

A NEW AUSTRIAN GUIDELINE FOR TUNNEL SAFETY DOCUMENTATIONS

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ABSTRACT

According to the Austrian tunnel safety legislation (STSG) for all tunnels of the national major road network, the tunnel manager has to compile a tunnel safety documentation, which shall describe the preventive and safeguard measures needed to ensure the safety of the users. This documentation is a necessary part of the technical documentation required for the approval by the administrative authority according to STSG §7 (approval of the preliminary design) and §8 (approval of putting into operation of a new tunnel). For this reason in 2006 i.e. immediately after the introduction of the STSG, the administrative authority, the ministry of transport (bmvit), released a guideline for the preparation of the tunnel safety documentation

Due to a revision of the STSG in 2010 and due to new standards, which have been introduced since the preparation of the first guideline in 2006, it has been decided to update the existing guideline. The main objective was to benefit from the experience gained so far, to accelerate the approval process and to simplify it wherever possible.

The paper presents the updated guideline. The emphasis is on the goals, the structure and the contents of the tunnel safety documentation. The annexes to the safety documentation as well as the additional documents needed for an efficient approval process are also described.

Keywords: guideline, tunnel, safety documentation, STSG

1. INTRODUCTION

In the Austrian tunnel safety legislation (STSG) [1], the European Directive on minimum safety requirements for road tunnels [2] is transposed into a national law. According to STSG, just like in the EU Directive, for each tunnel of the primary road network, a tunnel safety documentation must be prepared.

The tunnel safety documentation is the central part of the technical documentation on which the approval by the administrative authority is based. The STSG defines two distinct steps in the approval process:

- Approval of the preliminary design (§7 STSG)
- Approval for putting into operation of a new tunnel (§8 STSG)

For both of these steps, an independent review of the tunnel safety by an expert, specialised in the field of tunnel safety, is required. This expert report is normally based on the safety documentation and a number of additional documents, which are prepared by the project applicant. The quality of the safety documentation is thus of fundamental importance for an efficient approval procedure.

For this reason already in 2006, a first guideline for the elaboration of a tunnel safety documentation was published by the Ministry of Transport (tunnel authority) [3]. Based on this guideline, for each tunnel of the primary road network a safety documentation has been prepared and a large number of approval procedures according to §7 und §8 STSG have been accomplished.

The experience from these approval procedures shows

- that the minimum requirements for the contents of the tunnel documentation, formulated with catchwords, are often misinterpreted which results in incomplete safety documentations,
- that the information in the different documents (safety document, emergency response plan, tunnel-operation manual, maintenance concept, etc.) is often redundant and sometimes contradictory,
- that the safety documentations contain unnecessary ballast, which has been added for example during approval procedures.

This leads to inefficient approval procedures. In addition, a number of changes which influence the safety documentation have occurred since the first introduction of the guideline:

- Amendment of the STSG with new procedural steps (§7a, §10).
- Release of new guidelines (e.g. on tunnel portals and transport of dangerous goods)

An update of the tunnel safety documentation guideline was therefore necessary.

2. OBJECTIVES OF THE NEW GUIDELINE

The tunnel safety documentation is the main document describing the tunnel safety. It shall therefore describe and summarize all aspects which are relevant for tunnel safety in a condensed manner in one, clearly structured, superordinated documentation. The safety documentation serves as a basis for the following administrative procedures:

- The approval procedures according to §7, §7a and §8 STSG are based on the safety documentation. The tunnel safety documentation shall support these approval procedures of the STSG and shall help to understand the planned structure and the access to it, together with the plans necessary for understanding its design and anticipated operating arrangements.
- As the tunnel safety documentation is also used by the Administrative Authority in the regular inspections (according to §3 Abs. 5 STSG), a quick overview over the tunnel system and the existing deviations from the state of the art shall be possible.

With the actualisation of tunnel safety documentation guideline, the following objectives are pursued:

- **Overview:** The different bodies responsible for tunnel safety (tunnel manager, safety officer, administrative tunnel authority, independent expert, etc.) shall be able to obtain a quick overview over the relevant aspects of the tunnel safety. Accepted deviations from the state of the art are clearly visible.
- **Standardisation:** The structure of the safety documentation shall be standardized so that a quick overview is possible and existing deviations from the state of the art can easily be detected.

- Living document: The safety documentation shall be structured in such a manner that an update is easily possible. The quantity of documents must therefore be limited.
- Working instrument: The tunnel safety officer and the tunnel manager dispose over a tool for the coordination between the different documents relevant for tunnel safety. Changes in the tunnel infrastructure or of the equipment which are relevant for safety can be traced.

3. SELECTED APPROACH

3.1. Project team

The guideline has been prepared by a group of specialists from the bmvit (Administrative Authority), ASFINAG (project applicant, tunnel operator) and independent experts for tunnel safety.

3.2. Stepwise development

In a first step, a draft of the guideline has been elaborated by this team and published for provisional use. The draft of the guideline was applied in different projects, where an approval procedure was necessary (pilot projects). Additionally, it was checked that the guideline can also be applied to existing tunnels.

In addition to the guideline, a number of templates for selected documents have been prepared. These templates shall support and guide the writer of a tunnel safety documentation as well as in the production of additional plans and reports, so that all the information which is needed is included in these documents.

In a second step, the experience with the guideline was evaluated. On this basis, the final version of the guideline was prepared. The application of the guideline confirmed the advantage and the need of templates. Another important finding was that special provisions are needed for existing tunnels because in this case the quality of the original documentation can be lower than required today.

The final version of the guideline [4] is now available at www.bmvit.gv.at/verkehr/strasse/tunnel (in German only).

3.3. Structure and contents

The tunnel safety documentation has a modular structure (figure 1) with a master document and a number of annexes. This allows exchanging parts of the documentation easily and opens the possibility to implement running modifications without much effort.

The structure and the contents of the master document are standardised. The 12 chapters of the safety documentation are shown in table 1.

In order to keep the work for changes at the already existing safety documentations as low as possible, the structure and the contents are as far as possible similar to the structure and the contents defined in the previous guideline.

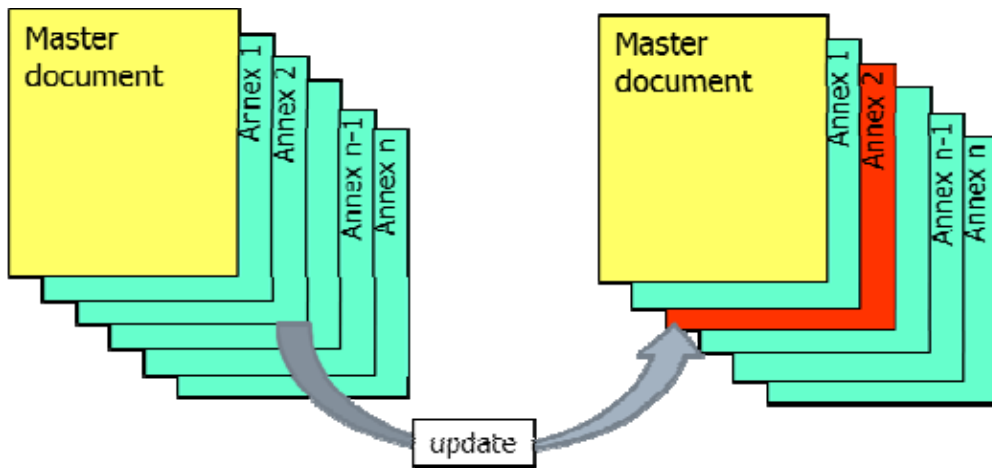


Figure 1: Modular structure of the tunnel safety documentation

The master document contains 12 chapters (see table 1). The first ten chapters summarize in a short form the main characteristics of the tunnel system as well as the technical and organisational measures.

Further details can be found in annexes which are joined to the safety documentation (chapter 11). The annexes needed for the different approval procedures as well as for a tunnel in operation are defined in the guideline. Chapter 12 contains a list of additional documents which are necessary for the approval procedures but which are not part of the safety documentation.

Table 1: Chapters of the main document

Chapter	Title	Modifications
I	Introduction	
II	Overview over the tunnel system	
III	Description of the structure and the access to the tunnel	
IV	Traffic situation and expected trend	
V	Specific hazard analysis	yes
VI	Organisational and operational procedures	
VII	Incident management	yes
VIII	Continuous improvement process	
IX	Exercises, tests and instructions	
X	Documentation of minor changes	new chapter
XI	Administrative notifications and their control	new chapter
XII	Annexes	
XIII	Additional documents	new chapter

The structure of the safety documentation allows a continuous evolution from the first project phase (planning stage) over the first putting into operation to the operation phase (living document).

3.4. Templates

To facilitate the preparation of a tunnel safety documentation, to minimize possible interpretation errors of the guideline and to guarantee a high degree of standardisation, the development of a template for the master document is in progress.

The template of the master document will be provided on the ASFINAG website.

To reduce the uncertainties, it is planned to provide also templates for selected annexes to the safety documentation. With such standardization, it is much easier to guide the originator of the safety documentation and to minimize misinterpretations of the guideline.

3.5. Additional documents

The most important elements for tunnel safety are documented in the master document and the annexes to the safety document. However in the approval procedures, additional information must be provided to the Administrative Authority and the safety expert in charge. These additional documents have also been defined in the new version of the guideline (chapter 12). However, in order to keep the safety documentation as lean as possible, these additional documents are not part of the tunnel safety documentation.

4. MODIFICATIONS COMPARED TO THE OLD GUIDELINE

Some of the major changes compared to the previous guideline have already been mentioned (list of annex documents and list of additional documents, templates). Some other important modifications are described below.

4.1. Deviations from the state-of-the-art

Existing tunnels often show deviations from the actual state-of-the art. Guidelines normally allow such deviations in existing tunnels as an upgrade is often possible only at excessive costs (principles of proportionality). To make these deviations transparent, a special subchapter is foreseen in the safety documentation.

4.2. Instrument to categorize tunnels with or without special characteristics

When a tunnel has a special characteristic with respect to the parameters mentioned in the annex of the STSG, a risk analysis shall be carried out to establish whether additional safety measures and/or supplementary equipment is necessary in order to ensure a high level of tunnel safety. In the past, the check if a tunnel has special characteristics has often been mixed up with the check if the minimum safety requirements defined in the annex of the STSG are fulfilled. Therefore, a simple instrument has been developed to categorize tunnels with/without a special characteristic. The instrument uses the 16 safety parameters mentioned in the annex of the STSG.

4.3. Periodic update of the safety documentation

According to §4(3) of the STSG, the safety documentation has to be kept permanently up-to-date. In the new guideline, the periods in which an update is necessary have been defined.

4.4. Additional notes

At the end of the guideline, some additional notes can be found:

- Guidance for the case that during a project new guidelines are introduced.
- A chronological sequence for a procedure according to §8 STSG: The sequence shows in an exemplary way the interaction and interdependence between the preparation of the tunnel safety documentation with the corresponding administrative steps and the still on-going finalisation of the construction, the installation and the tests of the electromechanical equipment.

5. CONCLUSIONS

The administrative procedures, especially the procedure to put into operation new or refurbished tunnels, normally have to be accomplished at a tight time schedule. It is therefore crucial that the tunnel safety documentation and the additional documents needed by the Administrative Authority are complete and of good quality. The new guideline for the preparation of the tunnel safety documentation aims at supporting this process and thus helps in speeding up the administrative procedures and making them more efficient. At the same time, it defines the standard for documentation, which can be used by the safety officer and the tunnel management as a tool in the daily work.

The new guideline is available at the website of the bmvit. To facilitate the preparation of tunnel safety documentations and to improve their quality, templates will be produced and made available in the near future for the public.

6. LITERATURE

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