Overview and Index to the EARLog Series

Numbers 1 - 21

BY ELLIOTT H. BERGER
Senior Scientist, Auditory Research

The EARLog series of technical monographs on hearing and hearing protection was created in 1979 as a vehicle to provide the most up-to-date research and educational information to the customers of E·A·R / Aearo Company. Since that time 21 EARLogs have been written, and are reprinted for free distribution, and can be downloaded from our web site at www.e-a-r.com/hearingconservation.

EARLogs are peer reviewed by independent experts prior to publication. This highly acclaimed series has appeared as paid advertisements in eleven journals, is read in over 36 countries, and is utilized by the U.S. armed forces, OSHA, CAOHC, and more than 70 universities as educational materials for hearing conservation training courses. Moreover, it was heavily cited by the Mine Safety and Health Administration (MSHA) in their revised 1999 noise regulation. Selected EARLogs have been translated into Danish, German, French, Portuguese, and Swedish and others have been reprinted as contributed technical articles in magazines and journals in the U. S., Canada, Europe, Australia, and Brazil.

An index to the complete EARLog series, numbers 1 - 21 appears on the following pages. This document concludes with a list of the titles of the 21 EARLogs, including initial publication dates and the languages into which selected EARLogs have been translated.

There have been substantial strides in understanding hearing protection function and performance in the years since the first EARLog was published. This evolving series has reflected that fact by incorporating the most current information available at the time of publication. Certain of the EARLogs (1, 2, 15, 16) contain information which is somewhat dated, or less relevant today than when initially published. Although those EARLogs are no longer in general distribution, copies may be obtained by contacting us and specifying the nature of your request.

EARLog Index

| AAO formula (see workers' compensation, AAO formula) | Subject fit 21 |
| action level (see OSHA, action level) | Z24.22-1957 1, 16 |
| amplitude-sensitive HPD (see hearing protection devices, level dependent) | attenuation |
| ANSI (American National Standards Institute) | ANSI data (see ANSI) |
| approvals (see hearing protection devices, approvals) | class rating (see class rating) |
| standards | derating 12, 20, 21 |
| ASA STD1-1975 1,16 | earmolds 18 |
| hearing protectors 1, 16, 20, 21 | earplugs vs. earmuffs 8 |
| S3.19-1974 1, 16, 20, 21 | fit testing (see fit testing) |
| S12.6-1984 16 | hearing protection devices 1, 4, 8, 9, 10, 13, 14, 18, 19, 20, 21 |
| S12.6-1997 21 | HML Rating (see HML Rating) |
| Method B 21 | long-method computation (see attenuation, octave-band computation) |
| | measurement of 1, 4, 16, 20, 21 |
| | NIOSH Method #1 12, 21 |
| | NRR (see NRR) |
| | NRR(SF) [see NRR(SF)] |
| | octave-band computation 2, 12, 20, 21 |
| | optimum-fit data 21 |
| | real-ear attenuation at threshold (REAT) 1, 16, 21 |
| | real-world values 4, 20, 21 |
| | data for earplug+earmuff 13 |
| | SNR (see SNR) |
| | standard deviation (see standard deviation) |
| | variability between labs 1 |
| | audiometry 7, 11 |
| | A-weighting (see dBA/dBC) |
bone conduction
  effects of hard hats 9
  limits to attenuation 2, 5, 9, 13

combined hearing protection (see hearing protection devices, earplug+earmuff)

comfort
  combined hearing protection
  cerumen
  C-A value

cerumen
  17, 19

class rating
  21

class rating (see NRR, C-A value)

canal caps
  (see semi-aural devices)

custom molded earplugs
  (see earplugs, custom molded)

custom molded earplugs (see earplugs, custom molded)

C-weighting (see dBA/dBC)

dBA/dBC
  use with NRR 2, 12

derating (see attenuation, derating)

dose
  11

dose 11 (also called trading approaching)

double hearing protection
  (see hearing protection devices, earplug+earmuff)

ear
  5
  anatomy 5, 17
  bone conduction (see bone conduction)
  cerumen (see cerumen)
  cochlea
  5
  concha 17, 19
  diagram 5, 17
  ear canal 5, 17
  injury to 10
  eardrum 5, 17
  injury to 9, 10
  ear wax (see cerumen)
  examination 17, 19
  external (see ear, pinna)
  hair cells 5
  infection 8, 17
  due to swimming 17
  (also see earplugs, swimming)
  prevalence 17
  irritation 17
  middle 5
  ossicles 5
  outer 5, 17
  pinna 5, 17, 19
  tragus 19

earmolds
  attenuation (see attenuation, earmolds)
  leaks (see hearing protection devices, leaks)

earmuffs
  5, 13, 14
  attenuation (see attenuation, hearing protection devices)
  cushions 19 (also see hearing protection devices, maintenance)
  earseals (see earmuffs, cushions)
  eyeglasses, use with 19
  fitting (see hearing protection devices, fitting)
  headbands 19 (also see hearing protection devices, sabotage)
  in combination with earplugs (see hearing protection devices, earplug+earmuff)
  earplug effect (see occlusion effect)
  earplugs
  5, 13, 14
  and blowing nose 8
  attenuation (see attenuation, hearing protection devices)
  comfort (see hearing protection devices, comfort)
  cotton 10
  custom molded 19
  deterioration (see hearing protection devices, maintenance)
  earmold injury (see ear, eardrum)
  fiberglass 4, 13
  fitting (see hearing protection devices, fitting)
  foam 4, 10, 17, 19
  effect of insertion depth 13
  hearing-aid earmold 18
  infection (see ear, infection)
  occlusion effect (see occlusion effect)
  premolded 19
  readjustment 8
  removal 9
  sizing 5, 19
  swedish wool (see earplugs, fiberglass)
  swimming 10 (also see ear, infection)
  V-51R 4, 17
  working loose (see earplugs, readjustment)

education (see training)

employee training (see training)

engineering noise controls (see noise, engineering control of)

EPA (Environmental Protection Agency)

HPD labeling requirements 2, 9, 12, 20, 21

exchange rate
  5, 11, 14 (also called trading ratio)

external otitis (see ear, infection)

extra-auditory effects of noise (see noise, effects of)

Federal Employees’ Compensation Act
  (FECA) 15

field performance of HPDs
  (see attenuation, real world)

50% derating (see attenuation, derating)

fit testing

foam earplugs (see earplugs, foam)

government regulations
  2, 9, 11, 12

gunfire

hearing aids
  9, 18
  as hearing protection devices 18
  compared to eyeglasses 9
  earmold attenuation (see earmolds)
  for noise-induced hearing loss 9

Hearing Conservation Amendment
  (see OSHA, Hearing Conservation Amendment)

hearing conservation programs (HCPs)
  absenteeism 6
  education (see training)
  enforcement 7
  lost-time accidents 6
  motivation (see motivation)
  productivity (see noise, effects of)

hearing impairment (see communication, hearing impaired)

hearing protection devices (HPDs)
  abuse (see hearing protection devices, sabotage)
  air leaks (see hearing protection devices, leaks)
  amplitude sensitive (see hearing protection devices, level dependent)
  approvals 9, 12
  attenuation (see attenuation, hearing protection devices)
  bone-conduction limits (see bone conduction)
  canal caps (see semi-aural devices)
  combined (see earplug+earmuff)
  comfort 5, 8, 10, 17, 19
  communication (see communication)
  derating (see attenuation, derating)
  deterioration (see hearing protection devices, maintenance)
  dispensing 19
  dual (see earplug+earmuff)
  earmuffs (see earmuffs)
  earplug+earmuff 5, 13
  earplugs (see earplugs)
  field performance (see attenuation, real world)
  fit testing (see fit testing)
  fitting 19
  headaches 9
  hygiene 17
  labeling (see EPA)
  leaks 5, 18, 19
  level dependent 3, 16
  maintenance 5
  nonlinear (see hearing protection devices, level dependent)
  occlusion effect (see occlusion effect)
percentage time worn (see, hearing protection devices, wearing time)
real-world attenuation (see attenuation, real world values)
sabotage 5
semi-aural devices (see semi-aural devices)
sizing (see earplugs, sizing)
testing (see ANSI, standards)
use time (see hearing protection devices, wearing time)
wearing time 5, 20 (also, see exchange rate)
HML Rating 20, 21

infection (see ear, infection)
infracisonic noise attenuation by HPDs 14
intelligibility (see communication, auditory)
irritation (see ear, irritation)
level-dependent HPD (see hearing protection devices, level dependent)
localization 3
long method (see attenuation, octave-band computation)

machine noise
perception of 8
mean attenuation (see attenuation)
motivation 7, 8, 9, 10, 20
MSHA (Mine Safety and Health Administration) 9

NHCA (National Hearing Conservation Association)
Task Force on Hearing Protector Effectiveness 21
NIOSH (National Institute for Occupational Safety and Health) 9
derating 21
Method #1 (see attenuation, NIOSH Method #1)
Method B (see standards, S12.6-1997, Method B)
NVLAP (National Voluntary Laboratory Accreditation Program) 21

noise
effects of
on hearing (see noise-induced hearing loss)
on nonauditory function 6
on performance 6
on safety 6
engineering control of 20
exposure limits
infracisonic 14
ultrasonic 14
hazard 10, 14, 15
perception of (see machine noise)
physiological (see physiological noise)
pink (see pink noise)
noise dose (see dose)
noise-induced hearing loss (NIHL) 8, 15
hearing aids (see hearing aids)
Noise Reduction Rating (see NRR)
Noise Standard (see OSHA, Noise Standard)
nonauditory effects of noise (see noise, effects of)
nonlinear HPD (see hearing protection devices, level dependent)
NRR (Noise Reduction Rating) 2, 12, 20, 21
C-A value 12
compared to octave-band computation (see attenuation, octave-band computation)
derating (see attenuation, derating)
effects of double protection 13
real-world ratings (see attenuation, real-world values)
7-dB correction 12, 20
use with A- or C-weighting 12

NRR(SF) [Noise Reduction Rating (Subject Fit)] 21

occluding earwax (see cerumen)
occlusion effect 5, 10
and fitting HPDs 19
occupational hearing loss (see noise-induced hearing loss)
octave-band computation (see attenuation, octave-band computation)
OSHA (Occupational Safety and Health Administration) 9, 11, 12
action level 11
approval of HPDs (see hearing protection devices, approvals)
derating (see attenuation, derating)
compliance 11
exchange rate (see exchange rate)
Hearing Conservation Amendment 11
Noise Standard 11
permissible exposure limit (PEL) 11
7-dB correction (see NRR, 7-dB correction)
standard threshold shift (STS) 11, 20
time-weighted average sound level (TWA) 11

otitis externa (see ear, infection)
otoscopy (see ear, examination)
overprotection 21

permissible exposure limit (see OSHA, permissible exposure limit)
physiological noise 16
pink noise 2
pinna (see ear, pinna)
real-ear attenuation at threshold [see attenuation, real-ear attenuation at threshold (REAT)]
real-world attenuation (see attenuation, real-world values)
recreational earphones (see stereo earphones)
regulations (see government regulations)

semi-aural devices 14
7-dB correction (see NRR, 7-dB correction)
SNR (single-number rating) 21
sound audible frequency range 14
Sound Level Conversion (SLC) 2, 4
speech discrimination (see communication, auditory)
speech intelligibility (see communication, auditory)
standard deviation
in attenuation measurements 4
in NRR computation 2, 20, 21
stereo earphones 9
STS (see OSHA, standard threshold shift)
swedish wool (see earplugs, fiberglass)
swimmers’ earplugs (see earplugs, swimming)
temporary threshold shift (TTS) 4
trading ratio (see exchange rate)
training 7, 11, 19, 20
TWA (see OSHA, time-weighted average sound level)

ultrasonic noise
attenuation by HPDs 14
use time (see hearing protection devices, wearing time)

Walkmans (see stereo earphones)
wearing time (see hearing protection devices, wearing time)
weighing (see dBA/dBC)
workers’ compensation 15
AAO formula 15
high fence 15
low fence 15
waiting period 15
<table>
<thead>
<tr>
<th>No.</th>
<th>Title</th>
<th>Date</th>
<th>Translations*</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.**</td>
<td>The Threshold Shift Method of Measuring Hearing Protector Attenuation</td>
<td>1979</td>
<td></td>
</tr>
<tr>
<td>2.**</td>
<td>Single Number Measures of Hearing Protector Noise Reduction</td>
<td>1979</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>The Effects of Hearing Protectors on Auditory Communications</td>
<td>1980</td>
<td>Sw</td>
</tr>
<tr>
<td>4.</td>
<td>The Performance of Hearing Protectors in Industrial Noise Environments</td>
<td>1980</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>Motivating Employees to Wear Hearing Protection Devices</td>
<td>1981</td>
<td>P</td>
</tr>
<tr>
<td>11.</td>
<td>The Hearing Conservation Amendment (Part I)</td>
<td>1983</td>
<td>F</td>
</tr>
<tr>
<td>12.</td>
<td>The Hearing Conservation Amendment (Part II)</td>
<td>1984</td>
<td>F</td>
</tr>
<tr>
<td>14.</td>
<td>Protection for Infrasonic and Ultrasonic Noise Exposure</td>
<td>1984</td>
<td>F,G</td>
</tr>
<tr>
<td>15.**</td>
<td>Workers’ Compensation for Occupational Hearing Loss</td>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>16.**</td>
<td>A New Hearing Protection Attenuation Standard - ANSI S12.6</td>
<td>1985</td>
<td></td>
</tr>
<tr>
<td>20.</td>
<td>The Naked Truth About NRRs</td>
<td>1993</td>
<td></td>
</tr>
</tbody>
</table>

* D = Danish, F = French, G = German, P = Portuguese, P/S = published as article in Sobrac (a Portuguese language Acoustical Journal), Sp = Spanish, Sw = Swedish. To obtain translations, contact Aearo Customer 317-692-3066.

** These EARLogs contain information that has been supplanted or has become dated. Those EARLogs are no longer in general distribution. Copies may be obtained by contacting us and specifying the nature of your request.