



# NOISE POLLUTION

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# NOISE POLLUTION

MOST OF US GO THROUGH LIFE TAKING OUR SENSES FOR GRANTED. LIKE TOUCHING, TASTING, SMELLING, AND SEEING; HEARING IS ALSO TREATED CARELESSLY.

BUT WHEN SOMETHING GOES WRONG WITH ANY OF OUR SENSES, WE EXPECT THAT MEDICAL SCIENCE HAS A MIRACLE TO OFFER. UNFORTUNATELY, MEDICINE OFFERS ONLY MODERATE IMPROVEMENT SPECIALLY FOR HEARING LOSS.

HEARING LOSS CANNOT BE RESTORED FOR MOST PEOPLE. LOTS OF PEOPLE SUFFER SOME DEGREE OF HEARING LOSS.

PEOPLE EXPOSED TO CONSTANT LOUD NOISE ON THE JOB, AT HOME OR THROUGH THEIR HOBBIES (EVEN FANS OF LOUD MUSIC!), HAVE AT LEAST ONE THING IN COMMON;

**THEY ARE AT RISK OF PERMANENT HEARING LOSS.**

# WHAT IS NOISE & NOISE POLLUTION

## ***ACCORDING TO ENCARTA***

SOUND ; = SOMETHING AUDIBLE

NOISE POLLUTION ; = IRRITATING NOISE FROM ENVIRONMENT

OR

PHYSICALLY DANGEROUS NOISE TO WHICH PEOPLE ARE EXPOSED IN THEIR ENVIRONMENT AND OVER WHICH THEY USUALLY HAVE NO CONTROL.

SOUND IS MEASURED IN DECIBLES AND IS A LOGARITHMIC SCALE AND CLIMBS STEEPLY, AN INCREASE OF 3DB WILL DOUBBLE THE SAOUND

# HOW MUCH NOISE IS TOO MUCH?

YOU CAN TELL WHEN NOISE LEVELS REACH UNHEALTHY STANDARDS IF:

- YOU GET HEADACHES OR FEEL DIZZY FROM THE NOISE.
- YOU ARE DIAGNOSED WITH A HEARING PROBLEM AND CO-WORKERS ALSO HAVE THE SAME ISSUES.
- YOU HAVE DIFFICULTY HEARING CONVERSATIONS AFTER WORK.
- YOUR EARS RING AFTER YOU LEAVE YOUR WORKPLACE.
- YOU OR YOUR CO-WORKERS NEED TO SPEAK LOUDER THAN USUAL OR YELL TO BE HEARD AT A NORMAL DISTANCE FOR A CONVERSATION (ARM'S LENGTH).

# EFFECTS OF NOISE ON HEALTH?

NOISE IS A SERIOUS ISSUE BOTH IN THE SHORT AND LONG-TERM THE LEVELS OF DAMAGE THAT NOISE HAS CAUSED YOU CAN BE DISCOVERED FROM A SIMPLE AUDIOGRAM (HEARING TEST). AN EXCESS OF UNWANTED NOISE CAN CAUSE:

- HIGH BLOOD PRESSURE
- DIZZINESS AND HEADACHES
- NERVOUSNESS AND STRESS THAT LEADS TO ULCERS, INSOMNIA AND HEART DISEASE
- TEMPORARY AND PERMANENT HEARING LOSS
- LOSS OF CONCENTRATION

**MAYBE WORST OF ALL**, IF YOU CAN'T HEAR IN THE WORKPLACE YOU CAN'T STAY SAFE..

IMAGINE IF YOU CAN'T HEAR PROPERLY AND SOMEONE IS TRYING TO GET YOUR ATTENTION, AS A PALLET OF BOXES FALLS OVER OR A VEHICLE IS HEADED YOUR WAY.

**“NOISE CAUSES MANY MORE ACCIDENTS EACH YEAR THAT ARE IN NO WAY HEARING RELATED”**

# WHAT ARE THE SIGNS OF HEARING LOSS?

YOU THEY CAN USE IT TO EVALUATE YOUR OWN HEARING HEALTH:

- DO YOU HAVE A PROBLEM HEARING ON THE TELEPHONE?
- DO YOU HAVE TROUBLE FOLLOWING A CONVERSATION WHEN TWO OR MORE PEOPLE ARE TALKING AT THE SAME TIME?
- DO PEOPLE COMPLAIN THAT YOU TURN THE TV, RADIO, OR STEREO VOLUME UP TOO HIGH?
- DO YOU HAVE TO STRAIN TO UNDERSTAND CONVERSATION?
- DO YOU HAVE TROUBLE HEARING WHEN THERE'S A LOT OF NOISE IN THE BACKGROUND?
- DO YOU FIND YOURSELF ASKING OTHERS TO REPEAT THEMSELVES?
- DO MANY PEOPLE SEEM TO MUMBLE OR NOT SPEAK CLEARLY?
- DO YOU MISUNDERSTAND WHAT OTHERS ARE SAYING AND RESPOND INAPPROPRIATELY?
- DO YOU HAVE TROUBLE UNDERSTANDING THE SPEECH OF WOMEN AND CHILDREN?
- DO PEOPLE GET ANNOYED BECAUSE YOU MISUNDERSTAND WHAT THEY SAY?

**ANY ONE WHO ANSWERS "YES" TO THREE OR MORE OF THESE QUESTIONS SHOULD TALK TO DOCTOR ABOUT GETTING A HEARING EVALUATION.**

# FEW COMMON SOUND LEVELS

- SOFT WHISPER 20 – DECIBELS
- LEAVES RUSTLING, VERY SOFT MUSIC 30 – DECIBELS
- NORMAL SPEECH, BACKGROUND MUSIC 60 – DECIBELS
- HEAVY MACHINERY WITH SOUND PROOF CABINS 85 – DECIBELS
- LAWN MOWER, SHOP TOOLS 90 – DECIBELS
- HEAVY MACHINERY WITHOUT SOUND PROOF CABIN MOTORCYCLES 100 – DECIBELS
- LOUD MUSIC, 115 – DECIBELS
- JET ENGINE, GUN SHOT 140 – DECIBELS

**\* LESS THAN 10 DB IS NOT AUDIBLE.**

# EXPOSURE LIMITS

| dBA       | EPA and WHO |         | ANSI AND NIOSH |         |        | OSHA  |         |
|-----------|-------------|---------|----------------|---------|--------|-------|---------|
|           | Hours       | Minutes | Hours          | Minutes | Second | Hours | Minutes |
| 70        | 24          |         |                |         |        |       |         |
| 73        | 12          |         |                |         |        |       |         |
| 76        | 06          |         |                |         |        |       |         |
| 79        | 03          |         |                |         |        |       |         |
| 82        | 01          | 30      |                |         |        |       |         |
| <b>85</b> |             | 45      | <b>08</b>      | 0       |        |       |         |
| <b>88</b> |             | 23      | <b>04</b>      | 0       |        |       |         |
| 90        |             |         |                |         |        | 08    |         |
| <b>91</b> |             | 11      | <b>02</b>      | 0       |        |       |         |
| 92        |             |         |                |         |        | 06    |         |
| 94        |             | 06      | 01             | 0       |        |       |         |
| 95        |             |         |                |         |        | 04    |         |
| 97        |             | 03      |                | 30      | 0      | 03    |         |
| 100       |             |         |                | 15      | 0      | 02    |         |
| 102       |             |         |                |         |        | 01    | 30      |
| 103       |             |         |                | 07      | 30     |       |         |
| 105       |             |         |                |         |        | 01    |         |
| 106       |             |         |                | 03      | 45     |       |         |
| 109       |             |         |                | 01      | 53     |       |         |
| 110       |             |         |                |         |        |       | 30      |
| 112       |             |         |                |         | 56     |       |         |
| 115       |             |         |                |         | 28     |       | 15      |



## RECOMMENDED EXPOSURE LIMIT (REL)

THE NIOSH RECOMMENDED EXPOSURE LIMIT (REL) IS 85 DECIBELS, ON AN 8-HR TIME-WEIGHTED AVERAGE.

EXPOSURES AT AND ABOVE THIS LEVEL ARE CONSIDERED HAZARDOUS

## EXPOSURE LEVELS AND DURATIONS (EL&D)

OCCUPATIONAL NOISE EXPOSURE SHOULD BE CONTROLLED SO THAT WORKER EXPOSURES ARE LESS THAN THE COMBINATION OF EXPOSURE LEVEL ( $L$ ) AND DURATION ( $T$ ), AS CALCULATED BY THE FOLLOWING FORMULA.

$$T \text{ (MIN)} = \frac{480}{2^{(L - 85) / 3}}$$

## CEILING LIMIT

EXPOSURE TO CONTINUOUS, VARYING, INTERMITTENT, OR IMPULSIVE NOISE SHOULD NOT EXCEED 140 dBA.

## DAILY NOISE DOSE

WHEN THE DAILY NOISE EXPOSURE CONSISTS OF PERIODS OF DIFFERENT NOISE LEVELS, THE DAILY DOSE ( $D$ ) SHOULD NOT EQUAL OR EXCEED 100%, AS CALCULATED ACCORDING TO THE FOLLOWING FORMULA:

$$D = [C_1/T_1 + C_2/T_2 + \dots + C_N/T_N] \times 100$$

WHERE

$C_N$  = TOTAL TIME OF EXPOSURE AT A SPECIFIED NOISE LEVEL, AND

$T_N$  = EXPOSURE DURATION FOR WHICH NOISE AT THIS LEVEL BECOMES HAZARDOUS.

THE DAILY DOSE CAN BE CONVERTED INTO AN 8-HR TWA ACCORDING TO THE FOLLOWING FORMULA :

$$\text{TWA} = 10.0 \times \text{LOG}(D/100) + 85$$

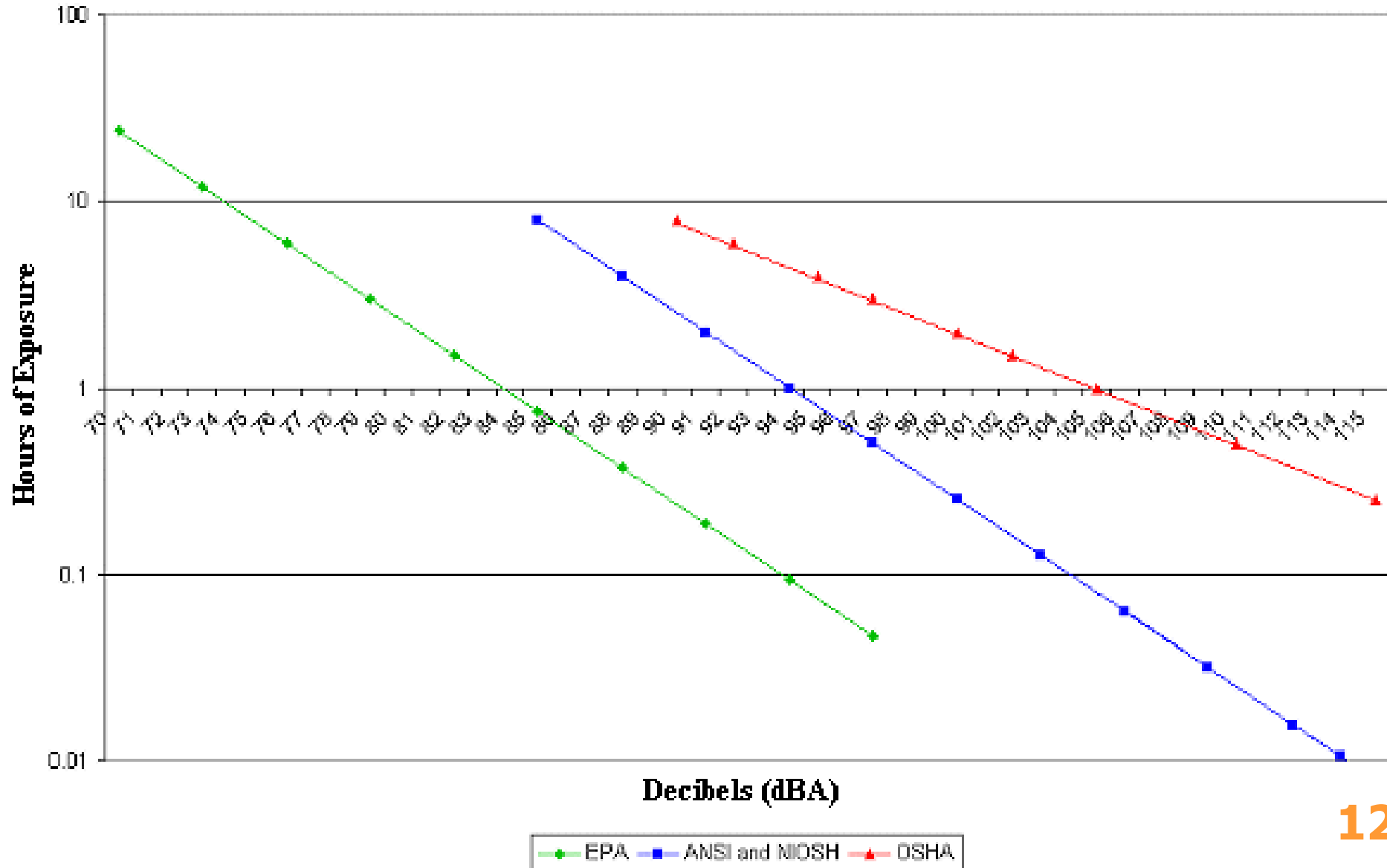
# DAILY NOISE DOSE AS AN 8 HR TWA

5 NSOHSE

| Dose (%)   | DBA as 08 hr TWA | Dose (%) | DBA as 08 hr TWA | Dose (%) | DBA as 08 hr TWA | Dose (%) | DBA as 08 hr TWA | Dose (%)        | DBA as 08 hr TWA |
|------------|------------------|----------|------------------|----------|------------------|----------|------------------|-----------------|------------------|
| 20         | 78.0             | 750      | 93.8             | 10000    | 105.0            | 275000   | 119.4            | 4000000         | 131.0            |
| 30         | 79.8             | 800      | 94.0             | 12000    | 105.8            | 300000   | 119.8            | 6000000         | 132.8            |
| 40         | 81.0             | 900      | 94.5             | 14000    | 106.5            | 350000   | 120.4            | 7000000         | 133.5            |
| 50         | 82.0             | 1000     | 95.0             | 16000    | 107.0            | 400000   | 121.0            | 8000000         | 134.0            |
| 60         | 82.8             | 1050     | 95.2             | 18000    | 107.6            | 4500000  | 131.5            | 16000000        | 137.0            |
| 70         | 83.5             | 1100     | 95.4             | 20000    | 108.0            | 5000000  | 132.0            | 18000000        | 137.6            |
| 80         | 84.0             | 1150     | 95.6             | 25000    | 109.0            | 450000   | 121.5            | 20000000        | 138.0            |
| 90         | 84.5             | 1200     | 95.8             | 30000    | 109.8            | 500000   | 122.0            | 22000000        | 138.4            |
| <b>100</b> | <b>85.0</b>      | 1300     | 96.1             | 35000    | 110.4            | 600000   | 122.8            | 24000000        | 138.8            |
| 110        | 85.4             | 1400     | 96.5             | 40000    | 111.0            | 700000   | 123.5            | 26000000        | 139.0            |
| 120        | 85.8             | 1500     | 96.8             | 45000    | 111.5            | 800000   | 124.0            | 28000000        | 139.5            |
| 130        | 86.1             | 1600     | 97.0             | 50000    | 102.0            | 900000   | 124.5            | 30000000        | 139.8            |
| 140        | 86.5             | 1700     | 97.3             | 60000    | 112.8            | 1000000  | 125.0            | <b>32500000</b> | <b>140.1</b>     |
| 150        | 86.8             | 1800     | 97.6             | 70000    | 113.5            | 1100000  | 125.4            |                 |                  |
| 170        | 87.3             | 1900     | 97.8             | 80000    | 114.0            | 1200000  | 125.8            |                 |                  |
| <b>200</b> | <b>88.0</b>      | 2000     | 98.0             | 90000    | 114.5            | 1300000  | 126.1            |                 |                  |
| 250        | 89.0             | 2500     | 99.0             | 100000   | 115.0            | 1400000  | 126.5            |                 |                  |
| 300        | 89.8             | 3000     | 99.8             | 110000   | 115.4            | 1600000  | 127.0            |                 |                  |
| 350        | 90.4             | 3500     | 100.4            | 120000   | 115.8            | 1800000  | 127.6            |                 |                  |
| <b>400</b> | <b>91.0</b>      | 4000     | 101.0            | 130000   | 116.1            | 2000000  | 128.0            |                 |                  |
| 450        | 91.5             | 4500     | 101.5            | 140000   | 116.5            | 2200000  | 128.4            |                 |                  |
| 500        | 92.0             | 5000     | 102.0            | 150000   | 116.8            | 2400000  | 128.8            |                 |                  |
| 550        | 92.4             | 6000     | 102.8            | 175000   | 112.4            | 2600000  | 129.1            |                 |                  |
| 600        | 92.8             | 7000     | 103.5            | 200000   | 118.0            | 2800000  | 129.5            |                 |                  |
| 650        | 93.1             | 8000     | 104.0            | 225000   | 118.5            | 3000000  | 129.8            |                 |                  |
| 700        | 93.5             | 9000     | 104.5            | 250000   | 119.0            | 3500000  | 130.4            |                 |                  |

# COMPARISON OF STANDARDS

Comparison of Noise Exposure Standards Set by Different Organizations



# **HEARING LOSS PREVENTION PROGRAM**

## **COMPONENTS**

- A. NOISE EXPOSURE ASSESMENT**
- B. ENGINEERING & ADMINISTRATIVE CONTROLS**
- C. MEDICAL SURVILLANCE**
- D. HAZARD COMMUNICATION**
- E. TRAINING / AWARENESS**
- F. RECORD KEEPING**

## **A. NOISE EXPOSURE ASSESSMENT**

### **INITIAL MONITORING**

- INITIAL MONITORING OF WORKERS EXPOSED TO NOISE UPTO 85DB OR ABOVE WILL BE DONE.

### **PERIODIC MONITORING**

- AFTER EVERY 02 YEARS IN SAME CONDITION AS OF INITIAL.
- UPON A CHANGE IN EQUIPMENT PROCESS IT IS TO BE DONE AGAIN

## **B. ENGINEERING & ADMINISTRATIVE CONTROLS**

### **HEARING PROTECTOR**

- WORKER SHALL BE REQUIRED TO WEAR HEARING PROTECTION, EMPLOYER
- WILL PROVIDE.
- IF EXPOSURE EXCEEDS 100 BDA, THEN DOUBLE PROTECTION I.E EARPLUGS &
- EAR MUFFS ARE TO BE WORN.

## **C. MEDICAL SURVILLANCE**

- AUDIOMETRIC TEST WILL BE PERFORMED BY AN QULAIFIED PHYSICIAN OR AUDIOLOGIST (AIR CONDUCTION, PURE TONE, HEARING THRESHOLD)
- BASE LINE AUDIOGRAM UPON NEW JOINING WITH IN 30 DAYS.
- MONITORING AUDIOGRAM (ON ANNUAL BASIS)

- UPON A CHANGE IN HEARING THRESHOLD LIMIT (HTL) IN EITHER EAR THAT EQUALLS OR EXCEEEDS 15 DB AT 500, 1000, 2000..... 6000 HZ, RETEST AUDIOGRAM WILL TAKEN
- CONFIRMATION AUDIOGRAM WILL BE TAKEN AS DEFINED IN ABOVE POINT AND WORKER WILL BE INFORMED
- EXIT AUDIOGRAM WILL BE TAKEN WHEN INDIVIDUAL LEAVES THE COMPANY  
(ROOM USED FOR TESTING SHOULD CONFIRM TO ANSI S1.3 – 1991 & INSTRUMENT USED SHOUD CONFIRM TO ANSI S1.4 – 1983.)

## **D. HAZARD COMMUNICATION**

- INSTRUCTIONS BOTH IN ENGINLISH AND OTHER PRE DOMINANT LANGUAGE OF WORKER WILL BE DIPLAYED PROMINANTLY.
- IN ADDITION TO ABOVE PRICORIAL SIGNS WILL BE PASTED

## **E. TRAINING / AWARENESS**

- WORKER WILL BE EDUCATED BY ONE TO ONE MEETING , OR IN GROUP ABOUT
  - \* THE PYSICAL & PSCYCHOLOGICAL IMPACTS.
  - \* HEARING PROTECTOR SELECTION, FITTING , USE & CARE
  - \* ADUIOMETRIC TESTING

## **F. RECORD KEEPING**

- RECORD OF ALL THE PERSONS INCLUDED IN HEARING LOOS PREVENTION PROGAMM WILL BE MAINTAINED AS PER STANDARD 29 CFR 10910.20(d)

# IDEAS FOR REDUCING NOISE

- REDESIGNING OF EQUIPMENT TO REDUCE THE SPEED OR IMPACT OF MOVING PARTS WHICH INCLUDE MAINTAINING EQUIPMENT TO KEEP IT IN GOOD RUNNING ORDER.
- PHYSICALLY PLACE EQUIPMENT AS FAR AWAY FROM WORKERS AS POSSIBLE.
- CUSHION NOISE SOURCES USING RUBBER PADS OR ENCLOSURES
- ROTATE WORKERS IN AND OUT OF HIGH NOISE AREAS
- MAKE SURE ALL WORKERS HAVE PERSONAL EAR PROTECTIVE EQUIPMENT AND THAT THEY KNOW



# CONCLUSION

ON AND AWAY FROM THE WORKPLACE HEARING PROTECTION IS YOUR TOTAL RESPONSIBILITY.

DON'T RISK YOUR HEARING FOR THE SAKE OF A HOBBY. KEEP THE MUSIC AT A REASONABLE LEVEL. IT MAY BE HARD TO ADMIT, BUT IF OTHER PEOPLE TELL YOU YOUR STEREO IS TOO LOUD, IT PROBABLY IS!

IF YOU RIDE A MOTORCYCLE OR ANOTHER NOISY VEHICLE, PROTECT YOUR HEARING.

IN YOUR WORKSHOP, USE HEARING PROTECTION THAT'S APPROPRIATE TO PROTECT AGAINST THE NOISE.

THINK OF THOSE SOUNDS YOU TAKE FOR GRANTED AND IMAGINE LIFE WITHOUT THEM. DON'T LET UNNECESSARY EXPOSURE TO NOISE TAKE THEM AWAY. YOU CAN DO SOMETHING TO HELP PROTECT YOUR HEARING. TAKE THE TIME TO KNOW WHAT PROTECTION TO USE AND USE IT FAITHFULLY.

**YOUR HEARING CAN LAST A LIFETIME WITH A FEW COMMON-SENSE PRECAUTIONS.**

**THANKS**