. 

 In the event of an emergency follow instructions of Tunnels Police and other Emergency Services personnel. In the event of a fire proceed to Fire Exits (nearest point of evacuation).

**DRIVE SAFELY. OBEY ALL SPEED LIMITS, SIGNS AND SIGNALS. KEEP YOUR DISTANCE. KEEP IN LANE**



**QUEENSWAY (B'Head)**

