

Measure 46: Tunnel safety

First page:

<p><i>Policy package:</i> ID: Road transport safety, quality and environment</p>
<p><i>Measure 46:</i> Harmonise minimum safety standards for road and rail tunnels belonging to the trans-European transport network.</p>
<p><i>What is the problem being addressed ?</i> Many road infrastructures, including tunnels, were built several decades ago when traffic density and vehicle characteristics were different from what they are today. As a result of recent tunnel accidents, in December 2002 the Commission submitted a proposal for a Directive aimed at ensuring a minimum level of safety in road tunnels on the Trans-European network. Indeed, because of the confined environment, accidents in tunnels, and particularly fires, can have dramatic consequences. The fires in the Mont Blanc and Tauern tunnels in 1999 and in the Gotthard tunnel in 2001 have put the risks in tunnels in the spotlight again and call for decisions at political level.</p>
<p><i>Measure's costs and/or benefits:</i> Improvement costs include three components: refurbishment and equipment, operational costs, and costs of traffic delay caused by the refurbishment. Costs for refurbishing road tunnels in accordance with the full set of requirements can be very high, because tunnels are the most expensive road infrastructure. For this reason, the Directive allows Member States to implement less costly measures under certain conditions where they achieve a sufficient safety level. For this purpose, the classification system introduced in Annex I – of COM(2002) 769 final, differentiates requirements according to traffic volumes and length, and a clause in the proposal allows Member States to accept alternative risk reduction measures when refurbishment costs are excessive in relation to the costs of a new tunnel. However, these results clearly demonstrate the need to prioritise tunnel safety investments, starting with the tunnels with the highest traffic volume and the greatest risk of accidents. The cost of structural work may be reduced by a factor of up to five for tunnels that benefit from a derogation. The total cost for the proposal is in the range of 2.6 billion Euro to 6.3 billion Euro. The latter figure assumes that all existing tunnels will be adapted to meet the provisions of new tunnels. The lower figure is an estimate where certain modifications in tunnel structure are replaced by alternative measures, such as traffic restrictions. Refurbishment and equipment account for the majority of costs, though traffic delay is estimated to account for one quarter of the costs. The costs incurred by the proposed Directive will be borne by the Member States.</p>
<p><i>Legislative implementation at the EU level:</i> Proposal for a Directive of the European Parliament and of the Council – COM (2002) 769 final, published on 30.12.2002. The scope of the Proposal for a Directive applies to tunnels longer than 500 m in the Trans-European network. Users can usually escape from tunnels under 500 m on their own, in approximately 5 to 10 minutes.</p>
<p><i>What are the objectives ?</i> The measure lays down safety rules for all existing and future tunnels of over 500 metres in length. More than 500 tunnels will be affected. More precisely, the UN-ECE has set up an inventory of road tunnels longer than 1000 m, including here 370 tunnels with a total length of 900 km, 182 of which are located in the Trans-European Network, with a total length of 446 km. Based primarily on the Member States' statistics and other sources, a total number of 216 TEN road tunnels of 500 to 1000 m has been identified, 70% being located in Italy. An additional number of 50 TEN road tunnels of 500 to 1000 m, with a total length of 39 km, are expected to open within the next 5 years. In most countries, the new safety standards must be met within ten years, while in the first six years 50% of the tunnels will need to comply.</p>

Objective achievement shall be monitored through the number of road tunnels or kms where the minimum standards have been implemented.

Interactions with other WP measures:

The measure is clearly linked to the European Road Safety Action programme and the objective of halving the number of road accident victims by 2010. Indeed, the number of accidents in tunnels is relatively limited as tunnels are not exposed to adverse weather conditions such as snow, ice, wind and rain, and this is especially true of longer tunnels. However, fires are fairly frequent although, according to international statistics, the majority of vehicle fires are not caused by accidents, but by self-ignition of the vehicle or its load due to defects in electrical systems or overheated engines. On the other hand, fires with the most serious consequences (fires involving injuries, fatalities or extensive material damage) have mostly been the result of accidents (12 out of the 14 worst fires known worldwide), with the exception of the Mont Blanc tunnel fire, which was caused by self-ignition of a heavy goods vehicle.

Second page:

Output indicators:

The key output indicator is the “number of road tunnels / kms where the minimum standards have been implemented”. Another indicator strongly related with this measure is the “number of days that a tunnel is closed”, due to: i) maintenance; ii) accidents.

Outcome indicators: intermediate impacts on transport markets

The measure will influence the costs of the tunnels and highways operators that will be obliged to upgrade the tunnel infrastructure.

Outcome indicators: final impacts on transport users and non users

Increasing safety is clearly the most important outcome of this measure. There are two main objectives set to reach the optimal level of safety in road tunnels:

- Primary objective: prevention
- Secondary objective: reduction of possible consequences, by providing the ideal prerequisites for:
 - enabling people in the accident to rescue themselves;
 - allowing immediate intervention of road users to prevent greater damage;
 - ensuring efficient action by emergency services;
 - protecting the environment;
 - limiting material damage.

Therefore, the indicators of safety outcome will belong to two main categories, those related to prevention and those measuring the reduction of consequences of accidents within the tunnels.

In the first category, a key indicator is the (reduction of) accidents occurred in the tunnels, while for the second category a key indicator is the (reduction of) the average number of victims and injuries in tunnel accidents. In addition, the potential disruption of the transport system following a major fire amplifies these consequences and can cause severe disturbances in the economy of a whole region.