

PERSONAL HEARING PROTECTION DEVICES

Introduction

When employees are exposed to sound levels in excess of occupational exposure or action limits, the first course of action is to reduce the noise with source and pathway controls (engineering controls). When sound levels cannot be reduced to less than an 8-hour Time Weighted Average (TWA) of 85 dBA through source and pathway control(s) and/or receiver controls (administrative controls), hearing protection should be used to protect workers from work-related hearing loss. Choosing the right kind of hearing protective device and correct use are essential to protection from hazardous noise exposures.

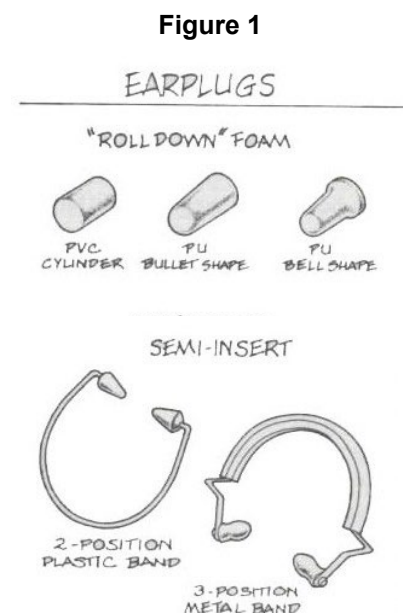
This SOP describes the most common types of hearing protectors used at UNL. There may be specialty hearing protectors prescribed for certain UNL employees exposed to impulse noises which are not addressed in this SOP. Regardless, all employees participating in UNL's Hearing Conservation Program will receive instruction in proper use of the hearing protectors prescribed for their exposure situation.

Types of Hearing Protection

There are two main types of hearing protection devices: ear plugs and ear muffs.

Ear Plugs

Ear plugs (figure 1) are commonly available in the following styles: roll-down foam; pre-molded; and semi-insert. Roll-down foam earplugs are rolled before each use and inserted into the ear canals. They conform to the shape of individual's ear canals. One size of roll-down foam will fit most workers although workers with extremely small or large ear canals may need a different size. One disadvantage of roll-down foam earplugs is that workers need to roll them each time they wear them, thus making it harder to use if workers have to take ear plugs out frequently during a work shift. Roll-down earplugs are disposable. They are not a good choice in dirty



environments since they cannot be washed and a worker must roll them to insert into the ears.

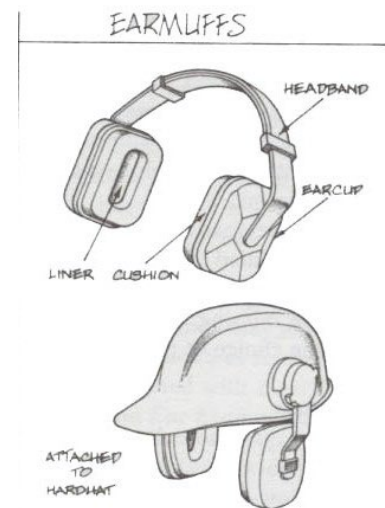
Pre-molded earplugs do not need to be rolled to conform to a worker's ear canal but the right sized earplugs must be used. They are relatively inexpensive, reusable, can be washed, require less handling, and come in a variety of sizes.

Semi-inserted earplugs consist of soft tips that are held in place by a light-weight band. They can be removed and replaced quickly and easily. They are not generally recommended because they tend not to provide adequate protection.

Earmuffs

Earmuffs (figure 2) are relatively easy to use since they are usually one-size devices designed to fit almost all adult users. Earmuffs usually consist of plastic ear cups that seal around the ear using foam filled cushions. The cups need to fit snug against the head without interference to achieve the full attenuation of the muff. An example of interference would be eyeglass temple bars, long hair, and heavy beards. Earmuffs are good with intermittent use due to the ease with which they can be donned or doffed.

Figure 2



Achieving Desired Attenuation

Attenuation capability of hearing protectors varies with style, model, and manufacturer. EHS will provide recommendations regarding particular hearing protectors. When used appropriately, the hearing protectors recommended by EHS for a particular worker and exposure scenario will attenuate the workers exposure to a level that is less than the occupational exposure limit. EHS recommendations are based on the Noise Reduction Rating (NRR) assigned to the hearing protector, as well as factors affecting the employee's individual exposure (e.g., sound levels, type and number of noise producing machines/equipment, time of exposure at various sound levels, etc.). Therefore, it is important for supervisors and employees to notify EHS of changes to conditions under which exposure levels were determined. Workers should also notify EHS and their supervisor if they experience discomfort or suspect a medical condition of the ear that is a result of or impediment to use of hearing protectors.

Using Hearing Protection Correctly

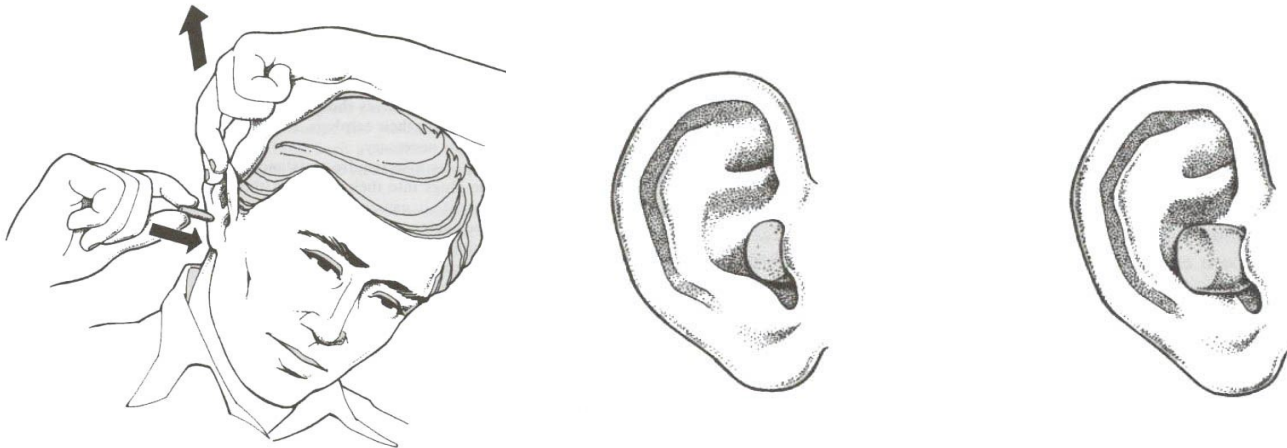
Actual attenuation achieved with any hearing protector depends on proper usage.

Earmuffs

Earmuff cups must fully enclose the user's ears. They should not rest on the user's ears. The headband should be adjusted so that it sits comfortably on the head. Long hair should be pulled back to ensure the best possible seal.

Foam Plugs

When using foam earplugs, roll in a crease-free manner and shape into a very thin cylinder by squeezing lightly and rolling. Progressively apply greater pressure as the plug becomes more tightly compressed. Do not roll the plug into other shapes such as a cone or a ball. Insert about $\frac{1}{2}$ the length of the cylinder into the ear canal. Foam earplugs should not be readjusted while in the ear. Instead, they should be removed, re-rolled and re-inserted.



Left: proper insertion of foam ear plugs. Middle: proper fit with foam ear plugs. Right: improper fit with foam ear plugs.

Pre-molded plugs

Pre-molded earplugs do not need to be rolled. To insert them into the ear canal, the wearer should pull the ear outward and upward and insert the earplug tightly into the ear opening (see left figure above). Pre-molded earplugs can be readjusted while in the ear. When pre-molded earplugs are properly inserted, they will create a plugged or blocked-up feeling due to the airtight seal. Pre-molded plugs are sized and a person may need a different sized plug for each ear.

Care of Hearing Protection

Foam earplugs are disposable and must be discarded when dirty or pliability is compromised. Foam earplugs must not be washed.

Pre-molded earplugs can be used multiple times although care should be given to prevent contamination with dirt, chemicals, etc., while in storage. They can be cleaned with mild soap and water and re-used, but should be discarded when they become worn or an effective seal cannot be achieved. Thoroughly dry pre-molded earplugs after washing and before re-use.

Earmuffs should be cleaned with mild soap and water when dirty. The ear cups need to be replaced when damaged or brittle to ensure effective protection.

Never modify an earplug or muff to improve comfort or improve communication. If the hearing protector is uncomfortable, choose a different hearing protector. Implement alternate communication methods when necessary.

Manufacturers Recommendations

In all cases, read and adhere to all recommendations and instructions provided by the manufacturer.

Source: The Noise Manual, Fifth Edition, American Industrial Hygiene Association.