THE ORGANISATION AND COST OF TUNNEL SAFETY WITHIN THE ASFINAG GROUP

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ABSTRACT

ASFiNAG plans, builds, maintains, and collects tolls on Austrian motorways and expressways. It currently operates a network comprising approximately 2,104 km of roads. This network includes approximately 140 km of special toll roads such as the Bosruck tunnel, the Gleinalm tunnel, the Arlberg tunnel, and the Tauern tunnel. A further 400 km of motorways and expressways are currently either at the planning stage or under construction.

A total of 137 tunnel facilities with a total length of approximately 295 km are currently in operation on the network. This is the same distance as a journey from Vienna to Salzburg on the A1 West motorway. Approximately 152 km of tunnel facilities are either at the planning stage or under construction. This is the same distance as a journey from Salzburg to Villach on the A10 Tauern motorway.

In view of the large number of tunnels on the network, ensuring the highest possible level of safety and economic efficiency in motorway and expressway tunnels is one of ASFiNAG’s main objectives.

On the basis of applicable directives and the Austrian Road Tunnel Safety Act (STSG), ASFiNAG has set up a streamlined, effective organisation to address the issue of tunnel safety.

1. INTRODUCTION

Ever since the tragic events of 1999, people in Austria have attached great importance to the issue of tunnel safety.

With the help of both technical developments and organisational measures, tunnel safety has been significantly improved in order to ensure maximum safety for tunnel users in the event of an incident.

2. ASFiNAG’S TUNNEL SAFETY ORGANISATION

Each of the tunnel facilities on the motorway and expressway network is operated by one of ASFiNAG’s four service companies: Servicegesellschaft Nord (north), Servicegesellschaft Ost (east), Servicegesellschaft Süd (south), Servicegesellschaft ASG (alpine region).

The Road Tunnel Safety Act (STSG) had a major influence of the way ASFiNAG organised its tunnel safety activities. This act, which came into effect for all tunnels >500m on the motorway and expressway network on 8 May 2006, contains instructions regarding the posts of tunnel manager and safety officer.
ASFiNAG’s four service companies operate a total of 137 tunnel facilities.

![Figure 1: Support areas of the four service companies](image)

The operation of the facilities is distributed among the four service companies as follows:

<table>
<thead>
<tr>
<th>Servicegesellschaft Nord (north):</th>
<th>20 tunnels</th>
<th>approx. 44 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicegesellschaft Ost (east):</td>
<td>25 tunnels</td>
<td>approx. 17 km</td>
</tr>
<tr>
<td>Servicegesellschaft Süd (south):</td>
<td>66 tunnels</td>
<td>approx. 156 km</td>
</tr>
<tr>
<td>Alpenstraßen GmbH (Alpine region):</td>
<td>26 tunnels</td>
<td>approx. 78 km</td>
</tr>
</tbody>
</table>

The table above shows that Servicegesellschaft Süd is responsible for about 50 per cent of all tunnel facilities.

Another aspect that was taken into consideration when structuring ASFiNAG’s tunnel safety organisation was the tunnel facilities that are currently either at the planning stage or under construction.

The table below shows the distribution of planned tunnels/tunnels under construction among the four service companies:

<table>
<thead>
<tr>
<th>Servicegesellschaft Nord (north):</th>
<th>24 tunnels</th>
<th>approx. 60 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicegesellschaft Ost (east):</td>
<td>4 tunnels</td>
<td>approx. 30 km</td>
</tr>
<tr>
<td>Servicegesellschaft Süd (south):</td>
<td>16 tunnels</td>
<td>approx. 46 km</td>
</tr>
<tr>
<td>Alpenstraßen GmbH (Alpine region):</td>
<td>5 tunnels</td>
<td>approx. 16 km</td>
</tr>
</tbody>
</table>

In approximately 5 to 10 years, operation of the tunnel facilities will be distributed as follows:

<table>
<thead>
<tr>
<th>Servicegesellschaft Nord (north):</th>
<th>44 tunnels</th>
<th>approx. 104 km</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicegesellschaft Ost (east):</td>
<td>29 tunnels</td>
<td>approx. 47 km</td>
</tr>
<tr>
<td>Servicegesellschaft Süd (south):</td>
<td>82 tunnels</td>
<td>approx. 202 km</td>
</tr>
<tr>
<td>Alpenstraßen GmbH (Alpine region):</td>
<td>31 tunnels</td>
<td>approx. 94 km</td>
</tr>
</tbody>
</table>
Based on the number of tunnel facilities being operated by the service companies, the following human resources were made available (TM = tunnel manager, SO = safety officer, OP = operator):

<table>
<thead>
<tr>
<th>Servicegesellschaft Nord (north):</th>
<th>44 tunnels</th>
<th>approx. 104 km</th>
<th>1 TM</th>
<th>3 SO</th>
<th>25 OP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Servicegesellschaft Ost (east):</td>
<td>29 tunnels</td>
<td>approx. 47 km</td>
<td>1 TM</td>
<td>1 SO</td>
<td>10 OP</td>
</tr>
<tr>
<td>Servicegesellschaft Süd (south):</td>
<td>82 tunnels</td>
<td>approx. 202 km</td>
<td>1 TM</td>
<td>5 SO</td>
<td>76 OP</td>
</tr>
<tr>
<td>Alpenstraßen GmbH (Alpine region):</td>
<td>31 tunnels</td>
<td>approx. 94 km</td>
<td>1 TM</td>
<td>2 SO</td>
<td>19 OP</td>
</tr>
</tbody>
</table>

Approximately 146 people at ASFiNAG are currently involved in tunnel operation.

In order to meet the provisions of the Road Tunnel Safety Act, several tools, including the tunnel safety database, were developed. This database has been in operation since May 2006. All accidents, fires, and cases of property damage relating to tunnel operation are recorded and entered in the database in order to allow improvements to be made as quickly as possible.

Thanks to the hard work and dedication of everyone involved, all requirements outlined in both the EU directive and the STSG have been met on time.

![Figure 2: Tunnel database](image)

3. THE COSTS OF TUNNEL SAFETY

In the period 1997–2020, ASFiNAG will invest approximately € 26 billion in the planning, construction, and maintenance of motorways and expressways. Investment has increased continuously since 1997. Approximately € 1.3 billion will be spent in 2008.

Examples of new-build investments include the construction of new expressways such as the S36 Murtal expressway. In the field of maintenance, ASFiNAG is investing in repairs and refurbishment (bridges, roads, tunnels, etc.) and the construction of extra lanes, second tunnel tubes etc.
Thanks to continuous investment since 1997, the network has grown from a total length of 1,902 km (1997) to 2,104 km (2007).

Between 2007 and 2010, ASFiNAG will invest approximately € 4.6 billion in new-build and maintenance projects.

This figure includes a budget of approximately € 850 million for the following projects (adding second tubes and repairing/refurbishing existing tubes):

- Pfänder tunnel (6,500 m)
- Ganzstein tunnel (2,100 m)
- Lainberg tunnel (2,200 m)
- Tauern tunnel (6,500 m)
- Katschberg tunnel (5,500 m)
- Roppener tunnel (5,100 m)
- Bruck series of tunnels
- Selzthal tunnel
- Wolfsberg tunnel
- and others

Approximately 18 per cent of the total investment earmarked for the period 2007–2010 (€ 4.6 billion) will be invested in the existing network.

The following new-build projects, which will cost approximately € 400 million, are currently in planning or under construction:

- S35 Brucker expressway
- S10 Mühlviertler expressway
- S36 Murtal expressway
- A26 Linzer motorway
- A10 environmental relief measures
- and others

Approximately 9 per cent of the total investment earmarked for the period 2007–2010 (€ 4.6 billion) will be invested in new-build projects.

ASFiNAG will invest € 1.25 billion in the construction and repair/refurbishment of tunnels on the motorway and expressway network between 2007 and 2010. This accounts for 27 per cent of the forecast investment of € 4.6 billion.

A further € 3.5 billion (30–35 per cent) will be invested in the construction and repair/refurbishment of tunnels between 2010 and 2020.

4. SUMMARY

A review of the past few years clearly shows that as a result of the current ambitious programme of investment (€ 4.75 billion) and the development of a streamlined organisation, the level of safety in tunnels on Austria’s network of motorways and expressways has been significantly increased since 1999.