

## OVERVIEW OF THE REVISION OF AS/NZS 2107

Marion Burgess<sup>1</sup> and Norbert Gabriels<sup>2</sup>

<sup>1</sup> School of Engineering and Information Technology,  
The University of New South Wales, Canberra, 2600, ACT, Australia  
Email: [m.burgess@adfa.edu.au](mailto:m.burgess@adfa.edu.au)

<sup>2</sup> Gabriels Environmental Design,  
Perth, WA

### Abstract

On behalf of its members, the Australian Acoustical Society was the lead organisation in the application to Standards Australia in 2013 for a project on the review of AS/NZS 2107 “Acoustics—Recommended design sound levels and reverberation times for building interiors”. The basis of this request was that the version from 2000 needed updating to revise the text, include more spaces relevant to the current building designs, remove spaces that are no longer relevant and revise the levels for both design sound levels and reverberation times. The project was approved by Standards Australia and the committee commenced the work. A draft was sent out for public review and almost 500 comments were submitted highlighting the importance of this standard to the acoustics community in Australia and New Zealand. Many of these comments were common indicating that discussion on the draft had been undertaken by groups; another good sign. A two day meeting was held in March 2015 for the committee to go through the comments and amend the draft as necessary to produce a final version. The revisions aim to maintain the same intent for what is clearly a well-respected and important document. In this paper an overview will be provided of the process and changes that have been made in the standard.

### 1. Introduction

In recent years the members of the Australian Acoustical Society (AAS) and of the Association for Australian Acoustical Consultants (AAAC) have been concerned about the need for revision of AS/NZS 2107-2000 “Acoustics—Recommended design sound levels and reverberation times for building interiors” [1]. This standard is within the remit of Standards Australia Committee AV 004 ‘Acoustics Architectural’ with the chair Norbert Gabriels. From general discussions it was identified that the standard did not need a major rewrite but did need revision in order to update and to revise the text, include more spaces relevant to the current building designs, remove spaces that are no longer relevant and to revise the levels for both design sound levels and reverberation times. In this paper we summarise the process to initiate and implement the review as well as overview the main changes.

## 2. Background

The preface of Australian Standard, AS/NZS 2107-2000 [1], states:

*The objective of this Standard is to provide methods for the measurement of compliance in terms of background noise and reverberation times. It recommends design criteria for conditions affecting the acoustic environment within occupied spaces.*

The standard provides a list of design noise levels and reverberation times for various areas of occupancy within buildings. As such it is a valuable reference as well as a compliance document for those involved with ensuring acceptable acoustic environments within spaces in buildings. It is also referred to in other Australian Standards, for example aircraft noise [2] and in regional compliance limits for internal noise levels, for example NSW Industrial Noise Policy [3]. It is important to remember that the noise levels and reverberation times in the document relate to the “space unoccupied but ready for occupancy”.

Under the current administration policy of Standards Australia, in order to initiate the process for introducing a new standard, updating of an existing AS or AS/NZS or adopting an ISO standard it is necessary to seek approval for the creation of a project. The applications for projects are called twice per year and then considered in the policy priority decision making process. In 2013, a project for the revision of AS/NZS 2107-2000 was submitted officially by the Australian Acoustical Society. The application for revision of a standard requires evidence of the need and a clear statement of the limitations for the revision. It is also necessary to demonstrate the net benefit and that the revision will still harmonise and align with existing documents. The real chore is getting comprehensive evidence of stakeholder support for revision of the standard. This involves approaching a range of organisations from each of the “stakeholder groups” defined by Standards Australia. These include; Research and academic organisations, Consumer interests, Government organisations, Regulatory and controlling bodies, Technical associations, Professional associations, Manufacturers’ associations, Suppliers’ associations, User and purchasing bodies, Testing bodies, Auditing bodies, Certification bodies, Employer representative bodies, Unions and employee associations and Independent. As this is an AS/NZS it was also necessary to obtain support from New Zealand.

The application was prepared by Marion Burgess and Norbert Gabriels. The approval was received in late 2013 and the work commenced on the project in 2014.

## 3. First Stage

The approval of a project triggers the administration requirements from Standards Australia. This traditionally starts with a confirmation of the members of the committee and an initial meeting. We made the case that the members of the committee were very familiar with AS/NZS 2107 and the general need to revise and were able to use email communications for those early administrative requirements.

Then the first task was to work through the current document to propose the initial revisions. When doing this it was important to keep in mind and stay within the approved scope for the project:

*“include revisions of text, mainly in accordance with modern measurement techniques, and updating of the tables to include additional “areas of occupancy” categories as relevant to current building designs and clarify technical aspects of the measurement of noise levels and reverberation times.”*

This first revision was distributed to the committee members for additional comments. Once these had been received and incorporated into the draft it was sent out for public comment.

## 4. Public Review Comments

There had been discussion in the acoustics profession about the need for a revision of AS/NZS 2107 for some time. The requests for support from the stakeholders during the application stage had also alerted organisations of the imminent review of this well used document. In addition to the advertising

by Standards Australia, the public review period was advertised by the AAS and related organisations. Some AAS and AAAC groups arranged a meeting to discuss and nominate one person to provide a combined consensus comment.

Much to the annoyance of some, there is a formal process to go through to access the draft document and then to provide comment. This involves registration, downloading the document and then uploading comments using in the specified format. This format requires completion of each column including: paragraph number, comment type, page number, comment detail and proposed change. For the committee reviewing the comments, the most relevant is the explanation of why a further change to the draft out for public review is needed and what that change should be.

Despite the process being a little daunting, close to 500 comments were received - suspected to be a record for an acoustics standard. On a quick scan through them it became apparent that many of the comments were similar and indeed some were identical. On the one hand this was good for it indicated that there had been discussions, that the comments were well considered and that a number of people were of the same opinion regarding changes in the draft. On the other hand it was a time consuming chore to go through all the comments, read them carefully to identify those that were proposing the exact same change. It was only in this way that the list of comments for the committee to consider could be brought down to a manageable number. With this experience we will propose that Standards Australia review the submission process to allow for group submissions to be identified as such and hopefully reduce the current perception that multiple identical submissions will result in a higher chance of the comment being accepted.

Once the listing of comments had been culled, a one and a half day meeting of the AV 004 committee was convened in mid-March 2015 to work through all the comments and agree on the appropriate actions. While most decisions were made during this committee meeting, there were some that required work by the committee members to be done after the meeting. With so many comments, the revision and production of the final version by the committee has taken a little longer than hoped. This version then needs the extensive editorial processing from Standards Australia before a publication is released but that should happen in 2016.

## **5. Summary of changes**

The review provided the opportunity to correct some of the terminology that had crept into the standard. This included a change from the use of “occupied spaces”, which has caused confusion as the design levels apply only when the space is unoccupied, to ‘building interiors’. Another terminology change was from ambient to the consistent use of background to describe the design levels.

The primary value of AS/NZS 2107 has been the extensive listing of “Recommended Design Sound Levels and Reverberation Times”. This table listing had two numbers; one identified as satisfactory and one as maximum. While acousticians understand the reason for this range and can apply appropriately, this has caused problems with meeting compliance for specifications when one or the other has become the mandatory compliance level. So the change for the public comment draft was to replace these two terms with only the word ‘range’. This gave the added benefit that it encouraged appreciation that there was not a single ‘magic’ noise level for the different areas within buildings. The public review comments were mainly in support of this approach and many of them proposed an extension to simply give an upper level for some uses. So, for example the range for an Undercover Carpark was listed as 55 to 65 dBA. The questions then became: what was the justification for setting a lower level of 55 dBA for a carpark and would there be the problem if the noise level in the carpark was less than 55 dBA? For this sort of space there was support for simply giving a recommendation that the level should be less than 65 dBA.

It was agreed however that this approach was not relevant to all spaces and a lower end to the range should apply to uses where acoustic privacy was a relevant consideration. These include meeting rooms, office areas, consulting rooms, sleeping areas etc. The committee worked through the list of uses and applied this approach to the draft; for example while the range for a ‘sleeping area’ in an inner city hotel remained as 35 to 40 dBA, for a ‘bar’ the range of 45 to 50 dBA was changed to be just <50 dBA.

During the meeting the committee members considered each of the spaces and with reference to their experience plus other national and international guidance reference material agreed to propose some changes. These included changes to the design sound levels for the listed spaces, introduction of new spaces (eg open plan office) and deletion of some spaces no longer considered relevant (eg draughting offices). Some new relevant spaces were proposed and further suggestions were made during the public review. Examples of these new spaces included residential aged care facilities, sports club function room, change room etc.

The focus on the use of the standard has been the list of design sound levels but it also includes the design reverberation times for many spaces. There were less public comments on these ranges but during the committee discussion it became clear that for many of these a similar approach could be taken and provide only a “less than” value for guidance. However for some spaces it was considered important to include a range; for example hotel “bars and lounges” the range remains as 0.6 to 1.0 sec and 0.2 to 0.4 sec for a “voice over booth”. For some spaces, for example airport departure lounges, it was agreed that the comment should simply be “as low as possible”. As the appropriate reverberation time for some types of space relates to the room volume, the Appendix of AS/NZS 2107 has included a chart presenting reverberation time versus room volume for speech and music purposes. It was flagged in the draft for public review that this chart needed revision. Some suggestions were made for alternative charts and the committee eventually selected one for inclusion but still only as an Appendix to the standard.

A number of public comments proposed to introduce a section on ‘sound masking systems’. While the reason for this recommendation was appreciated, the inclusion of this would be an entire new section. Thus it was outside the specified scope of AS/NZS 2107 thus not considered as part of the review and could not be included. However the revision has included updates of the section of acoustic masking, highlighting the potential disadvantage of specifying noise levels below the lower end of the range and additional comments on spectral imbalance.

## 6. Conclusion

The revision of AS/NZS 2107-2000 has been an identified need by acousticians for some years. The AAS was the applicant to Standards Australia to approve this project. Once approved, the major work on the draft revision was undertaken by the committee. The strong response during the public review period indicated the importance of this standard and need for the revision. The revised version should soon be released and contains updating to revise the text, the addition and removal of spaces relevant to the current building designs, as well as revisions to some of the levels for both design sound levels and reverberation times. Taking on the formal application to Standards Australia is one way that the Australian Acoustical Society demonstrate action to represent the membership.

## Acknowledgements

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## References

- [1] Standards Australia, AS/NZS 2107 2000. *Acoustics—Recommended design sound levels and reverberation times for building interiors*. Standards Australia, Sydney, AUS, 2000
- [2] Standards Australia, [AS 2021:2015](#). - *Aircraft noise intrusion - Building siting and construction*. Standards Australia, Sydney, AUS, 2015
- [3] Environment Protection Authority, NSW, Industrial Noise Policy, NSW Government, AUS 1999