Acoustics Standards Activity In Canada
2006 Update And Invitation To Participate

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ABSTRACT

This article is an update for 2006 of Acoustics Standards activities in Canada, especially those of the Canadian Standards Association. CSA currently has 10 Acoustics Standards and three more with significant acoustics content. Over five times that number of international acoustics standards have been reviewed and endorsed in a new Canadian Standard, Z107.10. This innovative standard streamlines the process whereby CSA endorses standards from other organisations, such as ANSI and ISO, which have been found suitable for use in Canada. Canadian acousticians are invited to contact the author to become more involved with the many acoustics standards activities currently underway in Canada and on behalf of Canada around the world.

SOMMAIRE

Cet article est une mise à jour des activités de normalisation en acoustique au Canada pour 2006, spécialement celles de l'Association canadienne de normalisation (ACNOR). L'ACNOR a présentement dix normes acoustiques et 3 autres comportant un contenu acoustique important. Plus de cinq fois ce nombre de normes acoustiques internationales ont été revues et sont endossées dans une nouvelle Norme Canadienne, Z107.10. Cette norme innovatrice améliore le processus par lequel CSA approuve des normes des autres organisations (par exemple ANSI ou ISO) comme étant acceptable pour une utilisation au Canada. Les acousticiens canadiens sont invités à contacter l'auteur pour s'impliquer dans les nombreuses activités en rapport avec les normes acoustiques actuellement en cours au Canada et au nom du Canada partout dans le monde.

1. INTRODUCTION

The major goals of this article are to inform Canadian acousticians of progress in Canadian Standards activities and to invite those who are interested to become more involved with these activities. Participation is one of the best ways to stay in touch with this fast moving field and an excellent way to meet those who are leading it in many fields. Any acoustician interested in becoming involved with Acoustics standards in Canada is invited to contact the author or any of the subcommittee chairs. Most chairs welcome newcomers willing to work and the work need not involve a lot of time. The following will give an overview of the areas involved.

Canadian Standards Association (CSA) Technical Committee Z107 – Acoustics and Noise Control and its subcommittees look after all but one of the 10 Canadian Acoustics Standards (the exception is Z94.2 Hearing Protection Devices, which has its own technical committee). Z107 also coordinates all Canadian acoustics standards activity, with representatives from Z94.2 and from Canada's international standards advisory committees providing liaison to their activities. It also reviews international standards and endorses those found relevant and useful for Canada

2. Z107.10 OMNIBUS STANDARD

The most important progress made by Z107 in 2006 is the publication of Z107.10, Guide for the Use of Acoustical Standards in Canada, a new omnibus standard by Cameron Sherry and his Editorial Subcommittee. The standard summarises all acoustics standards for which Z107 has an interest, including CSA standards, and those ISO, ASTM, ANSI and IEC standards that Z107 considers of importance to Canada. This gives the reader a single source for information relating to Acoustics standards of interest to Canada, including those referred to by regulations and guidelines within Canada. Given the speed with which ISO and other groups are changing standards, this new approach is not only convenient, it is essential and the intent is to issue revisions annually.

Z107.10 is an important innovation in standards review in Canada. For many applications there is no need to write a Canadian Acoustics Standard. Many international standards are well written by highly qualified technical committees and their use here helps simplify communication with international acousticians and acoustics done in Canada by global organisations.

Until now, standards from outside Canada were either endorsed or adopted singly, a time consuming process whereby each standard was reviewed and balloted and in some cases

published with small changes required for the Canadian context. The new standard streamlines this process considerably and is the first of its kind in Canada, addressing an important need in allowing Canadian users more ready access to Acoustics standards around the world.

An example will give an idea of what the standard contains:

> ASTM E492, Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine
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> This test method covers the procedures for laboratory measurement of impact sound transmission of floor-ceiling assemblies, using a standardized tapping machine. It is assumed that the test specimen constitutes the primary sound transmission path into a receiving room located directly below. Measurements may be conducted on floor-ceiling assemblies of all kinds, including those with floating-floor or suspended ceiling elements, or both, and floor-ceiling assemblies surfaced with any type of floor-surfacing or floor-covering material. The corresponding single-figure rating is the impact insulation class (IIC), which is determined according to ASTM E989.
>
> Architects, builders, and code authorities can use the IIC rating for acoustical design purposes, to specify the attenuation of sound from impacts due to footsteps for specific building constructions. The use of IIC to define the required impact sound insulation is recommended in the National Building Code of Canada, but is not mandatory.

This example shows an entry for an ASTM standard endorsed for use in Canada. It describes the standard, its results and the relevance in a Canadian context.

3. COMMITTEE ACTIVITIES

3.1 Z107 Acoustics and Noise Control

The Z107 main committee meets once a year, during the Canadian Acoustics Week. Its executive, consisting of all the subcommittee chairs and representatives of other committees, meets in the spring, either in person of by teleconference. Most other work is done by e-mail. The main committee reviews progress by each subcommittee and votes on any new work proposals. The main committee is also the last technical hurdle for a standard before CSA editors put it into final form. The steering committee, to which the main committee reports, approves work and reviews completed standards; however they cannot make technical changes.

The main activities are within the Z107 subcommittees, which are responsible for the following standards:

Hearing Measurement, chaired by Alberto Behar, responsible for CAN3-Z107.4-M86 Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening and CAN/CSA-Z107.6-M90 Pure Tone Air Conduction Threshold Audiometry for Hearing Conservation

Vibration, chaired by Tony Brammer, provides liaison between Z107 and the Technical Advisory Committee of Standards Council on ISO standards on vibration. Tony is active on the ISO group for ISO 2631, the definitive standard on measurement of whole body vibration.

In 2005, the most active subcommittee, **Industrial Noise**, was split into two separate subcommittees, Occupational Noise and Environmental Noise, splitting up the workload and allowing each to focus on different issues. The latter subcommittee is also incorporating the Transportation and Powered Machinery subcommittees and their standards.

Occupational Noise, chaired by Stephen Bly, is responsible for the following standards :

- **Z107.52-M1983** (R1994) Recommended Practice for the Prediction of Sound Pressure Levels in Large Rooms Containing Sound Sources. This standard is in need of major updating and a chair is being sought to do this work. The intent is to provide guidance to Canadian industry on how to design quiet plants. It is seen as building upon Z107.58, which provides advice on buying quiet equipment.
  Z107.56-06 Procedures for the Measurement of Occupational Noise Exposure. A new version was publisahed in 2006. It is referenced in Federal and some provincial regulations and has been updated by a working group chaired by Alberto Behar. The new version strongly recommends use of the 3 dB exchange rate, but equations for a 5 dB exchange rate are still provided to be useful to Ontario and Quebec, although their use is discouraged.
- **Z107.58-2002** Noise Emission Declarations for Machinery was written by a group chaired by Stephen Bly and was published3 in 2002. It became a National Standard of Canada in 2003 It is a voluntary guide on noise emission declarations for machinery to be used in Canada and is compatible with European regulations to allow Canadian machinery to be sold into that market. It is intended to help Canadian companies to purchase quieter machinery and plan noise control strategies. It does so by enabling manufacturers to formally provide sound-level data in an agreed format.
  A Noise Emission Declaration is a statement of sound levels produced by equipment, which would usually be included with the instruction or maintenance manual and in technical sales literature. Measurements are made according to ISO standards and include estimates of the likely variability of the measurements. Canada recommends use of either a declaration stating the level and uncertainty as two numbers, or adding them together into a single number.

In addition, the Occupational Noise subcommittee undertakes reviews of proposed federal and provincial regulations, often at the request of the regulators, and other activities affecting industrial noise. Recently a group from the subcommittee met with Ontario regulators considering a new occupational noise regulation. They strongly agreed with the proposal to use a 3 dB exchange rate and suggested Ontario follow the lead of Z107.56 in not having a separate limit for impulse noise. For a more detailed discussion of this issue, see Reference 4, by the author.

Environmental Noise, chaired by Bill Gastmeier is taking over responsibility for standards which have been part of Industrial Noise, Transportation Noise and Powered Machines. These include:

- **Z107.53-M1982** (R1994) Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Activities. This standard is in the process of being replaced with the new ISO1996 series, which were the last ISO Acoustics standards endorsed separately, before Z107.10 took over that role. A group centred on the Ontario MOE have been looking at using ISO 1996 to assess community noise[1, 2].
- **CAN3-Z107.54-M85** (R1993) Procedure for Measurement of Sound and Vibration Due to Blasting Operations. A working group, chaired by Vic Schroter, is revising this standard.
- **CAN/CSA-Z107.55-M86** Recommended Practice for the Prediction of Sound Levels Received at a Distance from an Industrial Plant. A joint CSA/ANSI working group co-chaired by Rich Peppin and Tim Kelsall is looking at ISO9613. This standard was originally written by an ISO working group chaired by Joe Piercy of NRC. It may ultimately replace or become the basis for a revised version of Z107.55, however the group has identified a number of shortcomings which need to be addressed.
- **CAN/CSA-Z107.9-00:** Standard for Certification of Noise Barriers. This standard is an adaptation of the Ontario MTO Highway Noise Barrier specification. It provides municipalities, developers, road and highway departments, railways and industry with a standard specification which can be used to define the construction of barriers intended to be durable enough for long term use in Canadian conditions.
- The US Department of Transportation, Federal Highway Administration, "Highway Noise Barrier Design Handbook" is already harmonized with the CSA standard, as is the Ontario Provincial Standard, and numerous US state transportation agencies, making this the de-facto standard for barriers across North America.

The subcommittee incorporates the Transportation and Powered Machinery subcommittees and their standards and is looking toward adopting the ISO Standard for the measurement of noise emitted by Wind Turbines.

Editorial, chaired by Cameron Sherry, (which reviews all proposed standards) and is responsible for reviewing and endorsing ANSI S1.1-1994 Acoustical Terminology. They recently reviewed the latest revision to Z107.56. In addition, they will have ongoing responsibility for updating the omnibus standard Z107.10 using input form each subcommittee. Cameron is actively looking for new members to assist in this work and can be contacted directly or through the author.

Z107 also has subcommittees providing liaison with international standards activities, specifically steering committees in Building Acoustics, Instrumentation and Acoustics and Noise. These Steering committees are run by the Standards Council of Canada and are harmonised with the Z107 committee to which they report regularly on progress. Draft international standards are provided on a private website to which steering committee members have access in order to review them and recommend Canada's position.

Building Acoustics, chaired by David Quirt, does not have its own standards, but reviews other standards from a Canadian viewpoint, mostly from ASTM and ISO. They review endorsed standards on building acoustics (a large part of the current Z107 list) and prepare appropriate entries for the new Z107 omnibus document as well as providing liaison with ASTM and ISO building acoustics activities.. David Quirt is chair (and Z107 liaison) of the Standards Council of Canada Steering Committee for ISO TC 43 SC2, Building Acoustics.

Instrumentation and Calibration: George Wong, is the chairman (and the CSA liaison) for the Standards Council of Canada Canadian Subcommittee of IEC/TC 29: Electroacoustics. This group deals with all instrumentation pertaining to acoustical measurements, such as WG 4: Sound level meters; WG 5: Microphones; WG 10: Audiometers; WG 13: Hearing aids; WG 17: Sound calibrators; WG 21: Ear simulators; and maintenance teams (MT) MT19: Filters; and MT20: Hearing aids induction loops. All of the above international Working Groups have Canadian members.

Liaison with the Canadian Steering Committee for ISO TC43 (Acoustics) and TC43(1)(Noise), chaired by Stephen Keith who provides Canadian comments, votes on ISO standards and coordinates the work of Canadian representatives on several ISO working groups. This group deals with ISO Standards on measurement and assessment of sound and hearing, such as WG 17: Hearing protectors WG28: Machinery noise emission standards (referenced in CSA Z107.58) WG 40: Impulsive sound propagation for environmental noise assessment, WG 45: Acquisition of data pertinent to land use, and WG 53: Occupational Noise Exposure. All of the above international Working Groups have Canadian members.

All these groups are always interested in new members willing to work.

3.2 Z94 – Hearing Protection

The second CSA Acoustics Standards Committee, Z94 is responsible for a single standard, the Hearing Protection Standard Z94.2 which defines Type A, B, and C type hearing protectors and is widely referred to in Canadian occupational noise regulations. They have recently approved a major new version of this standard in light of changes to the ANSI hearing protector standards and procedures. This will mean the introduction of user-fit hearing protector measurements, similar to those used by ANSI and now recognized as being more representative of how hearing protectors are used in practice than the old technician-fitted testing methods. This standard also has extensive information for users on how to select and use hearing protection.

4.0 CANADIAN ACOUSTICS STANDARDS

The following list shows all the Canadian Standards currently in force and also lists three standards with significant acoustical content. The list may also soon be found at the CAA website and will be kept up to date there. Meanwhile the list can be found at http://www.csa-intl.org/onlinestore/GetCatalogDrillDown.asp?Parent=430

There are also 24 acoustics standards from ANSI, ISO and ASTM endorsed by Canada.

CAN3-Z107.4-M86 Pure Tone Air Conduction Audiometers for Hearing Conservation and for Screening / Audiomètres tonals à conduction aérienne pour la préservation de l'ouïe et pour le dépistage

CAN/CSA-Z107.6-M90 Pure Tone Air Conduction Threshold Audiometry for Hearing Conservation

CAN/CSA-Z107.9-00: Standard for Certification of Noise Barriers

Z107.10 Guide for the Use of Acoustical Standards in Canada.

Z107.52-M1983 (R1994) Recommended Practice for the Prediction of Sound Pressure Levels in Large Rooms Containing Sound Sources

Z107.53-M1982 (R1994) Procedure for Performing a Survey of Sound Due to Industrial, Institutional, or Commercial Activities (soon to be replaced by ISO 1996).

CAN3-Z107.54-M85 (R1993) Procedure for Measurement of Sound and Vibration Due to Blasting Operations / Méthode de mesure du niveau sonore et des vibrations émanant des opérations de dynamitage

CAN/CSA-Z107.55-M86 Recommended Practice for the Prediction of Sound Levels Received at a Distance from an Industrial Plant / Pratique recommandée pour la prévision des niveaux sonores reçus à une distance donnée d'une usine

Z107.56-06 Procedures for the Measurement of Occupational Noise Exposure / Méthode de mesure de l'exposition au bruit en milieux de travail

Z107.58-2002 Noise Emission Declarations for Machinery

Z94.2-02 • Hearing Protection Devices - Performance, Selection, Care, and Use / Protecteurs auditifs

Standards with Acoustics Component:

Z62.1-95 Chain Saws

CAN/CSA-Z412-M00 Office Ergonomics / L'ergonomie au bureau

CAN/CSA-M5131-97 (R2002)Acoustics - Tractors and Machinery for Agriculture and Forestry - Measurement of Noise at the Operator's Position - Survey Method (Adopted ISO 5131:1996)

Endorsed Standards

53 standards are listed in Z107.10.

5.0 REFERENCES

1. C. Krajewski, Rating Sound Level- An Overview of Amendment 1 to ISO 1996-2, Canadian Acoustics, Volume 29, No. 3, September, 2001.
2. William J. Gastmeier and James L. Fielders, ISO 1996 Acoustics – Description and Measurement of Environmental Noise Round Robin Testing, Canadian Acoustics, Volume 29, No. 3, September, 2001 presented at CAA Conference 2001.
3. Stephen Keith, Stephen Bly, Tim Kelsall, A preview of the Draft CSA Guideline – Noise Emission Declarations for Machinery, Canadian Acoustics, Volume 29, No. 3, September, 2001.
4. Kelsall, Tim, Impulse Measurement Considerations in Setting Occupational Noise Criteria, Canadian Acoustics, Canadian Acoustics, Volume 34, No. 3, September, 2006