

ACOUSTICAL ENGINEERING WORK IN
PREVENTION SERVICES

by

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ABSTRACT

This is the second of three articles on acoustical activities in the Workers' Compensation Board of British Columbia. In this article, R. Griffioen, P. Eng., group leader for Acoustics for the Engineering and Research Section of Prevention Services covers the activities of his group.

SOMMAIRE

Cet article est le deuxième dans une série de trois articles sur les activités réalisées par la Commission de Compensation des Travailleurs en Colombie Britannique dans le domaine de l'acoustique. Dans cet article-ci, R. Griffioen Ing.P., Chef de Groupe de l'Acoustique, Section Génie et Recherches, Service de la Prévention, traite les activités de son groupe.

There are two acoustical engineers on the staff of the Engineering and Research Section of the Prevention Services Division. Their principal role is to provide technical support to staff conducting field inspections. They also assist industry to achieve compliance with the Board's Industrial Health and Safety Regulations regarding control of noise.

In 1979, as soon as the acoustical engineers joined the Engineering and Research Section, a detailed six month study was conducted to determine the extent of the problem of industrial noise in B.C. A review was made of the non-traumatic hearing loss claims paid by the Board since the Workers' Compensation Act of B.C. recognized noise induced hearing loss as a compensable industrial disease in 1975. The claims review revealed that eighty-four percent (84%) of the claims were generated by the lumber and paper products, the foundry and steel fabrication, and the primary metals' industries. These industries account for only twenty-two percent (22%) of the total provincial workforce. A statistical review was carried out of the noise surveys made in these industries and typical noise profiles were developed and compared to European and American studies. A projected cost estimate to determine the economic impact of the noise control regulations on these industries was developed using Bolt Beranek & Newman's "Economic Impact Analysis of the Proposed Noise Control Regulations".¹ Individual industrial sub-classes of the industries listed above were then ranked using the claims information, noise exposure profiles, worker populations and expected compliance costs to determine a priority listing.

Even though it ranked second behind steel fabrication and foundries the B.C. Sawmill Industry was given first priority for noise control action by WCB. This was due to present knowledge of noise control techniques available in this industry. In British Columbia there are over eight hundred and fifty sawmills in operation. There is a marked difference between coastal and interior operations owing to the harvested tree sizes but the sawmill operating principles and machinery are essentially the same. In a sawmill the principal noise sources are the band saws, edgers, trimmers, chippers, lumber conveying systems and planers. A detailed study was conducted of these machines to determine the feasibility and costs of achieving the 90 dBA exposure criteria required by B.C. Regulations. Numerous on-site noise measurements were made of the machinery during normal operation to obtain operator Leq's, machinery octave band sound pressure data and estimates of machinery sound power levels. An extensive literature review was made of noise control work done in European and North American sawmills by utilizing our own library search facilities. Site visits were made to U.S. sawmills in the Pacific Northwest noted for the work which they have done in noise control. Technical pamphlets were written detailing proven methods of reducing noise levels for the machines causing the major noise problems in sawmills. These were designed to provide sawmill maintenance superintendents with enough information to implement noise control in their own mills. The pamphlets were reviewed before release by a group of experts from the sawmill industry with a strong background in acoustics.

Presently, the Engineering Section's two acoustical engineers are developing noise control solutions for the British Columbia metal fabrication industries. Because of the diverse nature of these industries, each firm is being treated on an individual basis and comprehensive noise surveys are conducted at each site. This includes noise dosimetry of operators and measurement of machinery noise spectra and sound power levels. A computer simulated noise mapping technique is used to rank noise problems and evaluate the benefits of proposed noise control techniques. Cost estimates are developed for each of the proposed noise control solutions and a noise control case history for each plant is written. These are reviewed with the plant managers to obtain their input. The case histories are kept in the inspection firm files to act as a source of reference material for enforcement procedures.

To assist in noise problem evaluation, the section has a Hewlett-Packard 3582A dual channel real time analyzer controlled by a HP 85 computer. This system allows for rapid third octave band frequency analysis, measurement of room reverberation times and identification of noise sources utilizing cross-correlation coefficients. For field work, a Bruel and Kjaer 7003 tape recorder is used to record machinery noise. Spectra analysis and sound power calculations are made in the office from these recordings.

REFERENCE

1. "Economic Impact Analysis of Proposed Noise Control Regulation", by Bolt Beranek & Newman Inc., Report No. 3246, April 21, 1976.