

1. Background

Due to many developments in tunnel design in Australia over a period of many years, the Australian Tunnelling Society (ATS) has recognised the requirement to establish a guideline of tunnel design practice in Australia. Within its member base the ATS has experienced individual and corporate members that can contribute to the development of this design guideline.

Tunnelling involves an intricate interaction between ground and structure, where the former acts simultaneously as load and bearing element. Tunnelling activity has been sparse in Australia until recent times, and tunnel design is not covered in Australian undergraduate courses and rarely offered at post-graduate level. In addition, many current specifications do not include tunnel specific requirements that are important for tunnel design. The shortfall leads to the risk that inappropriate design standards are used in tunnel design in Australia.

During the Tunnel Design Short Course in 2018 held in Melbourne, the ATS Young Members recognised this deficiency and suggested a Working Group to develop a best practice guideline for Australian tunnel design. Supported by the ATS executive committee, the Young Members intend to deliver this guideline through the year 2019.

The working group recognises that the scope of this tunnel design guideline is potentially quite large, and needs to be limited to a workable size initially. This guide will reflect the experience of the ATS and best current design practise and where applicable and possible will reflect Australian and International standards. Changes to the guideline will continue to occur throughout its development and with this is the opportunity to revise and improve this guide. If the first edition is successfully received, subsequent expanded editions may be considered.

2. Purpose

The Tunnel Design Working Group was formed to collaboratively develop a best practice tunnel design guideline for the specific use for Australian tunnels.

This design guideline is intended to:

- Define the fundamental principles that need to be understood in tunnel design including differences between soft-ground and hard-rock tunnelling and the relevance of the construction stage as an inherent part of the design process
- Describe the more common approaches used in the industry and outline best practices in each area
- Generate a forum for continued discussion and improvement in tunnel design in Australia
- Supplement Australian Standards, International Tunnelling Association (ITA) and other design guides and codes where tunnel discipline items specific to Australian tunnel design are required.

Tunnelling, more than most other disciplines, involves many factors outside those related to ground excavation and support. These factors include:

- Construction methodology,
- Risk assessment and control,

- Contractual types,
- Mechanical and electrical requirements.

The first version of the proposed guideline will not necessarily focus on these aspects, only addressing their relation to the covered topics as considered necessary.

3. Role and Objectives of the Working Group

The Tunnel Design Working Group will work to:

- Provide a collaborative forum for compiling information about tunnel design methods commonly used in Australia i.e. rock classification, structural design methods, etc.
- Identify areas where methods are deficient or incomplete and address areas where further development is desirable
- Share findings with and consult Stakeholders (Road and Metro Authorities, Contractors, Consultants, Suppliers, and other related technical committees such as AuSS) to produce a final design guide accepted by the whole industry
- Produce a 'Best Practice Guideline' for the design of tunnels in Australia which will be of use for designers in Australia

4. Management

The Tunnel Design Working Group shall be a technical working group under the Australian Tunnelling Society.

The Working Group seeks:

- Access to the ATS Executive such that decisions are made in a timely manner that enables the Working Group to discharge its duties
- Seek approval of expenditure associated with executing activities
- Peer review and consult to ensure the design guide reflects best current practise

5. Membership

Membership shall include professionals with design and or construction tunnelling experience on tunnel projects in Australia. The Group aims to have a mix of young engineers, accountable for the delivery of different sections of the guideline, and engineers in senior leadership positions to provide guidance through extensive national and international experience. In addition, each young engineer shall identify a reviewer within their organisation. These reviewers may not be members of the Working Group itself. However, their contributions may be acknowledged in any publications produced by the Working Group. All working group members must be individual or corporate members of the Australian Tunnelling Society.

The membership is capped at 20 participants, unless otherwise agreed by the Working Group. Membership includes those listed in Attachment 1. An interim Chair is nominated for the first 12-months. If the Working Group continues after 12 months, a rotating Chair is proposed to lead the Working Group for 12-months periods as voted by the Working Group.

6. Role of Individual Group Members

The role of individual members includes:

- Attending regular meetings and actively participating
- A genuine interest in the initiative and the outcome pursued by the Working Group
- Being committed to and actively involved in pursuing the Working Group's outcomes
- Representing the interests of everyone involved in or effected by the tunnelling industry in a professional and responsible manner

The role of the Chair includes:

- Coordinate meetings
- Document the outcome of meetings through preparation and distribution of minutes
- Develop meeting agendas for each meeting and distribute to WG members to enable adequate preparation time
- At a minimum, the meeting agenda shall include a review of the progress status towards the achievement of defined milestones
- Preparation of summary reports to the ATS Executive

7. Frequency of Meetings

The Tunnel Design Working Group will meet on a monthly / bi-monthly basis via Skype in accordance with the Agenda shown in Attachment 2.

Attachment 1: Tunnel Design Working Group Members

Name	Affiliation	Position	Company
Working Group Members			
Simon Brinkmann	ATSym	ATS Young Members Representative, Chair, 2019	Mott MacDonald
Aaron Lippett	ATSym	ATS Young Members Representative	Aurecon
Renee Shi	Melbourne Metro	Tunnel Engineer	WSP
Geoffrey Chan	WestConnex M4-M5	Tunnel Engineer	Jacobs
Brodie Aitchison		Tunnel Engineer	Aurecon
Working Group Affiliates and reviewers			
Harry Asche	ATS	ATS National Committee Representative	Aurecon
Alexandre Gomes	ATS	Vice President ITA	SMEC
Diane Mather	ATS	ATS National Chair Queensland	
David Oliveira	ATS	ATS NSW Chapter Representative	Jacobs

Attachment 2: Agenda

Task	2019											
	January	February	March	April	May	June	July	August	September	October	November	December
Assignment of committee	All											
Collection and review of existing guidelines	YM											
Summary of common tunnel design methods in AUS	YM											
Definition of target product (e.g. chapters)		All										
Development of draft document*						YM						
Review of draft document									Specialists			
Development of final document										YM		
Review of final document											Specialists	
Submission'												All
<p>* Assign Young Members (YM) to the chapters of the target product Every YM will have a reviewer within their company for a first round review before submission to Working Group reviewers (here: Specialists)</p> <p>- Red vertical lines indicate meetings</p> <p>End of February: Kick-off Meeting</p> <p>End of March: Discuss YM- review of table of content / confirm ToR</p> <p>End of April: Progress update on table of content</p> <p>End of May: Assign chapters to YM and identify their internal reviewers</p> <p>End of July: Progress update on development of draft document / chapters</p> <p>End of August: Completion of draft - handover to Specialists to review (not necessarily a meeting)</p> <p>End of September: Completion of Specialist review / discuss further steps</p> <p>End of November: Discuss final comments (celebrate successful outcome)</p>												