



Iceland

Hvalfjarðargöng

2010



FIA Foundation
for the Automobile and Society

Forward.

In Iceland there are 7 tunnels in operation in the beginning of 2010. Two more are being built and scheduled to open by the end of the year. The first tunnel was build in 1949, but the rest is less than 30 years old in operation. All of those were operated by the Icelandic Road Administration.

The first tunnel to be inspected by EuroTAP is the Hvalfjörður tunnel. It is on road no. 1, which is the main road around Iceland and the only one to be under a fjord. The tunnel length is 5.770 m. with the lowest point 165 m. below sea level. It is operated by a private company, Spölur Ltd., which is mainly owned by government companies. Spölur Ltd. financed the building of the tunnel by special law on the project, planned to operate for 25 years by the use of road toll for the traffic using the tunnel. The tunnel was opened in 1998.

Hvalfjörður tunnel replaced existing road going around the fjord of 60 km., reducing the length of the ring road of Iceland for about 48 km. The road around the fjord had quite bad safety record, as well as being difficult in the winter time. After the opening of the tunnel, very few serious accidents have happened on that road and the safety record of the tunnel is very good, in fact with no serious accidents for the time of operation.

Icelandic Automobile Association FIB, has been member of EuroTAP from 2008 and decided to have this tunnel inspected with assistance from FIA Foundation and the operator Spölur Ltd. Inspector from ADAC rated the tunnel in co-operation with FIB.

Prior to that, FIB has inspected 3.600 km. of the road network in Iceland with EuroRAP, issuing a report in July 2010. The plan is to continue both programs in the future and to do EuroTAP inspection in the remaining tunnels in the next few years.

The Hvalfjörður tunnel was rated the poorest of the 26 tunnels inspected by EuroTAP in 2010. The working papers and reports follow herewith.

Hvalfjörður

EuroTAP rating: Very poor

Poorest test result

Location:	Iceland, near Akranes Highway No. 1 between Reykjavik and Akranes
Year opened:	1998
Length:	5,770m
Portal height level:	10 / 20m above sea level
Number of tubes:	1 / bi-directional traffic
Speed limit:	70kph
Vehicles per day:	5,400
Share of HGVs:	5%
Breakdowns / accidents / fires:	26/ 8/ 0
Risk:	Medium

Strengths and weaknesses

- 😊 Traffic lights and barriers in front of the portals
- 😊 Traffic radio throughout the tunnel, the operator can broadcast messages
- 😊 Video surveillance with cameras around every 525 metres
- 😊 Lay-bys provided every 500 metres
- 😊 Emergency phones provided every 500 metres
- 😊 Fire extinguishers provided every 250 metres
- 😊 Tunnel control centre manned around the clock by trained staff
- 😊 Radio communications possible throughout the tunnel for tunnel staff, police and fire brigade
- 😊 Emergency response plan is complete

- 😞 Lighting is too weak
- 😞 No loudspeakers
- 😞 Full video surveillance is not possible
- 😞 No automatic detection of traffic disruptions, the use of lay-bys, emergency phones or fire extinguishers

- ☹️ The distance of 500 metres between emergency phones is too long
- ☹️ Distance between fire extinguishers of 250 metres is too long
- ☹️ Escape routes are not marked by evacuation lighting and are poorly signposted
- ☹️ No additional escape or rescue routes
- ☹️ No automatic fire alarm system
- ☹️ In the event of fire, ventilation is not automatically activated
- ☹️ Ventilation control in the event of fire is not sufficiently effective and not sufficiently monitored
- ☹️ The ventilation section to extract smoke runs the entire length of the tunnel, i.e. 5,770 metres, and is hence too long
- ☹️ Emergency response plan out of date
- ☹️ Distance to be covered by fire brigade, i.e. 28 kilometres, is too long
- ☹️ Only one hydrant in the middle of the tunnel
- ☹️ The maximum time of use for the fire brigade's respiratory equipment is too short
- ☹️ The power supply and local power supply are not protected against power failure
- ☹️ Safety-relevant cables are not sufficiently fire-resistant
- ☹️ No system in place to quickly drain flammable and toxic liquids
- ☹️ No regular training or emergency drills

Plans for the future

- ◆ 2010: Improved markings for lay-bys; additional fire extinguishers; batteries for the uninterruptible power supply system to be supplemented/replaced
- ◆ 2011: Additional video cameras and transmission via optical fibres; additional emergency phones with fire extinguishers and improved markings
- ◆ 2012: Escape route signs in the tunnel; new cabling for evacuation lighting
- ◆ 2012/ 2014: Installation of an automatic video surveillance system; automatic extinguishing system in the transformer stations; certified cables for power supply and control

Briefly and to the point

- ◆ The medium risk found for driving through the tunnel is primarily due to the tunnel length of 5,770 metres and the steep gradient of more than eight percent. On the other hand, the traffic volume of 5,400 vehicles per day and the number of hazardous goods transports are rather low.

- ◆ Preventive measures are acceptable, at least with a view to the structure, and primarily comprise sufficiently wide lanes and lay-bys. However, lighting is too weak. The tunnel is monitored around the clock in a tunnel control centre manned by trained staff, however, video surveillance is incomplete.
- ◆ Incidents in the tunnel are not automatically reported to the tunnel control centre. Tunnel staff are forced to rely on reports made by motorists using either the emergency phones or their own mobile phones. If necessary, motorists are guided using traffic lights and variable traffic signs and information is provided on displays and traffic radio. There is no automatic fire alarm system; this means that if a fire breaks out, the tunnel control centre must activate the ventilation system manually, close the tunnel and notify the fire brigade. The long distance to be covered by the fire brigade and the insufficient supply of fire-fighting water with just one hydrant in the middle of the tunnel make fire fighting difficult. At least an emergency response plan co-ordinates co-operation between the tunnel control centre and emergency services. Emergency drills are not held regularly.
- ◆ The preconditions for effective self-rescue in a fire need to be improved badly. Due to the long ventilation section along the entire length of the tunnel, i.e. 5,770 metres, smoke located a long distance from the seat of the fire cannot be prevented from sinking down from the tunnel ceiling. Moreover, longitudinal flow in the tunnel is not considered in ventilation control. The steep gradient in the tunnel also encourages smoke to spread. This can lead to smoke spreading throughout the entire tunnel and, considering the lack of additional emergency exits and the hence long distances to be covered to the portals, this could be dangerous. Orientation in a fire is also difficult because these escape routes are not marked by evacuation lighting.

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