

40—Noise and Hearing Conservation

ess is such that the work task can be confined to a limited area, isolation of workers in a separate noise insulated room provides effective control. This control method has been observed in chemical processing, power, and metal products plants with noise reduction inside the rooms of as much as 30 decibels.

Machine insulation. Machines mounted directly on floors and walls vibrate them, resulting in sound radiation. The proper use of machine mountings insulates the machines and reduces the transmission of sound vibrations to the floors and walls.

Control of noise by absorption. Noise produced at a sound source travels out in all directions. When the sound waves encounter other machinery or walls, they are reflected. Thus, the total noise exposure within the room is equal to the sum of the direct and reflected noise. The application of sound absorption material to walls can reduce the noise exposure in the room. However, this method has limited industrial application as the absorbing material has no effect upon the direct noise from the source.

Substitution of less-noisy machines. This approach to noise control may have limited application. However, there are certain areas in which substitution has potential application. These include "squeeze" type equipment in the place of drop hammers, welding in place of riveting, and chemical cleaning of metal instead of high speed polishing and grinding.

Reduction of exposure time. Experience has shown that limiting the total daily exposure reduces the noise hazard. This principle is illustrated in the Threshold Limit Values listed earlier.

Personal protection against noise. There are many operations in industry that cannot be quieted by engineering methods. Ear plugs or muffs worn by the worker can provide effective protection in such cases. Numerous scientific reports have shown that such devices can provide 25 to 40 dB of protection if properly worn. As with the usual safety protective device, ear protectors may cause a degree of discomfort to the wearer. These devices are,

however, used successfully in many industries where adequate attention is given to program development and employee education.

Be sure to check the current OSHA rules and regulations regarding the attenuation characteristics of hearing protective devices before selecting them.

Hearing Evaluation

Hearing evaluation, an important part of a hearing conservation program, involves audiometric testing. Such testing should be done at time of hiring and may be done at periodic intervals, at the time of job change, or upon leaving employment. While there may be need for all of these evaluations in an industrial hearing conservation program, the preplacement test is the most important. An audiometer is required for assessing an individual's hearing ability. Depending on the type of test signal used, audiometers may be called "pure tone audiometers" or "speech audiometers." Manual and automatic models are available.

Pure tone audiometers are standard instruments for industrial use. For hearing tests likely to be required in industry, the test frequencies of 500, 1000, 2000, 3000, 4000, and 6000 Hz are needed.

Audiometric testing facilities

In industrial situations, medical facilities may be near noisy industrial areas and background noise levels in these facilities may be relatively high. If noise interferes with the audiometer signal, the subject will appear to be "partially deaf." To obtain reliable audiometric tests, it is necessary to maintain the background noise level in the test area below certain values. This may be accomplished by the design and construction of special rooms, or by the use of a prefabricated, commercially available audiometric test booth.

Audiometers must be calibrated periodically to ensure accurate test results. The calibration must include both the electronic circuits and the earphones, and calibration should be repeated at intervals not longer than one year and more frequently when erratic operation or erroneous test results are suspected. Rough daily calibrations can be made by testing the hearing of persons with known patterns.