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BRIDGING THE GAP - PRACTICAL WORKPLACE NOISE CONTROLS

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ABSTRACT

There is a wide gap between the knowledge presented at international conferences and action taken by people in workplaces to control occupational noise problems. To assist workplaces in Western Australia to prepare for new, more stringent occupational noise legislation, WorkSafe Western Australia, the State Government department for occupational safety and health, worked with eight companies in the construction and metal manufacturing sectors to document successful practical noise control measures. These were categorized according to the 'hierarchy of control'. This information was disseminated freely to a wide audience by means of the department's internet site, in the form of company case studies and an illustrated lecture on the basic principles of noise control. (See www.safetyline.wa.gov.au)

1 - INTRODUCTION

In recent years there has been a noticeable trend among acoustic consultants and researchers to concentrate their efforts in the transport and community noise areas rather than the occupational area. (For example Internoise 98 had 132 papers dealing with environmental noise issues and only 61 dealing with occupational noise issues. [1]) Often when queried on this they respond by saying that occupational noise problems have been dealt with and anyway workers can always wear personal hearing protectors. However, every occupational health specialist can give numerous examples of noisy workplace machinery and processes. It is enough to look at the industrial compensation statistics to realize that workers still lose their hearing while at work and that hearing protector programs have severe limitations [2].

As acoustic specialists at WorkSafe Western Australia (the State Government occupational safety and health department) we have been dealing with noise exposure problems for many years. We were concerned at the gap between expert knowledge and action in the workplace and with the lack of 'off-the-shelf solutions'. What was available was perceived as too complicated or too expensive for an average workplace.

In the 18 months leading up to the 1999 change in the occupational noise exposure regulatory standard from 90 to 85 dB(A) [3], it was decided to demonstrate that practical noise control solutions are available and that noise control is not 'too difficult and expensive'. The metal manufacturing and construction sectors were chosen for this project because they have some of the highest noise exposures and most variable conditions of work. The project included eight Western Australian companies representing small, medium and large businesses, which worked with us to reduce noise hazards at their workplaces and document the results.

2 - DESCRIPTION OF THE PROJECT

Invitations to participate in the project were extended to companies known to department inspectors to have already implemented some noise controls. We visited them to assess if the control methods used were suitable as examples to the rest of industry. The companies finally involved in the project were: Baulderstone Clough JV, Consolidated Construction and Macmahon Contractors representing the construction sector; J&E Hofmann Engineering and John's Engineering and Cranes for the large metal manufacturers; Production Machinery and Stegbar Building Products for the medium size and Williams Electrical Service as the small metal manufacturer.

We assisted each company to document its noise control solutions by taking photographs and obtaining information on technical specifications, approximate costs and noise reductions achieved. The latter were calculated from $L_{Aeq,T}$ measurements taken during 30-60 s of typical operation of the noise sources, with and without the controls in place. In situations where the controls could not be removed, pre-control noise levels were obtained from company noise survey reports. Measurements were taken at operator ear position or, for sources with no obvious operator, at 1 m from the source. Type 1 calibrated integrating sound level meters were used.

Ideas for further noise control were discussed with each company and, where these could be implemented within the timeframe of the project, they were also documented.

3 - OUTCOMES OF THE PROJECT

Each of the documented noise control solutions was placed into one of the following categories: New Equipment, New Workplace Layout, Elimination, Substitution, Isolation, Engineering Control at Source, Engineering Control on Transmission Path, Quieter Work Practices and Administrative Control.

These were then used in two ways: as case studies for each company (see the attached example) and as illustrations for a lecture on the basics of noise control management in which the principles of the above 'hierarchy of control' are explained.

The lecture consists of two parts: one dealing with new workplaces and the other with already established ones. The approach in new workplaces is somewhat different, where the importance of layout and 'buy quiet' principles are emphasized. For existing workplaces the hierarchy of control is explained and illustrated with the 'real life' examples. Throughout the whole lecture, the importance of the 'buy quiet' approach is stressed as the most effective and economical tool in noise control.

The Australian Bureau of Statistics [4] has estimated that in Australia over 70% of companies with more than 20 employees and 50% of small companies (5-19 employees) had internet access by June 1999. There is also internet access at many public libraries, telecentres and schools throughout the State. It was therefore decided that the best way to get this information out to people in workplaces was to use the department's internet site. (www.safetyline.wa.gov.au).

Information about the availability of the case studies on the internet site has been published in the department's SafetyLine Magazine (which goes to about 10000 people in workplaces and schools), and distributed at WorkSafe Week and training courses and to noise assessors and members of the Australian Acoustical Society. Printed copies of the case studies are available to each of the department's inspectors for use at workplaces not yet connected to the internet.

Since the initial project further practical noise control examples from the Education sector have been received and documented on the internet site.

4 - CONCLUSIONS

To help fill the knowledge/action gap, eight companies in the construction and metal manufacturing industries in Western Australia have been encouraged to share their successes in practical noise control. Use has been made of the internet to make this information freely available to a wide audience in the form of case studies and as an illustrated lecture on the basics of occupational noise management.

There is scope to include case studies from a wider range of industries so we invite you to forward any good examples you have for inclusion on the internet site, thereby helping people at workplaces to find practical solutions to their noise problems.

5 - APPENDIX – EXTRACT FROM MACMAHON CONTRACTORS CASE STUDY ELIMINATION

Macmahon Contractors eliminated the use of hammers when installing or removing bearings. Bearings are now either heated, using a A\$300 pie warmer, or cooled by using liquid nitrogen. This allows them to easily slip into position.

6 - ENGINEERING NOISE CONTROL AT SOURCE

The maintenance workshop experienced high noise from steam cleaners. They were replaced by very quiet RoboWash machines (less than 75 dB(A) at 1 m). However, it was often required to fast dry some parts for which compressed air was used, again producing very high noise levels. Air gun nozzles were fitted with cups designed in-house. This reduced noise levels at the operator position from 112 to 90 dB(A).

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The authors thank the eight companies which provided the case studies and allowed them to be shared with others via the internet site.



Figure 1: Bearings heated in pie warmer fit over shafts without hammering.



Figure 2: Bearings cooled in liquid nitrogen fit easily and silently into casing.

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Figure 3: RoboWash machine.



Figure 4: Cup fitted over air gun nozzle.