



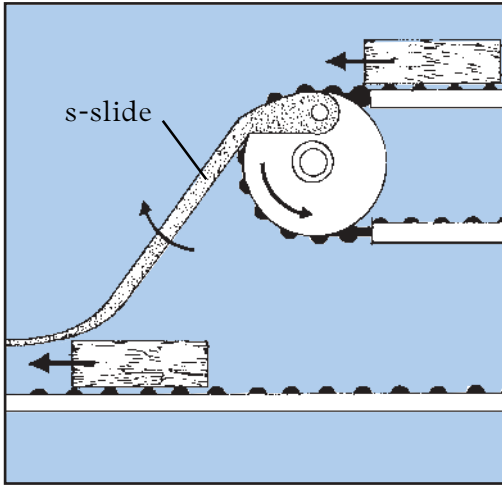
# Engineered Noise Control

The best method of dealing with noise in the workplace is reducing the noise at the source with engineering controls. At best, engineering controls can eliminate the need to provide hearing protection, hearing testing, and other elements of a hearing conservation program altogether. Even if noise cannot be reduced to safe levels, reducing noise at the source makes it more likely that hearing protection will be effective in reducing noise exposures below 85 dBA. At a minimum, noise control can improve speech communication and reduce annoyance due to noise.

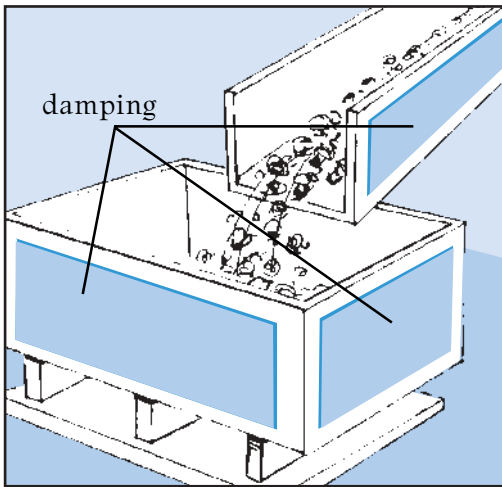
Employers **must** investigate options for engineered noise control when workers are exposed to noise above the exposure limits. Investigating noise control options requires a knowledgeable professional such as an acoustical engineer. Staff who understand the operational requirements in the workplace should provide input to the acoustical engineer.

When practicable, one or more options for engineered noise control to reduce worker noise exposure below the exposure limit must be implemented. Options include the following:

**Reduction at source** Many potential noise problems can be solved by choosing quieter equipment. When new equipment is purchased, specifications should include either a limit on the noise, or a requirement for the vendor to provide noise performance data. If noise is not engineered out in the design stage, retrofitting existing equipment with noise control devices such as mufflers, silencers, special nozzles, or isolators can sometimes be effective.



*An s-slide will reduce drop height and deliver material quietly.*



*Damping applied to delivery chutes and bins will reduce noise.*

Substituting quieter equipment for noisy equipment is another method of noise reduction at source. For example, substituting a large slow speed fan for a smaller high speed fan often reduces noise. When purchasing mobile equipment, specify that sound levels in the cab should be below 85 dBA. The higher initial cost of soundproofed mobile equipment could be lower than the cost of retrofitting the cab with special materials and devices.

A surprising amount of noise can occur in materials handling. Although the speeds of conveyors often cannot be changed for productivity reasons, drop heights can often be reduced, and impact points can be fitted with long-wearing rubber or plastic cushions that reduce noise. Compressed air exhausting from door or gate actuator ports also generates noise. Exhaust air (and noise) can be led away through hoses or pipes to remote spots or led to exhaust silencers.

Another common noise source is air jets used to cool, dry, move, or clean objects. Special air nozzles

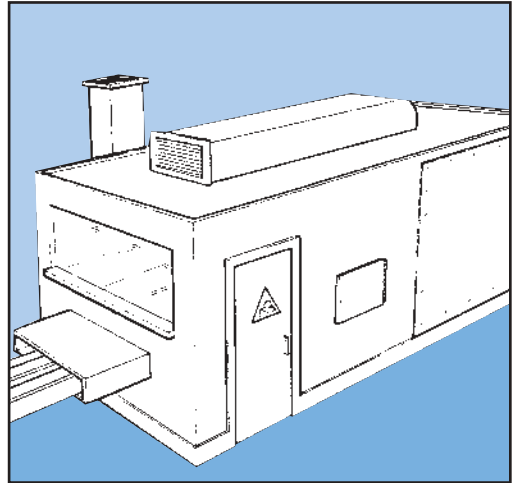
are available that reduce the noise of a plain nozzle by up to 20 dB while reducing the compressed air flow requirements.

Sheet metal panels, when struck, can produce significant noise by vibrating. The noise can be reduced by damping the vibrations. For example, vibration damping on punch press collection and delivery chutes can reduce noise by 5 to 10 dB.

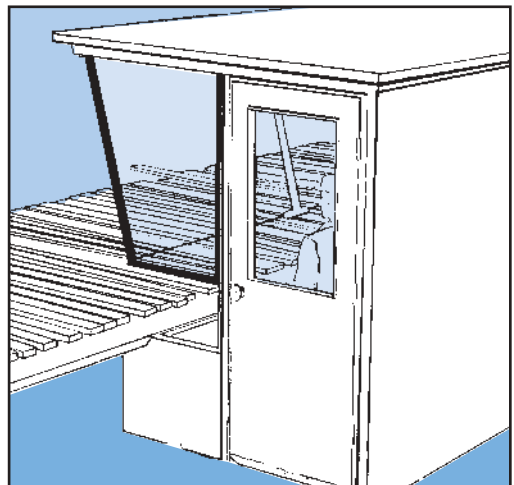
Some pneumatic hand tools are very noisy. Tools with reduced noise emissions may be available. Whenever possible, purchase this type of equipment.

### **Enclosure of the noise source**

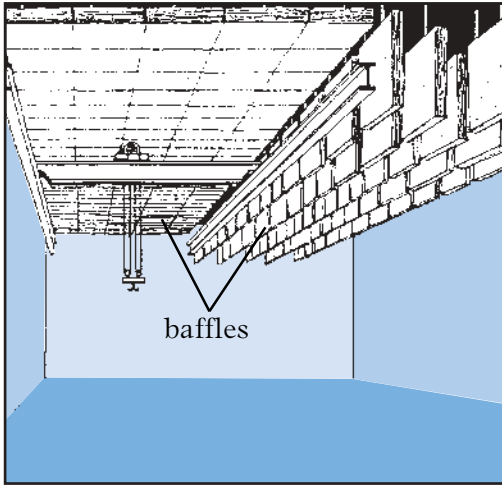
Enclosing the noise source is especially useful when the enclosure doubles as a safety guard or as an environmental control device. Enclosures reduce workers' noise exposure by acting as a barrier and as a sound absorber. Noise reductions of 25 dB are common with noise enclosures. The ceiling and walls of the enclosure should be lined with material that absorbs sound, otherwise noise will reverberate inside the enclosure and escape through small openings –



*Enclosing machinery will reduce noise levels.*



*A partial operator booth allows the operator to handle material.*



*Sound absorbing baffles reduce reflected noise effectively.*

often where workers are stationed. The size of all enclosure openings should be kept to a minimum.

Machines that have solid safety panels can often be modified to convert the guarding into effective local noise enclosures. For example, the engine compartments of trucks and buses can be lined with noise absorbents on the bulkhead and hood.

**Enclosure of workers** Enclosing workers in a booth is practical when workers leave the enclosure

only occasionally, for example, to make adjustments, or clear trapped material. Operator booths can achieve large reductions in noise levels; 20 dB is typical. Partial operator booths are effective for graders in sawmills.

**Acoustical treatment of the room** Lining the walls and ceiling with sound-absorbing panels or hanging baffles reduces reflected noise effectively. This method doesn't interfere with workers' access to machinery or require special building structures. However, close to the noise source, where workers are usually stationed, direct noise will remain a problem. Reductions of only 2 to 5 dB are typical when acoustical treatment of the room is used. The benefit of acoustical treatment is that all workers in the room will experience these noise reductions.

**Reduction of the length of exposure** On-the-job hearing loss is due to two factors – the level of the noise **and** its duration. Reducing the length of time workers are exposed to noise can reduce exposure below the allowable limits. For example, a worker exposed to 86 dBA for four hours could exchange jobs with another worker for the rest of the shift. If the noise level for the second half of the shift is 80 dBA, the total exposure for the full shift for both workers would be 84 dBA  $L_{ex}$ . Such arrangements are examples of administrative controls. Workers on canning and bottling lines, for example, change workstations at regular intervals so that none receives a very high noise exposure.

### **Separating the worker from the noise source**

Noise levels fall as the distance increases from the noise source. The rate at which noise is reduced with distance is increased with acoustical treatment of the room. Using this concept to plan workstation locations may be practical when designing new facilities.

Sometimes, a combination of noise control methods is required to reduce noise, for example, room treatment and a partial machine enclosure.

If engineering controls are put in place, the noise reduction achieved should be measured and the results documented. This will demonstrate compliance with noise control provisions of the Regulation, and may be useful in solving other noise control problems.

WCB Engineering staff can provide advice and guidance on noise measurement and noise control.