ACTIVITIES OF ISO TC43/SC1 "NOISE", WG19, "OCCUPATIONAL NOISE"

D.A. Benwell
Non-Ionizing Radiation Section
Radiation Protection Bureau
Environmental Health Directorate
National Health and Welfare
Ottawa, Ontario

Abstract

The revision of ISO 1999 (1975) "Assessment of occupational noise exposure for hearing conservation purposes" is described. The revised document ISO/DIS 1999 (1982) provides criteria that are as accurate and as practically useful as possible. The various features of this standard and its limitations are discussed. A new standard presently being drafted by the working group, "Guidelines for the measurement and assessment of exposure to noise in the working environment", is also described and related to current Canadian work on a C.S.A. standard for noise exposure measurement.

Sommaire

La révision de la norme ISO 1999 (1975) "Estimation de l'exposition au bruit durant le travail en vue de la protection de l'audition" est présentée. Le document révisé ISO/DIS 1999 (1982) fournit des critères qui sont aussi exacts et utiles que possible. Les diverses caractéristiques de cette norme et ses limites y sont étudiées. Une nouvelle norme actuellement rédigée part le groupe de travail, "Lignes directrices pour la mesure et l'évaluation de l'exposition au bruit dans le milieu de travail", est également présentée et mise en rapport avec les travaux canadiens actuels sur la norme de l'ACNOR pour la mesure de l'exposition au bruit.

1.0 INTRODUCTION

The activities of WG19 "Occupational Noise" are described from its inception to date in order to demonstrate the way in which ISO standards are formed and also to follow the development of an international occupational noise standard of importance to Canada. The background and progress of the revisions to ISO 1999 (1975)[1] and the present document (which should shortly go to press), are described. A description of the background, progress and contents of a new standard on guidelines for the measurement and assessment of exposure to noise in the working environment is given and is related to current Canadian activities.

2.0 REVISION OF ISO 1999 (1975)

2.1 Background

International Standards Organization (ISO) Technical Committee (TC) 43 Sub Committee (SC) 1 decided to set up Study Group D in 1976 in Gaithersburg, U.S.A.

This Study Group had the task of considering a possible revision to ISO 1999 and preparing an outline for this. The study group met for 2 days in 1977 and concluded that the new research data which became available in several countries during the latter stages of ISO 1999 development and after its adoption, as well as new instrumentation, made a revision of ISO 1999 highly desirable if not mandatory[2]. The study group went on to state that in the light of more recent data the 1975 standard tended to over estimate the risk of hearing impairment and that this should be corrected. In addition the definition of normal reference population serving as a basis for the standard should be more carefully defined. Finally the study group stated a preference for the revised standard to predict hearing impairment only, and to leave the definition of risk and handicapped disability to the individual countries or common language groups. The study group reported these findings to ISO/TC43/SC1 at their Vienna meeting in 1977 resulting in a resolution passed by the committee: to set up a Working Group 19 "Assessment of occupational noise hazard".

2.2 Progress of Document

The first meeting of Working Group 19 was held in 1978 with the author representing Canada. The scope of the working group was: "the formulation of methods for the assessment of occupational noise exposure for hearing conservation purposes". A number of background documents were considered at this time[1-8] including 3 reports from the National Physical Laboratory in the U.K., a report from the Netherlands TNO institute, and a report by Dr. D.L. Johnson (U.S.A.) which was published in 1978[8]. An outline for the revised document was prepared and tasks were assigned to various working group members, the author preparing the first draft of Clause 6: "Methods of Hazard Assessment".

From these documents a first draft for a revision of ISO 1999 was prepared in August 1979 and discussed at the second working group 19 meeting. The specific approach to the data incorporated (in graphical form), was based on Dr. Johnson's work[8], with the collaboration of Drs.' Passchier - Vermeer and Robinson. Following discussions and changes made at the working group meeting the First Draft Proposal ISO/DP1999/1 for "Acoustics - Assessment of Occupational Noise Exposure with Respect to Hearing Impairment"[9] was circulated for comment to member bodies of ISO. These comments were discussed at the next working group meeting in July 1980, and incorporated into the text where possible. One of the main decisions to emerge at this stage was the decision to tabulate information using equations and tables instead of graphs.

The next document to be circulated to members of ISO for comment was the layout for ISO/DIS 1999 "Acoustics-Determination of occupational noise exposure and estimation of noise-induced hearing impairment." Following incorporation of member country comments to this, the official draft international standard "ISO/DIS 1999 "Acoustics-Determination of Occupational Noise Exposure and Estimation of Noise-Induced Hearing Impairment"[10], was circulated for vote in April 1982. At this point extensive Canadian comments were offered. These comments primarily reflected the timeliness of simplifying the complicated issue of noise exposure quantities, a subject of controversy and debate for some time. The comments offered a new definition of noise exposure as the time integrated A-weighted squared sound pressure, E_{AT}, in pascal squared seconds x 10^3. This left decibels to unambiguously describe the equivalent A-weighted sound pressure level.

The international voting on ISO/DIS 1999 resulted in 20 countries in favour of the document, 7 countries opposed, with 2 abstentions. Very few of the reasons for disapproval did, however, contest the basic data and procedures of DIS 1999 and it was decided to proceed with publication of the standard. An editorial meeting was held in June 1983 to discuss the extensive comments on the document and a revised draft was produced incorporating most of these comments, including those from Canada. This document was presented to the full Working Group in July 1983, for their discussion and comments and was accepted for submission for publication as amended. The discussion at the plenary session of TC43/SC1, however, resulted in the inclusion of a note referencing the definition of L_{EX}, a term used in DIS 1999 that had since been incorporated into an EEC document.

It is hoped at this stage that the final revised standard ISO 1999 might be published in 1984.

2.3 Description of Revised Document

The revised version of ISO 1999 (198x) is well described by Henning von Gierke in reference 14. He states that it "allows the estimation of the noise-induced permanent threshold shift at all frequencies of interest in populations exposed to daily A-weighted noise exposure levels (L_{Aeq}) from 75 to 100 dB, and exposure durations from 0 to 40 years. Hearing impairment, risks and handicap can then be calculated according to each country's preference and maximum permissible noise exposures, settled upon by administrative decisions based on ethical, economic and political factors".

"An important feature of the approach is that it applies to noise with steady, intermittent, fluctuating, irregular or impulsive character. The latter feature is of particular interest - all impulsive noise is automatically included in the daily noise exposure level as long as the instantaneous sound pressure does not exceed 200 Pa (140 dB re μ 20 Pa). The implications of this recommendation for measuring and monitoring daily occupational noise exposure are obvious. It covers practically the whole range of industrial noise exposures and allows for easy integration of different exposure types and durations"[14].

The revised version of ISO 1999 (198x) contains sections on the description and measurement of exposure to sound, and on the prediction of the effects of noise on hearing threshold. The latter section allows the choice of 2 data bases, the one given in the document based on otologically normal persons (relating to ISO 7029), the other being a set of data collected on a control population not occupationally exposed to noise of the country under consideration (A separate data base for men and women is required unless it can be shown that there are no substantial sex differences). In addition there is a final section on assessment of noise-induced hearing impairment and handicap which outlines the methods by which this might be calculated. Finally an appendix of the document gives an example of the assessment of risk of noise-induced hearing impairment.

3.0 OCCUPATIONAL NOISE EXPOSURE MEASUREMENT DOCUMENT

3.1 Background

ISO/TC43/SC1 resolved at their meeting in 1980 to support a new work item dealing with the description and measurement of noise in the working environment. This decision was supported by the member countries and the task was assigned to WG 19.

3.2 Progress and Description of Document

The new work item was first discussed at the Working Group 19 meeting in Ottawa in 1982, at which time the background documents such as German[11], Canadian[12], and related ISO Standards were considered and a proposed title and list of contents for the new standard were drawn up. This was considered in more detail at the next meeting at which time section 4 was allocated to the German member, and section 5 was allocated to the Canadian member and the introduction, scope and field of application were allocated to the convenor, to draft. These draft documents were discussed at the last working group meeting and the next step is for the convenor to prepare the first draft proposal of the new standard for discussion at the next working group meeting, probably sometime in 1984.

3.3 Current Canadian Activities

The CSA Committee Z107 on Acoustics and Noise Control has a working group on occupational noise exposure measurement. In addition a Working Group on Occupational Noise Exposure and Hearing Conservation (of the Federal/Provincial Advisory Committee on Environmental and Occupational Health), was formed in 1982 with the task of preparing guidelines for occupational noise regulations. This latter group hopes to encourage uniformity of Canadian noise regulations which presently differ considerably from province to province[13]. It is hoped that Canadian and/or international standards on noise exposure measurement will soon be published to support the Federal/Provincial Working Group.

4.0 SUMMARY AND OBSERVATIONS

The revised ISO 1999 (198x) "Acoustics - Determination of occupational noise exposure and estimation of noise-induced hearing impairment", provides a reasonable basis upon which to develop Canadian occupational noise hazard assessment and consequent regulations. It is hoped that the international standards presently being drafted on occupational noise exposure measurements will also be useful and that Canadian occupational noise regulations will, through guidelines developed by the Federal/Provincial Working Group on Occupational Noise Exposure and Hearing Conservation, eventually be consistent across Canada. In this way "Standardization", national and international, may perform a very real and useful function in providing uniformity that is also relatively simple, practical, accurate and enforceable. This, coupled with a good hearing conservation program would provide practical protecton against noise-induced hearing loss.

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D.A. Benwell
Environmental Health Centre
Room 233, Tunney's Pasture
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