CAOHC

UPDATE

The Newsletter of the Council for Accreditation in Occupational Hearing Conservation

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Add Value to Your Hearing Conservation Program

Outgoing Chairperson's Message

by Jeffrey C. Morrill, MS
CAOHC Immediate Past Chair

I have often heard the statement that *the best hearing protector is the one that the employee will wear consistently.* I would like to add *and correctly* to that phrase. I hope that you as an OHC understand the noise reduction rating (NRR) is sort of a meaningless number for selecting hearing protection devices (HPDs).

The value that the OHC can add to the program is through inspecting how the employee inserts the HPD and providing one-on-one training until the employee can insert it properly. This is best done at the time of the hearing test when the results can be used to illustrate how the hearing is changing. When the employee can demonstrate proper insertion, the OHC will have achieved the first step to adding real value and potential return on the company's investment.

The next step is in the periodic inspection of how employees are actually wearing the HPD in the work environment. A periodic audit or inspection is the only way to accomplish this - unannounced. By documenting the observations and the individuals encountered, the OHC will help establish the company's defense against both citations and compensation claims...more value for your company.

Hearing protection programs have been a challenge in my career in occupational audiology of more than 25 years. Occasionally, I am disappointed at witnessing the same problems that were encountered before OSHA, especially failure of the employee to comply. These problems will probably always be there as a challenge to each of us.

It has been an honor to serve for the past 10 years on the CAOHC Council and to have been associated with so many fine professionals here throughout the years. One thing that we all have in common is a goal to eradicate unnecessary hearing loss due to occupational exposure. Our body of knowledge and tools is certainly better today than yesterday, however, it is the one-on-one interaction between the OHC and the employee that makes the difference and adds VALUE to the program.

Unique Hearing Protection Devices— The Search for a Balance

Donald G. Gasaway, MA
Hearing Conservationist *with E-A-R/Aearo Co., San Antonio, Texas*

Wearing personal hearing protection devices (HPDs) universally results in an altered world of sound. Few people realize the dramatic effect cutting out just 10 to 20 decibels of sound can have on their normal hearing function.

Humans depend on their hearing as they consciously and unconsciously monitor the incessant world of sounds and acoustic events that surround them. Reduce the ease with which a person can detect and "hear" this multitude of sound sources, and the effect can be profound. Hearing is an orientation, alerting, warning, and constant monitoring sense. Basically, hearing is the sentinel of the brain – for most, requiring little conscious effort.

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CAOHC to Celebrate 25th Anniversary in 1998

CAOHC celebrates twenty-five years as the "Council for Accreditation in Occupational Hearing Conservation." Its roots began with the Intersociety Committee on guidelines for noise exposure control in the mid 1960s. The Intersociety became active when the noise standard was being promulgated in the early 1970s, changing its name and makeup to the current CAOHC in 1973.

What's Inside?

CAOHC UPDATE

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Articles should be submitted, with a black and white photograph of the author. The *Update* is available to individuals not certified by CAOHC at an annual subscription rate of $15. Payment must accompany request:

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New Executive Committee Named to CAOHC Council

Outgoing and Incoming CAOHC Council Members met in Denver, October 9, 1997. They are pictured left to right first row: Elliott Berger, Merrie Healy, Myrna Stephens, William Monk, Richard Danielson, Theresa Schulz; Second Row: Jeff Morrill, Michael Holthouser, Alex Sanchez, Dennis Driscoll, James Banach, Susan Megerson, Robert Dobie, Peter Weber, Barbara Panhorst-Lassiter, Linda Dolby (Jill Niland, not pictured)

The Council for Accreditation in Occupational Hearing Conservation elected a new Executive Committee effective October 9, 1997.

The Executive Committee is headed by the CAOHC Chair, Susan Cooper Megerson, MA CCC-A. Megerson represents the American Speech-Language-Hearing Association on the CAOHC Council. She is the President of IMPACT Health Services, Inc. of Kansas City, Missouri, which provides hearing conservation and respiratory surveillance services for over 5,000 industrial clients throughout the United States and Canada. Megerson succeeds Jeffrey Morrill, MS.

Other officers include Vice-Chair, COL Richard Danielson, PhD CCC-A. Danielson, a representative of the Military Audiology Association, is currently the Director, U.S. Army Audiology and Speech Center, Walter Reed Army Medical Center, Washington, D.C.

Secretary/Treasurer is Robert Dobie, MD, CAOHC's representative from the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS). He is currently Professor & Chairman, Dept. of Head and Neck Surgery, University of Texas Health Science Center, San Antonio, TX.

CAOHC Council Holds Fall Meeting

The CAOHC Council held its Fall meeting October 9, 1997 in Denver, Colorado.

While business items for 1997 were reported, the main agenda focused on the development of a Professional Supervisors Course. The objectives have been developed and course curriculum is now being finalized. Plans are for the first course to be held in the Fall of 1998.

The Executive staff reported that CAOHC now has over 18,500 Certified Occupational Hearing Conservationists and nearly 400 Certified Course Directors.

In addition, plans for the announcement of CAOHC's 25th Anniversary in 1998 were discussed. (This newsletter will feature historical articles and interviews throughout 1998.)

"FITTING HEARING PROTECTION" GUIDE

One of CAOHC's goals is to provide education and information in occupational hearing conservation. CAOHC has purchased the printing rights to 7 practical guides from the National Hearing Conservation Association.

CAOHC will print one new brochure from the NHCA series in this and upcoming issues of the *UPDATE*. We hope that you will find this comprehensive brochure helpful in your hearing conservation efforts. See Page 3 to contact NHCA for additional copies.

Three Steps to Effective Hearing Protection

1) Selection.

Offer a variety of hearing protectors, including a minimum of two types of premolded earplugs; two types of formable earplugs; semi-insert devices; and earmuffs. Identify the HPDs which are appropriate for the individual by considering the noise level, work environment, and the wearer's convenience, communication needs, and pre-existing hearing loss.

2) Fit the Individual.

Not every suitable device will fit the individual comfortably. Starting with the wearer's choice of HPDs, check the fit in each ear to see if the device is a good match for the individual's anatomy. The two earcanals may differ, so check the fit for both ears. If the device comes in multiple sizes, determine the best size for each ear separately. Ask the wearer to judge comfort. The best HPDs are the ones that will be worn all day, every day. Comfort is the key to user acceptance.

...the best HPD is the one that gets used... comfort is the key!

3) Train, train, train.

Don't just tell the individual how to wear the HPDs — have the wearer demonstrate correct placement of the device. Stress the importance of a good seal for adequate noise reduction, show what a good fit feels and sounds like, and reinforce the need to use HPDs at all times in noise. Teach the wearer how to care for HPDs and recognize when they need to be replaced.

Fold Here

One Size Does NOT Fit All!

An important and often overlooked part of an effective hearing conservation program is the fitting of hearing protection devices (HPDs).

Although some expandable foam earplugs come close, there is really no such thing as a one-size-fits-all HPD. Each person must be individually evaluated to determine the best match of HPD for their environment, noise exposure, anatomy, and hearing ability.

Individual fitting is also a great opportunity to provide training about the effects of noise and proper use of hearing protection. The individual attention given to the worker during the fitting session can increase the acceptance of HPDs by the user, and can help the user get more protection by learning how a proper fit should feel and sound.

For more information, contact:

NHCA *National Hearing Conservation Association*
611 East Wells Street, Milwaukee, WI 53202
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NHCA thanks Larry and Julia Royster for their contribution, comments and material adapted from their Hearing Instruments magazine article. 2.96

Fold Here

Guide #2

A practical guide to:

Fitting Hearing Protection

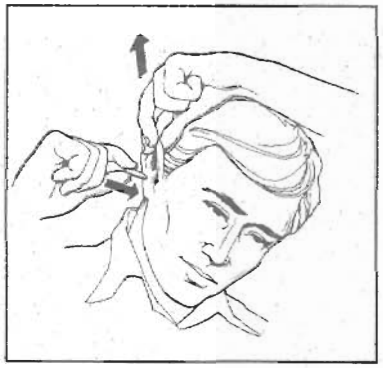
NHCA

National Hearing Conservation Association

The mission of the National Hearing Conservation Association is to prevent hearing loss due to noise and other environmental factors in all sectors of society.

Tips for Fitting Earplugs and Semi-Inserts

Before fitting earplugs or semi-insert HPDs, examine the employee's earcanals to determine whether any obvious indications of possible medical problems are present. Also check for excess cerumen (ear wax) that might be pushed further into the canal by the insertion of an earplug (in a few instances complete blockage of the earcanal may have occurred). If these conditions exist, then the employee should wear earmuffs until the problem is corrected.



Examining the ear also enables the fitter to give the employee two additional vital pieces of information: the orientation of the earcanal (so the wearer will know which direction to start inserting the plug) and which way (if any) to pull the pinna (outer ear) to straighten the earcanal for easier insertion of an earplug (see figure).

The fitter may find it helpful to use a sizing tool to estimate the size of earplug needed. Although an experienced fitter can "eyeball" canal size, manipulating the tool may also help the employee understand which way the earcanal goes.

How Do I Know If It's Working?

Use these field tests to check fitting:

The Tug Test

The fitter can very gently tug back and forth on the handle of the plug. If there is resistance and if the employee feels a sensation of gentle suction on the eardrum, then the earplug has probably achieved a seal. In contrast, if the plug pulls out easily, an adequate seal was not achieved.

The Hum Test

After the fitter has inserted just one earplug, ask the employee to hum or "say ahhh". If one ear is properly sealed (creating the occlusion effect), then the sound of the user's voice will seem louder in the sealed ear. If the employee does not get this sensation, then the earcanal is probably not adequately sealed. Sealing both canals at the same time will cause the voice to be perceived equally in both ears, or in the center of the head.

The Loudness Test

While in a noisy environment with plugs inserted in both ears, cup both hands over the ears. If there is a perceptible difference in the noise level, the HPDs are probably not properly fitted; the HPDs should be blocking enough noise so that putting hands over the ears should not result in a significant difference. Conversely, the perceived noise level should increase markedly as the user breaks the seal of each earplug or raises each cup of an earmuff when in noise.

Tips for Fitting Earmuffs

Although earmuffs can successfully fit a large percentage of hearing protector wearers, the fitter must still check the fit of each individual.

- Does the headband extend or retract enough to position the earmuff cups securely over the pinnas (outer ears)?
- Can the entire pinna comfortably fit inside the earmuff cup?
- Does the cup's cushion seal against the head all the way around the ear, or are there excessive gaps caused by bone structure, bulky eyeglass temples or facial hair?

If significant gaps or leaks are present, then wearing earmuffs can actually increase the level of noise reaching the eardrum. This resonance effect may occur in noise environments with dominant tones in the range of 125-250 Hz from sound sources such as large heating or air conditioning fans. To increase success when issuing earmuffs, be sure to stock models with easily adjustable headbands, adequately large cup openings, and good cushioning. Check earmuff condition regularly, since cracking and hardening of cushions can cause leaks.

If gaps are present, earmuffs can actually increase the level of noise reaching the eardrum!

OHC Corner

The Survey is Coming! The Survey is Coming!

Barbara Panhorst-Lassiter, EdD RN COHN-S
CAOHC Representative of the American Association of Occupational Health Nurses

I am going to tell you about the survey and its implications for all Occupational Hearing Conservationists (OHCs), ***but first***, I want to address a few questions that have come forth from several of my past columns. Since some people called or wrote for clarification on certain issues, I thought perhaps more of you might be wondering the same thing.

Recording on the OSHA 200 Log

Question: I work in a state that recognizes an average shift in either ear of 25 dB in 2000, 3000, and 4000 Hertz as a basis for recordability on the OSHA 200 Log. You wrote that everyone must follow-up on standard threshold shifts (STSs). Does this mean that I must keep track of two baselines?

Answer: Yes. The criteria for a STS and a 25 dB shift are very different. A STS is an average loss in either ear of 10 dB or more at 2000, 3000, and 4000 Hz from the *last* STS baseline. A 25 dB shift is an average loss of 25 dB or more at 2000, 3000, and 4000 Hz when the current test is compared to the *initial* baseline or the *last* 25 dB baseline (see next question regarding revision). There can be several STSs with new baselines established before a 25 dB shift occurs. As I've said before, Form 200 requirements are under review. Ask your Professional Supervisor to help you with this.

Question: When a 25 dB shift occurs, do I establish a new baseline for comparison? Doesn't the memorandum to OSHA compliance officers say to compare to the initial baseline?

Answer: Yes, to both questions. When I called OSHA for interpretation, I was told if the initial baseline is not changed when a 25 dB shift occurs, every test thereafter would continue to show a shift. Our employers would not be happy about listing all these shifts on the OSHA Log. My own term for this new baseline is *last 25 dB baseline*. I use this terminology so I don't get confused with the STS baseline. And, yes, this is confusing.

Role of the Professional Supervisor

Question: Since a microprocessor audiometer operator does not have to be certified, why can't my company use this equipment without having trained OHCs.

Answer: Every OHC must be trained and report to a Professional Supervisor who oversees his/her competence in obtaining valid audiograms, properly using, maintaining, and checking calibration and proper functioning of audiometers. Everyone must have suitable training.

Occupational Hearing Conservation Recordkeeping

Question: Can a registered nurse or other trained personnel diagnose or determine the job-relatedness of a standard threshold shift?

Answer: According to the noise standard 1910.95(8) follow-up procedures, (ii) Unless a physician (my bold) determines that the standard threshold shift is not work related or aggravated by occupational noise exposure, the employer shall ensure that the following steps are taken when a STS occurs. . . . (this means if a physician says the STS is not job related, you don't have to perform the follow-up procedures but if a physician says the hearing loss is due to workplace noise you must comply with the follow-up procedures). Interpretation on Form 200 recordability (standard 1904) may vary. In most cases a physician or audiologist may determine if the STS should be listed on the 200 Log.

1998 OHC Survey

In 1990, CAOHC surveyed several hundred OHCs from among its 10,000 certified occupational hearing conservationists to find out what, if any, changes should be made to the certification course as far as content was concerned. In addition, various demographic and work-related questions were a part of the survey. The results helped the CAOHC Council redesign the course curriculum and address specific issues in occupational hearing conservation.

Art provided by E-A-R/Aearo Company

Today, in 1997, we have over 18,000 CAOHC certified OHCs... and the number continues to grow! Some of the questions CAOHC will be asking in the new survey include:

1) Have our changing job demands and work environments created new issues to deal with in the field of occupational hearing conservation? 2) Who are our Professional Supervisors and do they understand their responsibilities to us? 3) Do the CAOHC certification and recertification courses adequately prepare us to perform our occupational hearing conservation duties?

In early 1998, over 1,000 OHCs will be invited to complete this new survey. The results will help the CAOHC Council in their continuing efforts to improve hearing health. If you are one of the OHCs selected randomly by the computer, please take a few minutes to complete the survey and become instrumental in CAOHC's future as well as yours as an Occupational Hearing Conservationist in the 21st century!

CAOHC will report the findings of the survey in upcoming issues of the *UPDATE* and any subsequent modifications will be shared with you as well.

Unique Protection Devices,

continued from page 1

The most dramatic negative impact associated with wearing HPDs is the impaired ability to easily hear and understand auditory communications. Typically, the most common unsolicited response among new HPD users is *"But, I can't hear!"* In reality, the person is not rendered "deaf," only "hard-of-hearing." Oh! Audible sounds are still reaching the inner ear structures, but the ease with which these acoustic events can be "heard" has been substantially changed.

A common simile one makes when wearing HPDs is *"...sounds like someone is talking with his head in a barrel."* Inability to adequately "hear" environmental and communication sounds in many work environments can result in a multitude of undesirable, if not catastrophic, consequences: ranging from mild irritation to physical injury or even death. The failure of safety-health providers to recognize the critical importance of properly balancing the amount and type of HPD attenuation against each individual's ability to hear in the presence of noise poses a significant problem.

Many employees who work in noise have to wear HPDs that were chosen for them simply because the only devices selected by the company were those accompanied with the highest noise reduction rating (NRR). This belief, "highest is best," although somewhat understandable from a logic point of view, is seriously flawed. Even though "real world" studies of HPD attenuation performance have consistently revealed typical users of devices do not achieve levels of attenuation equal to laboratory measures, the majority of HPD users only need to acquire from 10 to 15 dB (equivalent NRR values) of sound reduction to adequately protect their hearing. For example: Ideally, if one encounters a noise level of 90 dBA, an at-the-ear NRR of 10 dB would yield about 80 dBA, and an NRR of 15, an at-the-ear level of 75. But if the HPD delivered 25 or 30, the at-the-ear levels would result in levels of 65 or 60. Arbitrarily choosing too high an NRR for use in ambient noise settings that actually are not severe would be like wearing welding goggles to reduce light when in a brightly lighted room and trying to read a newspaper.

New Kids on the Block

The HPD neighborhood has received several new arrivals. Some of these new arrivals are in their teens and others are of kindergarten age. As a group, they compose a different breed: nonlinear, level-dependent, amplitude sensitive, frequency sensitive, uniform or flat attenuation, and all can be classified as either active or passive. They differ from the conventional population of linear attenuation devices that have been around for many years because they perform differently in the way they alter or modify sounds reaching the ear.

Most conventional HPDs are passive and offer linear attenuation.[1,2] Conventional plugs and muffs tend to deliver greater amounts of attenuation within the higher range of frequencies (at and above about 2000 Hz) than within the lower range (below 2000 Hz), serving essentially as a "low-pass" filter. This type of filtering distorts intelligibility of speech sounds. Typically, sounds which arrive at the ear are described as "indistinct," eliciting a response such as, *"I can hear the speaker but I can't understand what is being said."* The primary acoustic portions of human speech necessary for a listener to distinguish word differences are consonants, especially voiceless components, which reside in the frequency range above 1000 Hz.

Using a conventional HPD tends to functionally diminish the intelligibility of spoken language, but the degree of difficulty experienced is far less when one possesses normal hearing (no hearing level poorer than about 20 to 25 dB at 500 through 2000 Hz). If the listener has a typical noise-induced hearing loss (NIHL), where the most impaired range of the hearing lies above 1000 Hz, then the low-pass filtering presented by a conventional HPD has a far more profound detrimental effect on functional hearing. The person with moderate to severe NIHL faces a "Catch-22" situation – if the person wears HPDs his already compromised hearing function is further impaired, and if he does not wear protection it is only a matter of time until the already marginal hearing performance becomes so impaired he cannot adequately accomplish listening tasks essential to achieve and sustain satisfactory job performance.

So, what can be done to improve listening-in-noise situations among both normal hearing and those possessing less than normal auditory function?

Seeking a Balance

First and foremost – recognize that overprotecting people who work in noise is not the way to go. Each HPD available for employees should be

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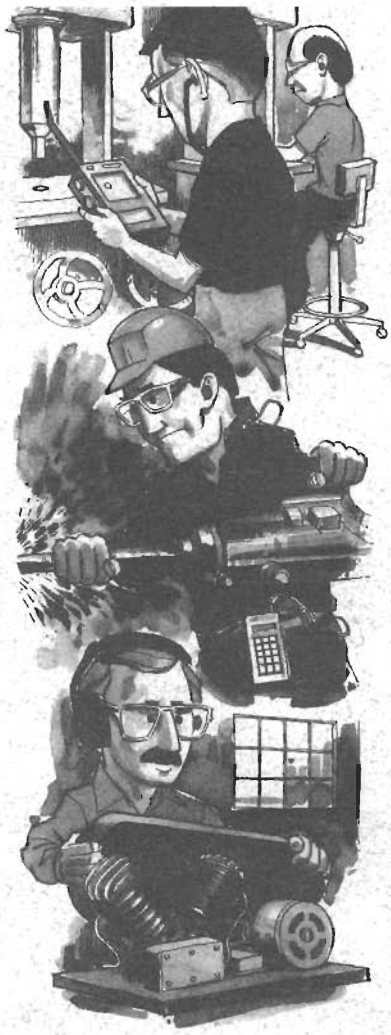

Art provided by E-A-R/Aearo Company

Unique Protection Devices,

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individually selected to ensure that the device chosen provides a reasonably safe level of hearing protection while balancing the ability of the wearer to sufficiently hear desired auditory signals in the presence of noise. Because the majority (92 percent) of industrial type noise levels are 95 dBA or less[3], then devices which deliver 10 to 15 dB (NRR) of effective at-the-ear attenuation should be adequate to protect the integrity of hearing of most workers while still facilitating audibility of desired auditory signals.

It is within the realm of lower, rather than maximum achievable, attenuation where a wide range of superior choices between protection and retention of auditory performance while wearing HPDs emerges. In this approach, the safety-health provider is making discriminating choices based on "better" HPD performance, rather than the more common and naive "highest is best" concept. A related benefit commensurate with making better choices, each on an individual basis, is the enhancement such HPD selections will have on the person's greater acceptance of the need to properly and consistently wear HPDs during all encounters with potentially hazardous noise.

Level-Dependent or Nonlinear Devices

These devices can be either active or passive; i.e., electronic or non-electronic. A 1995 listing of commercially available models of level-dependent devices included 20 insert devices and 17 circumaural muff type units of either passive or electronic design.[4] The term nonlinear can apply to acoustic alterations of either frequency (spectrum composition) or level of attenuation.[2] Typically, a passive (no electronics) level-dependent device is designed with an apparatus, like a valve or small round hole or slit(s) in a metal cone or diaphragm, which is installed in an acoustic duct through which sound passes to reach internal hearing mechanisms. This aperture tends to partially bypass the normal attenuating properties of the device in which installed.

The amount of attenuation provided by such devices remains linear until the level of external sounds (usually impulse or impact) reaches a rather high level, like 120 dB. At this level and above, the action of the level-dependent apparatus creates a turbulent flow within the aperture or slit that causes a restriction of additional noise level passage. The increase in attenuation delivered by this type of device, once the level exceeds about 120 dB, may, for example, be about one-half dB per 1-dB increase. The limiting factor associated with providing additional sound reduction performance is dictated by the inherent passive sound attenuation properties of the device in which the apparatus is installed.[2]

These types of nonlinear (level) devices are primarily beneficial for encounters with open-field gunfire, allowing the wearer to better hear communications and environmental sounds but providing some degree of additional protection during encounters with impulse-type noise associated with firing. Typically, these devices are relatively low attenuating units, usually between 6 to 16 dB (NRR), when used in sound or noise environments below about 120 dB. Also, the nonlinear apparatus does not operate as effectively when impulse-type acoustic emissions are in the near vicinity to a roof, panel, concrete walls, and other surfaces that result in a reverberant sound field.

An electronic level-dependent nonlinear device is typically of muff design and contains electronic components that serve to pick up ambient sounds with an externally mounted microphone and deliver them to the ears of the wearer by earphones located in the over-the-ear muff cups. Sixteen such commercially available devices were listed in the 1995 HPD compendium. These units are fitted with electronic amplification units, which deliver from 5 to 10 dB of signal gain and are usually outfitted with an electronically activated system that causes the signal gain to either cut-out or suppress at-the-ear levels delivered to the ear when ambient levels reach some pre-set level, usually about 82 to 85 dB.[1,2] If the level continues to increase beyond 85 dB, for example, the electronically amplified signal typically shuts off, leaving the inherent normal (linear) attenuating properties of the HPD muff to operate in a passive manner.

Active HPDs of the type described here can amplify ambient sounds to partially overcome the attenuation normally delivered by the device, but the electronic quality of the amplified signals may be less than optimum because all sounds, desired and otherwise, receive increased gain and, in addition, inherent electronic "noise" tends to be present to some extent in most units. Operationally, it is best to obtain units where separate (independent external pick-up) microphones and internal electronic systems are installed in each muff unit. This arrangement enhances localization of sounds reaching the head of the wearer and more evenly simulates true stereophonic hearing of ambient signals.

Typically, when a muff cup contains electronic components, including batteries, volume control, and on-off switches and other internal components, the acoustic attenuation properties of the basic cup/cushion unit has been compromised; that is, it offers less overall passive attenuation. When such units are worn around gunfire, impulses created in near proximity to the wearer "trigger" the amplifier delivered suppression circuit, and this may result in annoying "gaps" that occur in an ongoing contextual communication as other shooters fire their weapons. As with all types of level-dependent units, the potential user should try out the units under actual operational conditions to ensure proper compatibility and user functions prior to deciding they are "best" for a desired application.

Active Noise Control Devices

Active noise control (ANC) devices are also available, of which five were identified as commercially available in

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Unique Protection Devices,

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October 1995.[4] These devices, if they are to be put to use in potentially hazardous noise settings, are solely available in circumaural muff models at present. These units also use electronic processing but in a different manner from simple electronic level-dependent or nonlinear type units previously described.

The ANC unit picks up ambient sounds through use of an externally mounted microphone and by electronic processing, re-delivers the sound inside the cup through a separate transducer in the muff. During this processing the phase of the sound striking the outer surface of the muff cup has been altered 180-degrees out of phase, partially canceling the acoustic signal within the lower frequencies. Basically, the active noise control features delivered by such systems are limited to about 800 to 1000 Hz and below range of frequencies. This type of unit is typically the most expensive of all the types of nonlinear or acoustic altering devices currently available commercially. As technology advances and manufacturing procedures and materials advance, the effectiveness of the noise-canceling capability should increase, and the overall cost decrease.

ANC devices containing communication elements necessary for two-way communications, including integration of at-the-lip or hand-held microphone transducers, have received the greatest usage of such units, such as those employed in private, miliary, and commercial aviation. Basically, choices among these types of units are dictated by the spectrum of the ambient noise in which worn. That is, noise dominated by lower frequencies and restraints imposed by economy and operational constraints associated with routine use.

Of course, a limiting factor is the level of the ambient noise in which these units will be worn. Even though they can deliver some degree of low frequency attenuation at 800 to 1000 Hz and below, the actual passive attenuation provided by the cup-cushions is generally in the lower range of overall performance. This is due to inherent properties associated with cup/cushion interface that have been compromised by containment of the electronic components, batteries, switches, and more. Therefore, these units may be restricted from routine use in many industrial work environments containing high noise levels where some safety-health providers, managers, and others had first sought their use as a solution to controlling exposures.

Flat-Response, Moderate Attenuation Devices

The concept of designing an HPD that selectively filters or modifies the levels of sound within the frequency distribution of the sound spectrum reaching the hearing mechanism is not new. But recent advancements in manufacturing capability and molded materials, coupled with applied developmental research, have delivered some interesting results. As of October 1995, sixteen models were commercially available within the industrial market and a few non-industrial units exist within domestic market areas.

Available as an insert or circumaural muff, these devices contain acoustic apparatus designs that alter the degree of attenuation afforded over the primary audible range. The design goal has been to achieve a "flatter" attenuation across the overall audible frequency range, particularly from 500 to 4000 Hz, thereby improving the "naturalness" of ambient sounds delivered at the ear of the user. These devices typically offer low attenuation; between about 6 and 20 (NRR).[4]

Because the uniqueness of the design of these devices is to more evenly provide attenuation across adjoining frequency ranges, the signal reaching the auditory system of a wearer is relatively "flat." In a way, these flat-response, moderate-attenuation devices are like neutral gray tinted safety glasses; i.e., a light attenuating tint that does not severely discriminate against the remainder of the color dependent spectrum. Applications for flat-moderate HPDs include performing and practicing musicians and audiences attending concerts; reducing distracting sounds while retaining easier hearing of essential sound events; settings such as a study hall or library; keypunch operators; busy office areas; and for wearing in airlines, subways, and in noisy vehicles.

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Council Invites INCE to Join CAOHC

At the October Council meeting, CAOHC unanimously elected the Institute of Noise Control Engineering of the United States of America (INCE) to join the Council as a Component Professional organization. Two representatives will be appointed to the CAOHC Council beginning with the 1998 Spring Council meeting. INCE/USA will become CAOHC's eighth component organization. We will profile INCE in our March 1998 issue.

FOUR NEW REPRESENTATIVES APPOINTED TO CAOHC COUNCIL

At the close of the Council meeting in Denver, CO, Oct. 9, 1997, four new representatives joined the CAOHC Council.

James D. Banach, MBA, will represent the American Industrial Hygiene Association. He is with Quest Technologies, Inc. in Oconomowoc, Wisconsin, an international manufacturer of instrumentation for noise measurement and analysis. His roles have included regional and national sales management and general management with activity in noise measurement seminar development and presentation.

Elliott H. Berger, MS INCE Brd.Cert., is also a new representative from the American Industrial Hygiene Association. Mr. Berger is Senior Scientist, Auditory Research for E-A-R/Aearo Company in Indianapolis, Indiana, an international manufacturer of safety products. He supervises and conducts research in hearing protector design, measurement, performance, and audiometric data base analysis, and the incidence of noise-induced hearing loss.

Maj Theresa Y. Schulz, USAF, PhD, CCC-A, will represent the Military Audiology Association. She is the United States Air Force Executive Manager for Joint Service Hearing Conservation at the Aberdeen Proving Ground in Edgewood Area, Maryland. Dr. Schulz has received numerous awards and decorations both within and outside the armed services for her contributions in hearing conservation.

Myrna M. Stephens, PhD, is a new representative from the American Speech-Language-Hearing Association. Dr. Stephens is owner and director of Audiology Consultants, Inc. of Davenport, Iowa. She is Chair of ASHA's Special Interest Division for Hearing Conservation and Occupational Audiology, and is a CAOHC certified Course Director.

Jeffrey Morrill, outgoing CAOHC Chair, welcomes the four new Council Members pictured left to right: Jeff Morrill (outgoing chair), Elliott Berger, Theresa Schulz, Myrna Stephens, James Banach

Fall 1997 Course Director Workshop

The Fall Course Director Workshop was held in Denver, Colorado on Friday, October 10, 1997. Eleven new Course Directors were awarded certification upon completion of this workshop. Four previously certified Course Directors renewed their certification. The Course Director is responsible for planning and conducting training courses for OHCS and ensuring CAOHC guidelines are followed.

OHC Certification

CAOHC Certification is valid 5 years from the date of the original 20 hour course. Recertification at an 8 hour course must be made by the expiration date of your CAOHC issued certificate. Your application must be filed with the CAOHC office to be valid. Contact CAOHC staff to verify certification or to locate an approved CAOHC course by calling 414/276-5338...or locate courses at CAOHC's website.

Events

BALTIMORE, MARYLAND LOCATION FOR COURSE DIRECTOR WORKSHOP

The Spring 1998 Course Director Workshop will be held at the DoubleTree Guest Suites in Baltimore, Maryland on Friday, March 27, 1998.

This workshop is for Course Directors who are planning to initially certify, or are using the workshop method to recertify. Applications must be received in the CAOHC office no later than February 27, 1998, and can be obtained by contacting Barbara Lechner at the CAOHC executive office at 414/276-5338 or accessing the website at http://www.globaldialog.com/~caohc.

CAOHC EXHIBITING AT TWO UPCOMING CONFERENCES

CAOHC will be exhibiting at the 23rd Annual NHCA Hearing Conservation Conference being held at the Hyatt Regency in Albuquerque, New Mexico, February 19-21, 1998.

In addition, CAOHC will exhibit at the American Occupational Health Conference being held in Boston, Massachusetts, April 24-May 1, 1998. You will be able to verify your certification at the booth and make any address corrections needed. Please stop by our newly updated booth and say hello!

Upcoming OHC Certification and Recertification Courses*

Approved December 1, 1997 for the year 1998

**The listed dates indicate day one of the scheduled classes; certification courses are 20 hours in length; recertification classes are 8 hours.*

Date	City	Course Director	Phone
1/5	Ft.Sam Houston, TX	Peterson, Cpt. Eric	(Army)
1/5	Yokosuka, Japan	Williams, Lt. Kelly	(Navy)
1/6	Greensboro, NC	Juarez, Omar	910/665-1818
1/7	Boise, ID	Bowman, Rick	208/376-3591
1/7	Greensboro, NC	Juarez, Omar	910/665-1818
1/7	Rock Hill, SC	Niedringhaus, Jackie	803/327-1900
1/8	Delray Beach, FL	Adam, Nimet	561/495-3648
1/9	Beaufort, SC	Faulkner Gischia, Carol	(Navy)
1/13	Chapel Hill, NC	Stewart, Andrew	800/334-5478
1/14	Brookfield, WI	Korabic, Dr. Edward	414/288-3428
1/14	Chapel Hill, NC	Stewart, Andrew	800/334-5478
1/21	Dallas, TX	Harris, Dr. Dean	970/586-0702
1/21	Los Angeles, CA	McCall, Kirsten	910/665-1818
1/26	Walnut Creek, CA	Fankhauser, Dr. Charles	707/746-6334
1/27	Brooks AFB, TX	Waldo, Tressie	(Air Force)
1/28	New Haven, CT	Hengen, Dr. Garth	508/752-4663
1/28	Amherst, NY	Nelson, David	716/633-7210
1/28	Moraine, OH	Pavlakos, Dr. Chris	937/436-1161
2/2	Portland, OR	Atack, Dr. Rodney	503/614-8465
2/4	Wellesley, MA	Gordon, Pamela	612/891-9124
2/4	Jacksonville, FL	Green, Nancy	904/399-3370
2/5	Charleston, WV	Harris, Gary	304/766-6555
2/9	Towson, MD	Moreland, Dr. Rebecca	410/646-2121
2/10	Indianapolis, IN	Cook, George	800/334-5478
2/10	Los Angeles, CA	McCall, Kirsten	910/665-1818
2/10	Charlotte, NC	Newman, Valerie	800/334-5478
2/11	Indianapolis, IN	Cook, George	800/334-5478
2/11	Springfield, MA	Gordon, Pamela	612/891-9124
2/11	Los Angeles, CA	McCall, Kirsten	910/665-1818
2/11	Charlotte, NC	Newman, Valerie	800/334-5478
2/25	Omaha, NE	Norris, Dr. Thomas	402/391-3982
2/25	Chapel Hill, NC	Stewart, Andrew	800/334-5478
3/3	Wellesley, MA	Gordon, Pamela	612/891-9124
3/3	Durham, NC	Landreth, Lee	919/544-7500
3/4	Greeley, CO	Kastner-Wells, Laurie	970/351-2014
3/6	Brooks AFB, TX	Waldo, Tressie	(Air Force)
3/9	Lexington, KY	Green, Dr.William	606/323-5840
3/10	Charlotte, NC	Newman, Valerie	800/334-5478
3/11	Charlotte, NC	Newman, Valerie	800/334-5478
3/16	Brooks AFB, TX	Waldo, Tressie	(Air Force)R
3/18	Owensboro, KY	Etienne, Dr. Joseph	502/926-0418
3/18	Brookfield, WI	Hase, Meredy	414/547-2227
3/18	Los Angeles, CA	McCall, Kirsten	910/665-1818
3/23	Ft.Sam Houston, TX	Peterson, Cpt. Eric	(Army)
3/25	Dallas, TX	Harris, Dr. Dean	970/586-0702
3/25	Charlotte, NC	Newman, Valerie	800/334-5478
3/30	Brooks AFB, TX	Waldo, Tressie	(Air Force)
4/2	Newport News, VA	Hecker, Henry	757/874-4665
4/6	Portland, OR	Atack, Dr. Rodney	503/614-8465
4/7	Chapel Hill, NC	Stewart, Andrew	800/334-5478
4/9	Montgomery, AL	Smith, Dr. Curtis	334/887-6302
4/14	Chapel Hill, NC	Stewart, Andrew	800/334-5478
4/15	Charlotte, NC	Newman, Valerie	800/334-5478
4/21	Indianapolis, IN	Cook, George	800/334-5478
4/21	Greensboro, NC	Juarez, Omar	910/665-1818
4/21	Los Angeles, CA	McCall, Kirsten	910/665-1818
4/22	Indianapolis, IN	Cook, George	800/334-5478
4/22	Greensboro, NC	Juarez, Omar	910/665-1818
4/22	Los Angeles, CA	McCall, Kirsten	910/665-1818
4/24	Brooks AFB, TX	Waldo, Tressie	(Air Force)
5/5	Waterville, ME	Giroux, Anne	207/872-4382
5/5	Warwick, RI	Gordon, Pamela	612/891-9124
5/5	Durham, NC	Landreth, Lee	919/544-7500
5/5	Brooks AFB, TX	Waldo, Tressie	(Air Force)
5/11	Concord, NH	Gordon, Pamela	612/891-9124
5/12	Greensboro, NC	Juarez, Omar	910/665-1818
5/13	Dallas, TX	Harris, Dr. Dean	970/586-0702
5/13	Greensboro, NC	Juarez, Omar	910/665-1818
5/18	Brooks AFB, TX	Waldo, Tressie	(Air Force)R
5/20	Los Angeles, CA	McCall, Kirsten	910/665-1818
5/21	Waterville, ME	Giroux, Anne	207/872-4382
5/27	Chapel Hill, NC	Stewart, Andrew	800/334-5478
6/1	Portland, OR	Atack, Rodney	503/614-8465
6/1	Ft.Sam Houston, TX	Peterson, Cpt. Eric	(Army)
6/16	Los Angeles, CA	McCall, Kirsten	910/665-1818
6/16	Charlotte, NC	Newman, Valerie	800/334-5478
6/17	Los Angeles, CA	McCall, Kirsten	910/665-1818
6/17	Charlotte, NC	Newman, Valerie	800/334-5478
6/17	Omaha, NE	Norris, Dr. Thomas	402/391-3982
6/18	Brooks AFB, TX	Waldo, Tressie	(Air Force)R
6/23	Indianapolis, IN	Cook, George	800/334-5478
6/24	Indianapolis, IN	Cook, George	800/334-5478
6/24	Denver, CO	Harris, Dr. Dean	970/586-0702
7/1	Brooks AFB, TX	Waldo, Tressie	(Air Force)
7/8	Brookfield, WI	Hase, Meredy	414/288-3428
7/14	Greensboro, NC	Juarez, Omar	910/665-1818
7/15	Dallas, TX	Harris, Dr. Dean	970/586-0702
7/15	Greensboro, NC	Juarez, Omar	910/665-1818
7/21	Brooks AFB, TX	Waldo, Tressie	(Air Force)
7/29	Owensboro, KY	Etienne, Dr. Joseph	502/926-0418
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8/4	Durham, NC	Landreth, Lee	919/544-7500
8/4	Chapel Hill, NC	Stewart, Andrew	800/334-5478
8/5	Jacksonville, FL	Green, Nancy	904-399/3370
8/5	Greeley, CO	Kastner-Wells, Laurie	970/351-2014
8/5	Chapel Hill, NC	Stewart, Andrew	800/334-5478
8/6	Montgomery, AL	Smith, Dr. Curtis	334/887-6302
8/6	Brooks AFB, TX	Waldo, Tressie	(Air Force)R
8/11	Waltham, MA	Gordon, Pamela	612/891-9124
8/11	Los Angeles, CA	McCall, Kirsten	910/665-1818
8/12	Los Angeles, CA	McCall, Kirsten	910/665-1818
9/1	Indianapolis, IN	Cook, George	800/334-5478
9/1	Brooks AFB, TX	Waldo, Tressie	(Air Force)
9/2	Indianapolis, IN	Cook, George	800/334-5478
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9/22	Concord, NH	Gordon, Pamela	612/891-9124
9/23	Dallas, TX	Harris, Dr. Dean	970/586-0702
9/23	Chapel Hill, NC	Stewart, Andrew	800/334-5478
9/24	Newport News, VA	Hecker, Henry	757/874-4665
10/5	Portland, OR	Atack, Dr. Rodney	503/614-8465
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10/20	Woburn, MA	Gordon, Pamela	612/891-9124
10/20	Charlotte, NC	Newman, Valerie	800/334-5478
10/21	Denver, CO	Harris, Dr. Dean	970/586-0702
10/2	Charlotte, NC	Newman, Valerie	800/334-5478
10/28	Omaha, NE	Norris, Dr. Thomas	402/391-3982

Please contact the CAOHC office at 414/276-5338 for additional course availability. Publication dates may have precluded some course dates.

CAOHC
Council for Accreditation in
Occupational Hearing Conservation
611 East Wells Street Milwaukee, WI 53202-3816

Return Service Requested

Look for CAOHC
on the
INTERNET

http://www.globaldialog.com/~caohc

or e-mail our office at
caohc@globaldialog.com

CAOHC Council Members and Their Represented Organizations