HEARING PROTECTION PROGRAM

PURPOSE / SCOPE

The policy of Winger Companies, herein referred to as Winger, is to perform work in the safest possible working conditions for its employees' work place. It is each employee's responsibility to ensure they are performing their job in the safest most efficient manner possible.

The purpose of Winger's Hearing Protection Program is to provide personnel with the knowledge and equipment necessary to prevent occupationally related noise-induced hearing loss from work related noise exposures and to ensure compliance with OSHA 1926.52. Continual exposure to excessive noise levels has a cumulative effect and may cause permanent hearing loss. Exposure to sudden, intense noises may even cause rupture of the eardrum and damage to the inner ear.

EFFECTS OF NOISE ON HEARING

Facts:

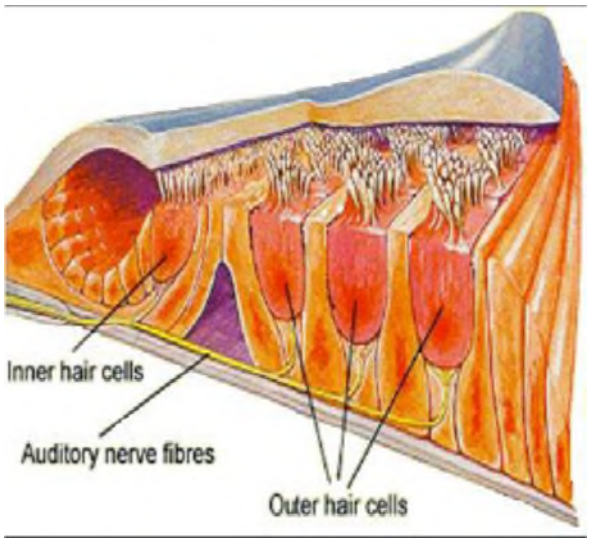
- Approximately 17 percent, or 26 million, adults (age 20-69) have permanent damage to their hearing from exposure to excessive noise.
- Noise-induced hearing loss is the most common workplace disorder and the second most self-reported occupational illness or injury.
- Noise typically causes a gradual, progressive high frequency hearing loss (loss of hearing in the high pitches of sound), but in some instances, it can cause immediate hearing loss.
- Excessive unprotected noise exposure leads to a progressive loss of communication ability and difficulty understanding conversation, especially when there is background noise.
- A constant tinnitus, or ringing sensation in the ear or head, is a common side effect of hearing loss. It can be mild to severe, and possibly disruptive to daily life.
- 44% of carpenters and 48% of plumbers report having a hearing loss.
- By the age of 25, the average carpenter has the same hearing as a 50-year-old person who does not work around hazardous noise.
- Noise-induced hearing loss adds to the inevitable age-related hearing loss (**presbycusis**).
- Noise-induced hearing loss is permanent. Excessive noise damages the hair-like neural receptors (cilia) in the inner ear (Organ of Corti), and these do not heal.
- Hearing aids may help, but will never restore normal hearing ability. They not only make what you are trying to hear louder, but also increase the background noise. Hearing aids cannot restore clarity.

HOW YOUR HEARING WORKS

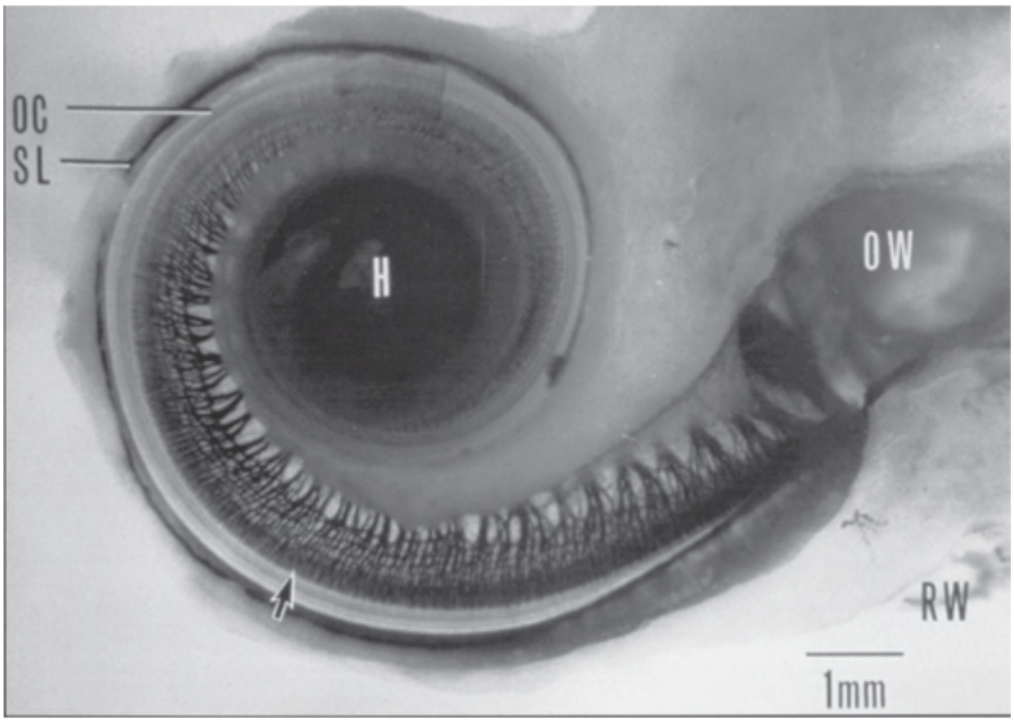
- The hearing mechanism has 4 components:
  - Outer ear – Collects and funnels sound down to the eardrum.
  - Middle ear – The eardrum and middle ear bones vibrate in response to sound, and transfer the sound into the inner ear.
  - Inner ear – see below
  - Central nervous system – see below
- The Inner Ear houses the anatomy that is affected by noise.
  - Sound travels through the outer and middle ear to the inner ear.

- A snail-shaped organ located in the inner ear, known as the cochlea, is the sense organ of hearing.
- The cochlea is fluid-filled and contains many cilia (nerve endings).
- As sound impulses enter the cochlea, they cause movement of the fluid and deflection of the nerve endings.
- Deflection of the cilia generates nerve impulses which are sent to the brain (central nervous system) and interpreted as sound.
- Sound can also be transmitted to the ear through bone conduction, or bone/skull vibration.

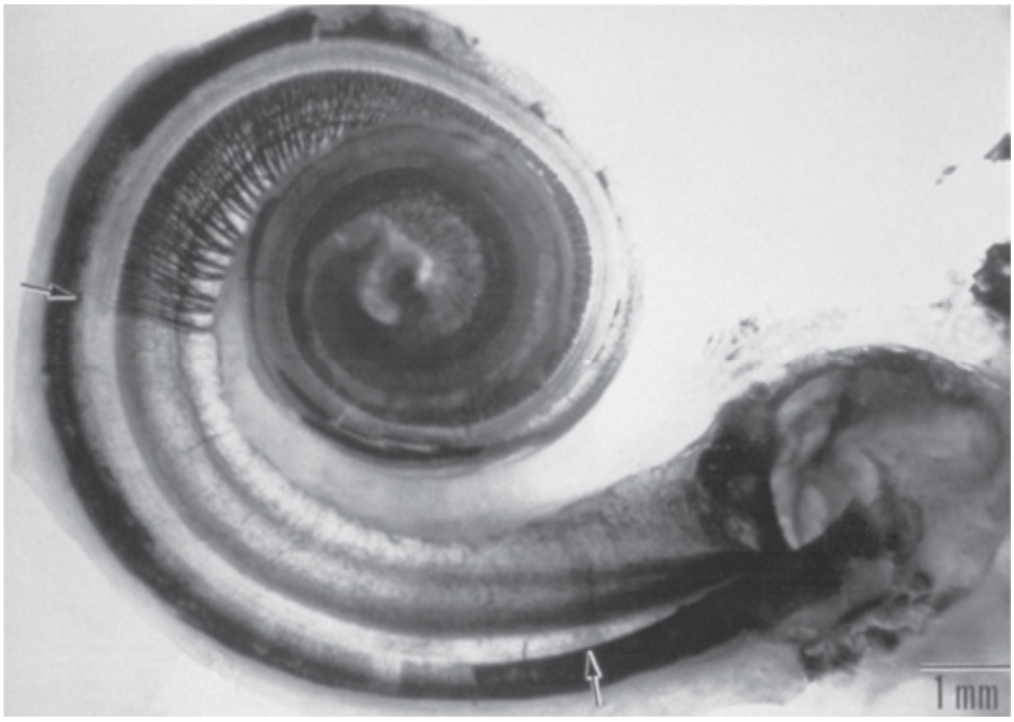
- Prolonged exposure to hazardous noise causes hearing loss by physical destruction of the cilia in the cochlea.
  - Once the cilia are destroyed, they can no longer send nerve impulses to the brain for sound recognition and analysis. There is no chance for hearing acuity to return to normal.
  - Damage/destruction of the cilia is irreversible and can occur suddenly from exposure to an explosion or weapon fire, or it can be gradual from long-term exposure to loud, steady noise, Cilia do not regenerate, once destroyed, they will never recover.
  - The cilia in your ear act like the grass in your lawn – walk on them a little, and they recover. Walk on them too much, and the damage is permanent. Repeated and excessive exposure to noise is like walking on the grass too much. Dead cilia won't let you hear, they won't grow back, and you can't re-seed your ear like your lawn.
  - The consequence of this damage is a high frequency sensori-neural hearing loss (loss of hearing of the high pitches of sound), a dysfunction of the inner ear or hearing nerve.
  - The amount of hearing loss obtained varies from person to person, as some people are more susceptible to hearing loss than others.
  - Sensori-neural hearing loss is irreversible, untreatable and permanent.



YOUR INNER EAR



This is the inner ear of a person who had good hearing. The arrow shows the part of the ear that has the healthy nerve cells. These nerve cells are necessary for good hearing and communication.



YOUR INNER EAR AFTER NOISE

This is the inner ear of a worker who was exposed to high noise levels without hearing protection. The arrows show the area of destroyed nerve cells resulting in permanent hearing loss. Excessive exposure to loud noise can cause this type of damage. This kind of damage cannot be repaired.

- Difficulty understanding conversation.
- Two main factors that determine whether hearing loss is likely to result from loud noise exposure are: **intensity** (the loudness level of the sound) and **duration** of exposure (how long you are around the noise). So, by limiting the intensity and/or the duration of exposure, you reduce the likelihood of acquiring hearing loss. Reducing the intensity and duration can be accomplished through noise abatement, engineering or administrative controls, and/or through the use of hearing protection.
- Sound volume is measured in decibels (dB), which is the logarithmic unit for intensity.
- The human ear can hear frequencies (pitches of sound) at 20 – 20,000 Hertz, but the range where the most useful pitches, such as speech sounds, occur is at 500 – 4,000 Hz.
- Hearing loss from noise exposure typically affects the high frequency range of human hearing (3,000 – 6,000 Hz). This results in the inability to hear many of the consonant sounds of speech, which fall into this high frequency range. Therefore, a noise-induced hearing loss affects the clarity of speech, as well as the volume.
- Speech sounds will seem distorted, even at loud levels.
- Understanding conversation is difficult when there is background noise or room reverberation, which can be very distracting and can impede a hearing–impaired person from understanding the speech signals.
- Noise not only affects hearing. It affects other parts of the body and body systems. It is now known that noise…..
    - Induces physical stress.
    - Increases blood pressure.
    - Has negative cardiovascular effects such as changing the way the heart beats.
    - Increases breathing rate.
    - Disturbs digestion, can cause an upset stomach or ulcer.
    - Can negatively impact a developing fetus, perhaps contributing to premature birth.
    - Makes it difficult to sleep, even after the noise stops.
    - Disrupts attention or concentration.
    - Causes fatigue, tension, nervousness, anxiety and hostility.
    - Intensifies the effects of factors like drugs, alcohol, aging and carbon monoxide.
    - Leads to isolation and withdrawal from social situations due to repeated embarrassment from misunderstanding conversations.
    - Causes distance in relationships due to the continual increased effort involved in communicating.

HOW CAN YOU TELL IF A NOISE SITUATION IS TOO LOUD?

- If you have to raise your voice to talk to someone who is an arm's length away.
- When exiting from a loud music concert or a noisy industrial environment, sounds may seem muffled or dimmed. In this instance, the cilia in the inner ear have been bent. The cilia may later return to their normal upright position after a few hours or by the next day. With repeated unprotected exposure to loud noise, the cilia begin to break off and die.
- "Naw, that noise doesn't bother me, I'm used to it", means you probably already have lost some hearing and don't realize how loud the environment really is.
- When you go to work, set your car radio to a just audible level upon arriving at work. Turn off the ignition, leaving the volume untouched. After returning to your car for the trip home, carefully listen to see if you can still hear the radio. If you cannot, this is evidence that your ears have been fatigued by the day's noise exposure.

NOISE REDUCTION RATING (NRR)

- Noise Reduction Rating (NRR) is defined as the maximum number of decibels (dB) that the hearing protection will reduce the sound level when worn.
- OSHA states that the hearing protection should have a NRR sufficient to reduce the exposure to an 8-hour Time Weight Average (TWA) of 90 dB (Construction Standard) or 85 dB (General Industry Standard).
- When using an A-weighted TWA, first subtract 7 dB from the NRR, then subtract the remainder from the TWA to determine the attenuated noise level.
    - OSHA allows for earplugs to be worn underneath earmuffs. The NRR this will produce is calculated by adding 5 dB to the NRR of whichever protection (the earplug or the earmuff) has the higher NRR. Keep in mind that this is after the necessary reduction factor of 7 dB (if using the A weighted scale) has been calculated. For example, if you were using an earplug with a NRR of 32 dB with an earmuff of 27 dB, your noise reduction calculations would be:
    - 32 dB[A] (earplug) – 7 dB (OSHA Safety Factor) = 25 dB
    - 25 dB + 5 dB (for using earmuff and earplug together) = 30 dB
    - Total corrected NRR = 30 dB

TYPES OF HEARING PROTECTORS SELECTED BY WINGER

Winger has evaluated specific noise environments and provides the following types of hearing protection at no cost for their employees when exposed to an 8-hr. time-weighted average of 85 decibels. Employees will be given an opportunity to select their hearing protection from the employer's selection

- Disposable Earplugs: These are the most common type of protection. Disposable earplugs are compressed or rolled-down prior to insertion and then slowly re-expand to fill the ear canal. These earplugs are available with a pre-attached cord. **This cord must not be removed due to our customer's requirements.**
- Hearing Bands / Canal Caps: Hearing Bands consist of a pair of earplugs connected to a flexible band, which caps the ear canal. These can be worn in a number of positions over-the-head, under-the-chin or behind-the-neck. The NRR of these bands is similar to most earplugs.
- Earmuffs: Earmuffs have rigid cups with soft cushions that seal around the ears to block noise. Three common designs of earmuffs are over-the-head, cap-mounted and behind-the-neck. These may be worn in addition to earplugs, for double hearing protection required areas.
- Some employees purchase and wear electronic earmuffs at home. These provide the same protection as standard earmuffs but also offer other features such as AM/FM radio reception, two-way radio reception or amplification of low sound levels. Anything louder than 90 dB is restricted. These are awesome for loud events off the job, such as trap shooting and car races, while still being able to hear normal conversations.
- Hearing Protection is required and will be worn by employees:

MAINTENANCE OF HEARING PROTECTION

Ear plugs used by employees are disposable and therefore no maintenance is required. Follow manufacturer's instructions for the maintenance and care of hearing bands and earmuffs. You should not use hearing protection that is uncomfortable, loose, cracked, or that doesn't seal well. Care shall be taken if the plugs are removed frequently. They may become dry or greasy and should be cleaned or a new pair should be used as often as necessary. Care shall be taken not to handle and insert ear plugs with dirty hands as this could lead to severe ear infections. Ear-muffs should be cleaned frequently with a mild soap and water solution or a cleaning solution. After they are washed, they should be rinsed in plain warm water, wiped dry with a clean cloth, and air-dried. The components of the ear-muffs shall be inspected frequently for damage. Damaged ear seals shall be replaced.

NOISE LEVELS FOR COMMON EQUIPMENT

If this equipment is used, the appropriate hearing protection should be noted. This note is not all inclusive. Sound levels for equipment not on this may be extrapolated using this list as a guide if actual measurements are unavailable. Operation of multiple noise sources in the same area or operation of any noise source in a reverberant environment, such as confined space, will result in higher noise levels.

Equipment Used	Hearing Protection Required	Sound Level Max
Aerial Lift	One	< 85
Air Compressor (185 psi)	Single	90
Air Compressor (w/o muffler)	Double	130
Air Hose (90 psi)	Single	100 - 104
Back Hoe	Single	95 - 99
Ball Mill	Double	110
Blower (electric)	None	< 90
Bull Dozer	Single	100 - 104
Chainsaw	Double	> 125
Cherry Picker (8 or 15 ton)	Single	100 - 104
Circular Saw (unloaded)	Single	99 - 104
Crane (hydraulic, 45 ton)	Single	100 - 104
Drill (unloaded)	Single	90 - 98
Fork Truck	Single	90 - 104
Grinder (unloaded)	Single	94 - 102
Hammer Drill (loaded)	Single	101 - 104
Jig Saw (unloaded)	Single	95 - 98
Lawn Mower	Single	90 - 100
Pile Driving	Double	125 - 127
Power Saw	Double	102 - 110
Reciprocating Saw	Single	96 - 103
Road Grader	Single	< 90
Screwdriver (unloaded)	Single	90 - 93
Shotgun	Double	170
Welding Machine	Single	> 90

DO'S AND DON'TS

- High noise levels can damage hearing and cause safety problems. Always use hearing protection as this can cause:
  - Temporary or permanent hearing loss.
  - Tinnitus, a constant or periodic ringing or roaring in the ears.
  - Inability to hear signals and safety warnings (interferes with communication).

- Never use cotton, stereo headsets, or other makeshift hearing protection. Always use assigned hearing protection: earmuffs, earplugs, or canal caps.
- Inspect hearing protection before each use. Don't use:
  - Earmuffs or canal caps that are loose, cracked, or don't seal well.
  - Earplugs that are cracked, misshapen, or hard and inflexible.
- Be aware of and report hearing problems such as:
  - Noise or ringing in the ears.
  - Trouble hearing voices or high or soft sounds.
  - Needing TV or radio volume so high that others complain.
  - Difficulty hearing normal conversation.
- Wear hearing protection for off-the-job noise exposure:
  - Power tools, chain saws, lawn mowers, garden tractors.
  - Hunting, shooting.
  - Motorcycles, snowmobiles, rock concerts, car and motorcycle races.
- Protect yourself and co-workers by always wearing hearing protection when using power tools and in noisy areas. Even if you're not the one making the noise, be aware of the hazard and use protection.

LOOK FOR THESE SIGNS OF HEARING LOSS:

- Frequently asking people to repeat themselves.
- Turning your ear toward a sound or cupping your hand around your ear to hear better.
- Understanding people better when you wear your glasses or concentrating on visual cues, like reading their lips, when people are talking to you.
- Keeping the volume on the TV or radio at an excessive level.
- Pain or ringing in your ears.
- Not being able to hear while talking on the telephone.
- Trouble following a conversation when two or more people are talking at the same time.
- Trouble hearing in a noisy background.
- People seem to mumble when they talk or not speak clearly.
- Misunderstand what people say.

OSHA 1910.95(K) TRAINING REQUIREMENTS:

- Training is required for each employee who is exposed to noise at or above an 8-hour time-weighted average of 85 decibels in accordance with OSHA regulations. All employees exposed shall participate in the program before initial assignment.
- Training must be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.
- Training shall be updated to be to be consistent with changes in protective equipment and work processes that include instruction on the proper use and fit of hearing protectors.
- Training shall include the following:
  - The effects of noise on hearing.
  - The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use and care.
  - The purpose of audiometric testing, and an explanation of the test procedures.

AUDIOMETRIC MONITORING

Within 6 months of an employee's first exposure at or above the action level, the employer shall establish a valid baseline audiogram against which subsequent audiograms can be compared. Winger uses mobile van testing.

Where mobile test vans are used to meet the audiometric testing obligation, Winger will obtain a valid baseline audiogram within 1 year of an employee's first exposure at or above the action level. Employee shall wear hearing protectors during that time. Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise. Hearing protection may be used as a substitute for this requirement.

All Winger employees who are routinely exposed to hazardous noise at work and are enrolled in the Hearing Conservation Program must have an annual hearing test. Hearing tests are administered by medical personnel who are certified in occupational hearing conservation. Results of the hearing test are compared to a baseline test to look for changes in hearing. If the annual audiogram shows that an employee has suffered a standard threshold shift, Winger may obtain a retest within 30 days and consider the results of the retest as the annual audiogram. The audiologist, otolaryngologist, or physician shall review problem audiograms and shall determine whether there is a need for further evaluation. Further evaluation may be; hearing protection shall be re-evaluated and/or refitted and if necessary a medical evaluation may be required as directed by the professional reviews.

Winger shall provide to the employee the following information:

- A copy of the requirements for hearing conservation.
- The baseline audiogram and most recent audiogram
- If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employee shall be informed of this fact in writing within 21 days of the determination.

RECORD KEEPING

Noise exposure measurement records shall be retained for two (2) years. Audiometric test records shall be retained for the duration of the affected employee's employment. All records shall be provided upon request to employees, former employees, representatives designated by the individual employee and the Assistant Secretary and Director. Training records shall be kept for five (5) years.

PROGRAM EVALUATION

This program will be reviewed and updated on an annual basis, or whenever necessary, to reflect changes in regulations, work practices, or procedures.

SOURCE CREDITS

U.S. Department of Labor, Occupational Safety and Health Administration, www.osha.gov
Mechanical Contractors Association of America, www.mcaa.org
National Institute on Deafness and Other Communication Disorders (NIDCD), www.nidcd.nih.gov
Bacou-Dalloz Hearing Safety Group

DOCUMENT CONTROL

Initial Program January 4, 2006
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