

EuroTAP 2010 Tunnel Test

Demands: How tunnel operators can ensure safety

Measures to be implemented in the short term:

- ◆ Motorists should be given better general information on safety and how to behave in tunnels along with more specific information on the safety equipment and facilities provided in the tunnel (lay-bys, emergency phones, fire extinguishers, emergency exits and similar equipment).
- ◆ Orientation in the tunnel should be improved with bright tunnel walls, sufficient lighting and LEDs on the edge of the carriageway.
- ◆ Motorists should be instructed to keep a sufficient safety distance between vehicles when driving through a tunnel.
- ◆ Communication must be improved: Traffic radio must be available throughout the tunnel. The broadcasting of messages on traffic radio should be a standard feature with standardised messages in several languages used for different situations (accident, closure, fire). Loudspeakers should be installed at obvious points, e.g. in lay-bys and cross-connections between neighbouring tubes and in safety shelters.
- ◆ Motorists should be informed of why the tunnel is closed, for example, using variable traffic signs or variable information signs. Detour routes should be announced on time.
- ◆ All escape routes and emergency exits should be clearly marked.
- ◆ Regular training for tunnel staff; rescue services should be familiar with the safety equipment in the tunnel; emergency drills should be carried out regularly.
- ◆ Emergency response plans must be prepared and continuously updated.
- ◆ Fire brigades must be equipped with suitable respiratory protection.
- ◆ Risk analyses must be carried out for the carriage of hazardous goods and the tunnel category defined according to ADR 2007.

To be implemented in the medium to long term within two to ten years:

- ◆ Traffic standstills, for instance due to congestion or road works, particularly in tunnels with heavy traffic, should be avoided by suitable means of traffic management.
- ◆ Distances between video surveillance cameras should be reduced; if an incident occurs, the camera image should be automatically displayed on an alarm monitor; automatic recording and saving of data.
- ◆ Emergency phones should be provided at sufficiently short intervals.
- ◆ Ventilation systems must be checked with regard to fire incidents and brought up to today's standard.
- ◆ All tunnels that are longer than 1,000 metres should be equipped with automatic fire alarm systems. Fire detection should be improved, for example, using combined systems (thermal line detectors and visibility impairment equipment installed at certain points or digital video image evaluation).

- ◆ Escape routes must be marked, for example, with LEDs, so that they remain visible even when there is smoke in the tunnel.
- ◆ Escape and rescue routes must be created: Additional galleries must be built; openings must be made to an existing, second tube at short distances, existing supply-air ducts should be converted for use as additional escape routes; existing escape chambers should be connected to external escape routes.
- ◆ Tunnel radio must be warranted for rescue services throughout the tunnel.
- ◆ Rescue vehicles must be able to change tubes at the portals of twin-tube tunnels.
- ◆ Tunnel control centres must be set up to monitor several tunnels.
- ◆ Single-tube tunnels should be fitted with a second tube.

Generally speaking:

- ◆ The requirements and regulations of the EU Directive on minimum safety requirements for tunnels in the Trans-European Road Network must be implemented promptly, thus ensuring a standardised minimum safety level for Europe's road tunnels in the near future.