

EuroTAP
EUROPEAN TUNNEL ASSESSMENT PROGRAMME

Robert Sauter
Director Consumer Affaires Promotion and Communication
ADAC

ABSTRACT

1. TUNNEL TESTS HISTORY

EuroTAP took its origin in 1999. Following the disaster in the Montblanc tunnel, the German automobile club ADAC decided to initiate and implement a pan-European test on the safety of European road tunnels. ADAC testers were the last independent experts to inspect the Austrian Tauern tunnel before it burnt out completely following a disastrous accident. Two days after the Tauern disaster, ADAC published its first tunnel test. Naturally, media interest was extremely high.

Ever since, the tunnel test project has advanced to an annual programme:

- 1999: 20 tunnels tested
- 2000: 25 tunnels tested
- 2001: 16 tunnels tested
- 2002: 31 tunnels tested
- 2003: 25 tunnels tested
- 2004: 27 tunnels tested

By 2004, a total of 144 tunnels were tested before EuroTAP followed suit with its testing programme in 2005. EuroTAP is scheduled until 2007.

2. EuroTAP PARTNERS

EuroTAP is a European consortium consisting of 12 EuroTest automobile clubs from 11 European countries. The EuroTAP project management lies with the initiator ADAC whereas the FIA Brussels Office is responsible for coordination.

Since 1999, DMT (Deutsche Montan Technologie), has been entrusted with the technical implementation. DMT is an international technology service provider in the areas of raw materials, safety and infrastructure staffed with 550 employees. They provide a broad service spectrum from the investigation of construction sites to the planning and safe operation of tunnel systems. Focus is on safety in complex systems, especially the protection against fire and explosion, and ventilation and rescue systems. DMT also has a modern training centre for fire brigades, providing real-life conditions for fire fighting in tunnels and buildings.

The EU Commission subsidises and supports EuroTAP. As a consumer-oriented safety comparison of European road tunnels, EuroTAP is unique in Europe and does not interfere with national risk analyses currently being developed by EU member states within the framework of the new EU Directive 2004/54/EC.

The test programme includes tunnels of at least one kilometre length covering areas with high traffic volume. The tunnels under review should also be significant for the European transit traffic and part of the TERN.

3. CHECK LIST

The original 1999 check list has been enhanced regularly taking the following basics and opinions into account:

- German regulations RABT 2003 (directives on the equipment and operation of road tunnels)
- Recommendations of the UNECE (United Nations Economic Commission For Europe) expert group on the safety of road tunnels, Dec. 2001
- Opinions of PIARC (World Road Association) and CEDR (Conference of European Directors of Roads)
- EU Directive 2004/54/EC
- National rules of the 6 major European tunnel states: Italy, Austria, France, Spain, the UK and Switzerland

The criteria on which the check list is based are divided into 46% preventive measures (traffic and traffic enforcement 16%, tunnel system 14%, lighting or energy supply 8%, emergency management 8%) and 54% incident-combating measures (fire protection 19%, escape and rescue 13%, communication 11%, ventilation 11%).

Approximately 200 check items are evaluated by a point system. The points total identifies the safety potential. It comprises all constructional, technical and organisational measures that are to prevent or limit the extent of an incident. The safety potential must be considered in the light of each tunnel's risk assessment result, which is evident in the risk potential. The risk potential comprises the statistical incident probability and expected damage severity. It is influenced by the following parameters: traffic volume per year (in relation to the tunnel length), share of HGV per day and tube, traffic type, vehicles per hour and lane, transport of hazardous goods, longitudinal inclination, intersections and entries/exits. These parameters improve the safety potential result by up to 40%. The interdependence of safety and risk potential can be subsumed in the following way: The higher the risk, the more safety measures should be taken.

From 2006, new elements were introduced to the test procedures, the K.O. criteria. They are a new quantitative element in the basically qualitative assessment process as they operate with the methodical option of downgrading. They point out that certain deficiencies cannot be compensated by other safety measures and that interdependence of different safety measures has to be taken into consideration in the assessment. Results from this new evaluation using a quantitative approach are specified separately in the individual assessments of the tested tunnels.

4. RESULTS

Tunnel test results are specified in a five-grade evaluation system ranging from "very good", "good" and "acceptable" for positive results to "poor" and "very poor" for negative ones.

22 of 52 tested tunnels achieved the grade "very good" in the latest 2006 test. Experts rated nine tunnels "good", eight tubes achieved "acceptable" thus still being in a positive range. Yet five tunnels had to be rated "poor" and eight were "very poor" which means that every fourth tunnel failed the test.

The M-12, access road to Barajas airport in Madrid, was rated number one. The 1.8km tunnel started operation only last year. It consists of two tubes and is equipped with all modern and safety-relevant features such as traffic lights and barriers before the portals, emergency lanes, eye-catching emergency phones, fire extinguishers and additional emergency exits and escape routes. While safety is monitored by 24-hour video surveillance and qualified staff in the tunnel control room an automatic warning is generated for special incidents, e.g. stopping vehicles. The tunnel meets the requirements for an efficient self-rescue in the case of fire.

The Segesta tunnel on the A29 (Palermo-Trapani) near Calatafimi came last in the test. With 1.7km length and 30 years operation it achieved the worst results ever in the ADAC tunnel test history. Its age is rather obvious and there are two tubes with only one cross section as additional emergency exit and escape route in the centre of the tunnel. No other safety elements can be listed.

Tunnels failing the tests since 1999 are indicated in the following percentage rates:

- 1999: 8 out of 19 tunnels: 42%
- 2000: 8 out of 25 tunnels: 32%
- 2001: 4 out of 16 tunnels: 25%
- 2002: 8 out of 30 tunnels: 27%
- 2003: 11 out of 25 tunnels: 44%
- 2004: 4 out of 27 tunnels: 15%
- 2005: 8 out of 49 tunnels: 16%
- 2006: 13 out of 52 tunnels: 25 %

5. PREDOMINANT DEFICIENCIES

In the 2006 test, the emergency exit and escape route category was particularly obvious with a failure rate of 37%. Predominant deficiencies were:

- 6 one-tube tunnels: Cholfirst (1.3km – KO!), Lorca (0.9km), Loibl (1.6km – KO!), Nes (1.3km), Colle di Tenda (3.2km) und Montecrevola (2.2km)
- Distance between emergency exits too long: 12 tunnels, e.g. Kirchberg (approx. 580m), Segesta (approx. 830m), Oslofjord (approx. 5,350m)
- Insufficient identification of emergency exits: 8 tunnels, e.g. Universität Düsseldorf, Kirchberg, Appia Antica, Fossino, Segesta
- No emergency lighting and no indication of escape directions/distances: 15 tunnels - Universität Düsseldorf, Kirchberg, Rastatt, Bruck, Calzadas Superpuestas, Rovira, Oslofjord, Nes, Gardunha, Fossino, Montecrevola, Segesta, Las Planas, L'Arme und Medway

29% of the tested tunnels failed the communication category. The most significant examples for safety gaps include:

- Poor radio traffic service reception throughout the tunnel: 15 tunnels
- No additional messages can be transmitted (radio traffic channel): 4 tunnels - Dortmund-Wambel, Rastatt, Oswaldiberg and Nievares
- No emergency phones: 3 tunnels – Fossino (1.6km), Montecrevola (2.2km) and Segesta (1.7km)
- Emergency call points not adequately identified: 4 tunnels - Universität Düsseldorf, Calzadas Superpuestas, Rovira and Liefkenshoek
- Distance between emergency call points relatively long: 4 tunnels – longest distance with 450m in the Ribeira Brava tunnel, Mala Kapela (280m), Grič (330m) and Gardunha (315m)

- Emergency call points out of order: 4 tunnels – in the Lorca tunnel, the phones were shabby, in the Appia Antica the entire emergency phone system has been out of order for some time due to wire damage during construction works

27% failed the test in the ventilation category. The reasons include:

- No mechanical ventilation: 3 tunnels, Segesta has no ventilation system at all, in the Rovira and Medway tunnels, ventilation can be controlled manually only.
- No fire ventilation programmes: 10 tunnels, e.g. Rovira, Ribeira, Brava, Monte Pergola, Appia Antica, Las Planas, L'Arme and Medway
- Ventilation devices are not temperature-resistant: 14 tunnels, e.g. Dortmund-Wambel
- Ventilation sections with poor smoke venting: 5 tunnels, 3 of which are tunnels with two-way traffic, e.g. Mala Kapela (5,760m), Oslofjord (7,250m) and Colle di Tenda (3,186m), the other two are one-way tunnels, e.g. Oswaldiberg (4,307m) and Ehrentalerberg (3,345m)

Other categories revealed further negative aspects:

- No fire extinguishers in the Segesta tunnel
- No fire extinguishers in SOS recesses in the Perdón tunnel
- Distance between fire extinguishers too long: 3 tunnels - Mala Kapela (280m), Gric (330m) and Fossino (650m)
- Access route for fire brigades extremely long: 30km for the Colle di Tenda
- Fire brigades require too much time to reach tunnel: 5 tunnels - Calzadas Superpuertas, Loibl, Fossino and Segesta (20 minutes) as well as Monte Pergola (30 minutes)
- Neither lay-bys nor emergency lanes: 18 tunnels – e.g. Hochwald, Bruck, Rosenberg, Confignon, Glion, Lorca, Calzadas Superpuertas, Rovira, Sijtwende, Ribeira Brava, Colle di Tenda, Segesta, Vuache, L'Arme and Medway
- No alarm and emergency plans for incidents: 6 tunnels, e.g. Dortmund-Wambel, Universität Düsseldorf, Fossino, Segesta and Medway
- Alarm and emergency plans not up to date: 3 tunnels – e.g. Kirchberg, Monte Pergola
- No automatic activation of ventilation system: 3 tunnels – Rovira, Medway and Segesta (no ventilation system at all)
- No regular emergency drills: 17 tunnels

6. THE EuroTAP PROGRAMME

So far, the EuroTAP programme has involved the following activities:

- 2005: - 49 tests and 49 tunnel info sheets online
- 2006: - January: distribution of 2.5 million leaflets
- 27 April: publication of 52 tests
- 22 May: publication 52 of tunnel info sheets

The following activities are scheduled:

- 2007: - April: publication of 49 tests
- May: publication of 49 tunnel info sheets
- December: audit

7. “SAFE TUNNELS” AWARENESS CAMPAIGN

In their role as consumer protectors in the area of mobility, automobile clubs not only engaged in the safety tests of road tunnels but also in raising motorists' awareness.

By educational measures they ensure correct behaviour in tunnels thus preventing accidents and serious consequences. In 2004, automobile clubs made it their task to initiate an awareness campaign comprising the following activities:

- May 2004: 50 tunnel info sheets
- December 2004: PC game “Safe in the Tunnel”
- 19 January 2005: Symposium
- December 2005: DVD “Safe in the Tunnel”

The entire range of educational means continues to be issued in large numbers to club members in the whole of Europe and further distribution is managed by suitable partners from private and public areas. The educational means are also made available via the Internet.

8. EuroTAP AS MEDIA PLATFORM

Both EuroTest and EuroTAP form a unique communication platform in Europe. Based on professional media activities functioning according to specified principles, publication has gained maximum publicity in Europe. With numerous contributions in the club magazines, the EuroTAP partners reach approximately 40 million motorists directly. Readers studying detailed EuroTAP reports on the clubs’ websites complete the list.

The EuroTAP partners reach external media and a broad non-club public in press releases and press conferences. At least 25 million radio listeners and a 58 million tv audience could be reached when the EuroTAP 2005 test results were so published. And with a run of 84 million, the print media covered at least as many readers.