1. Engineering and Administrative Noise Controls

A noise control program should be established as soon as a noise problem is identified. The program should consist of the most practical engineering and administrative controls that can be instituted consistent with the noise control criteria selected.

A. NOISE CONTROL CRITERIA

Two types of criteria are generally followed for industrial noise control. The first is hearing conservation criterion and the second and of equal importance, where applicable, is speech communication criterion.

1. Hearing Conservation

A hearing conservation criterion is established to protect employees from noise-induced hearing loss. The OSHA '90 dBA' standard has met with approval by many authorities and can be used as a minimum hearing conservation criterion for most industrial noise situations. A-Scale measurements can be easily made with a simple sound level meter for problem identification and to monitor noise levels. The weighting characteristics of the A-Scale are shown in Figure 1.

![Frequency Responses for SLM Weighting Characteristics](image)

**Fig. 1.** Random-incidence response of sound level meter for different networks – A, B and C weighting characteristics.
Some industries have adopted 85 dBA as a hearing conservation standard as it is obviously safer and provides a hedge against future legislation which may reduce the standard to this level. The Walsh-Healey noise exposure rules and regulations when first published in the Federal Register (January 17, 1969) used 85 dBA as the minimum permissible noise level for 8 hr per day exposure! This was withdrawn and revised by Secretary of Labor George Schultz. The revised version, published May 20, 1969, established the present Walsh-Healey standard of 90 dBA which subsequently became a part of the OSHA Standards.

2. Speech Communication

High noise levels in factory offices interfere with speech intelligibility and make the use of the telephone difficult or impossible. It is not unusual, for example, to observe an office worker bent over with this head in the knee-hole beneath his desk in an effort to communicate on the telephone. Design criteria to eliminate this type of problem must be based upon the ways that noise affects our ability to hear speech.

Noise which interferes with speech is usually referred to as masking. Masking is the process by which the threshold of audibility for one source is raised by the presence of another (masking) noise. At night, however, the noise of a dripping faucet may become audible as the background noise diminishes. For some, the dripping noise becomes psychologically louder to the point where it is annoying.

In a factory environment, as the background noise increases so does the employee's threshold of audibility. As the threshold raises, he will hear only a few or perhaps none of the sounds necessary for satisfactory intelligibility.

Because of the obvious need for speech and telephone communication within a factory environment, speech communication criteria should be used in evaluating and specifying noise control treatment. In addition, it is generally accepted that high noise levels interfere with concentration and can cause a higher rate of errors and accidents.

Considerable research has been done concerning the speech-interference level (SIL), speech communication (SC) contours, and the preferred frequency SIL known as PSIL are reliable standards used by architects, engineers and acoustical consultants. John C. Webster recently published a summary of speech communication criteria which included a relatively new criterion based upon the weighted A-scale. This should prove ideal for most industrial noise control programs because of the A-scale's alternate use as a hearing conservation standard. Figure 2 shows how A-scale levels relate to the ability to communicate under noisy conditions.

Once the extent of the noise problem has been determined and the criteria selected, then the most practical noise control techniques can be established to implement the hearing conservation program.

To quote from the Walsh-Healey Act, "If employees are subject to noise levels exceeding those found in Table I, then feasible engineering or administrative controls shall be utilized."

A detailed analysis of noise control techniques is given in the section which follows. This includes a discussion of administration and engineering noise controls plus