

VIDEOSCRIPT
FOR
HEARING CONSERVATION PROGRAMME

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An Independent Project submitted as part
fulfilment for the first year M.Sc. (Speech
and Hearing) to the University of Mysore.

All India Institute of Speech and Hearing
MYSORE - 570 006
MAY 1993

DEDICATED TO :

My beloved PARENTS , my dearest
BROTHER , my most loving SISTER
and my FRIENDS .

WITH LOVE

CERTIFICATE

THIS is to certify that the Project entitled:
"VIDEOSCRIPT FOR HEARING CONSERVATION
PROGRAMME " is a bonafide work, done in part fulfilment for
the First Year Degree of Master of Science (Speech and
Hearing) , of the student with Reg. No. M. 9216.

Mysore
MAY 1993



Director

All India Institute of
Speech and Hearing
MYSORE - 6.

CERTIFICATE

This is to certify that this Independent Project entitled. VIDEOSCRIPT FOR HEARING CONSERVATION PROGRAMME " has been prepared under my supervision and guidance.

MYSORE
MAY 1993.


Dr. (MISS) S. NIKAM
GUIDE

DECLARATION

I hereby declare that this Independent Project entitled: "VIDEOSCRIPT FOR HEARING CONSERVATION PROGRAMME" is the result of my own work under the guidance of Dr. (MISS). NIKAM, Professor and Head of the Department of Audiology, All India Institute of Speech and Hearing, Mysore, has not been submitted earlier at any university for any othe Diploma or Degree.

MYSORE
MAY 1993

Reg.No . M.9216

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INTRODUCTION

Hearing is one of the God-gifts. We all being able to hear, can not imagine the life of an individual who loses his/her hearing due to various reasons. And, when we imagine, we realize how important this blessing is! Hearing ability does not remain the same throughout the life span of an individual. Few lose it even before being born, few right at the time of birth and few others in the later part of their lives. When an individual loses it due to the exposure of noise at the work place, eg., industry & military, the need of an effective Hearing Conservation Programme (HCP) arises.

The purpose of an industrial HCP is to prevent employees from developing Noise Induced Hearing Loss on the job. Since Noise Induced Hearing Loss (NIHL) has become a compensable disability, the area of Hearing Conservation has assumed an economic importance to industry. The employer must perform a hearing test on each new employee and this initial audiogram becomes a 'Reference' with which future audiograms will be compared to determine what changes, if any, have occurred in an employee's hearing levels during his period of employment. Those employees who work in noisy environments, they should be tested regularly to determine whether the noise exposure is affecting their hearing or not.

The following components of an HCP, which are necessary for its effective functioning, have been widely accepted (Fox, 1966; IVIass, 1972; Newby, 1964; Royster et al, 1982).

- 1) Measurement of work area noise levels
- 2) Identification of over-exposed employees
- 3) Reduction of hazardous noise exposure to the extent possible through engineering and administrative controls.
- 4) Provision of personal hearing protection, if other controls are inadequate.
- 5) Initial and periodic education of workers and management.
- 6) Motivation of workers to comply with HCP policies.
- 7) Initial and periodic evaluation of worker's hearing levels.
- 8) Professional audiogram review and recommendations.
- 9) Follow-up programme for audiometric changes.
- 10) Detailed record keeping system for the entire HCP.
- 11) Professional supervision of the HCP.

It is important that proper attention be given to all programme components in order to achieve an effective HCP. It is equally important to make an effective HCP in schools.

Identification of hearing impairment is a primary concern in the establishment of a comprehensive and effective HCP in schools. It also includes Prevention, Assessment, Habilitation & Rehabilitation and Follow-up, Referral & Record keeping.

This Independent Project: Video Script for HCP ' gives, in detail, all the necessary requirements of an HCP and practical guidelines for its success. In our

country, where common mass is not aware of hearing related disorders, it becomes extremely important to teach them the hazards of noise and benefits and strategies of an effective HCP. And, we can consider this video script a major step towards the achievement of the goal - AWARENESS, because, once aware, one can take big step towards CURE i.e PREVENTION. Because, PREVENTION is better than CURE!

NOTE:

1) F.V -- Represents Female Voice 2) W.F - Represents what Is to be said in written form and block letters on the screen. 3) Whenever, Vijay is addressing the viewers, his voice should be in the background.

HEARING CONSERVATION PROGRAM 8 ITS FIVE PHASES

VIDEO (VISUAL)

AUDIO

Presenter of the film, named vijay

Hello, veivwers ! I am Vijay.

In the background, an insdustry is seen.

We are here to know something about Hearing Conservation Program or HCP. Before starting to talk about it, let us enter the factory and have a look

Factory

Focus on any work place in the factory where there is lots of noise. Focus for 30 seconds.

Noise

Vijay is seen and in the background, the same noisy work place.

There is too much of noise over here.

Workers working at this noisy place.

F.V What is the effect of this loud noise on these people.

(IN BLOCK LETTERS.WRITTEN FORM)
WHAT IS NOISE ?

F.V. - Before proceeding to say anything, we should know what noise is.

W.F - NOISE IS ANY UNDESIRABLE
ACOUSTIC SIGNAL

F.V. Read-Out of Video

Workers working in these noisy places.

F.V. - And how does this irritating and loud noise effect these people who work in these noisy work places?

W.F. - EFFECTS OF NOISE IN BRIEF

F.V. - Read-out of the Video.

- (1). Noise damages the inner part of our ear resulting in permanent hearing loss.
- (2). It can interfere with speech communication and perception of other auditory signals.
- (3). Noise disturbs sleep.

- (4). Noise is a source of annoyance.
- (5). Noise interferes with the performance of complicated tasks and can especially disturb performance when speech communication or response to auditory signal is demanded.
- (6). Noise can adversely affect the mood of the person.
- (7). Noise is a major source of distraction.
- (8). It interferes with resistance to viral diseases.
- (9). Noise produces pathological effects on life. eg. hypertrophy of adrenal glands, developmental abnormality of the foetus and brain injury.
- (10). Noise causes cardio vascular disorder.
- (11). Noise causes Ear, Nose and Throat problems.
- (12). Noise causes equilibrium disorders.

Individuals working in these noisy areas (but not the same Video film as before)

F.V. - With so many adverse effects of noise we possibly can't leave these people, who make an important part of our society, vulnerable to noise and its adverse effects. Here arises the need for a Hearing conservation Programm or HCP.

What exactly is an HCP -?

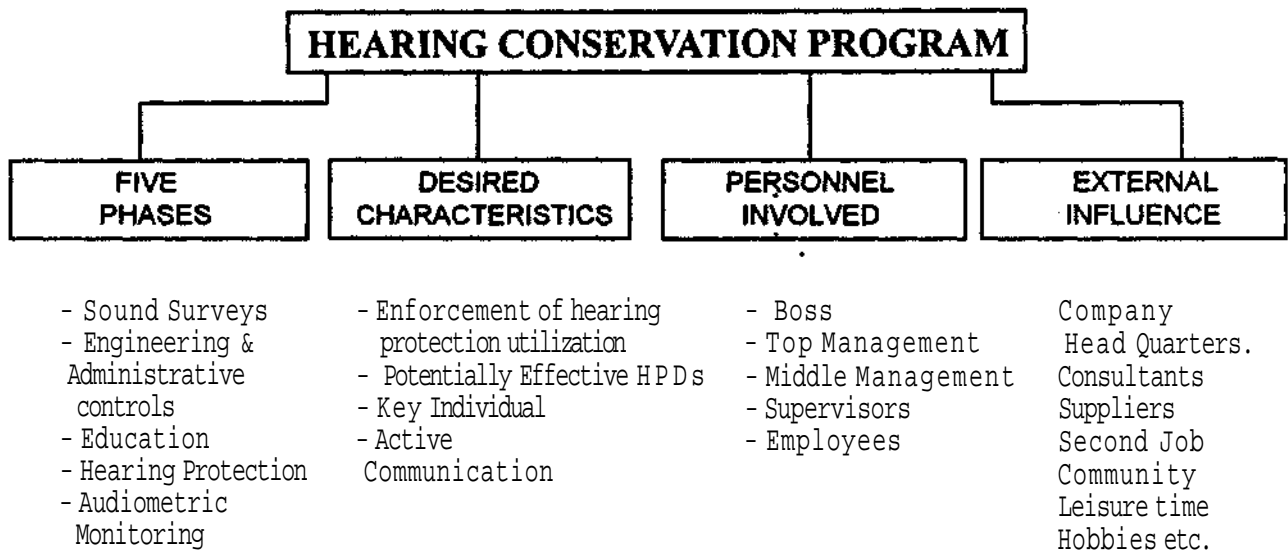
W.F. - The prevention of or reduction of hearing problems in a population through a program of hearing screening, follow up, testing, referral, protection and education.

[Read- out of Video]

Focus on workers wearing Hearing Protective Devices, machines on rubber pads, audiometry being done etc.

F.V.- When we talk about HCPs, we talk in terms of an effective HCP meaning that the goals and aims of HCP are being met with.

VIDEO



PIC-I

AUDIO

Read out of video F.V

FIVE PHASES

I. EDUCATION

Focus from whole of the chart to the "Five Phases" of the ' education"

F.V. - Coming on to the education among the five phases of the HCP, education of the employee should start even before the sound surveys or engineering controls are carried out. The question here arises, why education first?

Vijay, addressing the viewers, in the background of a working place in an industrial setup.

There are few other forms of safety apparatus which are generally accepted without any question or any resistance. For example,

(1) Worker wearing safety glasses.

(1) Workers know that a chip or spark flying into an eye will cause instantaneous discomfort and possible loss of sight.

(2) Workers wearing gloves.

(2) They realise that hot items can't be handled without gloves

(3) Workers wearing steel toed shoes.

(3) If they drop a heavy object on the foot, toes cry out immediately for attention.

(4) Workers wearing hard hat and leather apron

(4) A blow to the head can ruin one's entire day if head protection is not in place.

(5) Worker without any HPD in a noisy working place in a factory.

There is an instantaneous knowledge of injury.

(5) But exposure to loud sound rarely causes any pain or discomfort. Over exposure to loud sound doesn't cause one to realise instantaneously that hearing has been injured.

Vijay seen in the back ground of factory and addressing the viewers.

Noise induced hearing loss or NIHL or hearing loss caused by constant exposure to loud sounds & develops gradually and hence, it is not feared in the same way as are painful or bloody injuries. Without meaningful education to motivate

individual actions and constant supervision of safety practices, the HCP will fail. Education and motivation are critical in helping employees actively participate in HCP and generating the sincere support of the Program by the management.

When round survey are planned to determine whether an HCP needs to be established, all the employees should be given sufficient knowledge about the purpose of sound surveys and to explain that their assistance is important for obtaining accurate sound measurements. And if it is found out that the industry requires an HCP, the more formal education program should start before any other phase of the HCP is to be started.

W.F. The management must emphasize that the education program

- is regular
- attendance in these classes is maintained.
- includes education for those who are regularly overexposed to loud noise.
- includes education for those who are occasionally exposed.
- includes supervisors and managers responsible for production areas with hazardous noise.

The class is an HCP set up with employees, teacher and the manager.

W.F. Manager's role :

- (1) Outline Company's policies.
- (2) Demonstration of company's commitment to HCP.

F.V. Read-out of Video.

F.V.- The class should be small consisting of the Supervisor & Manager, few employees and of course a teacher.

F.V. -Manager should participate in each educational session to outline company's policies and demonstrate company's commitments

(3) Giving complete information on an HCP.

W.F. -- What kind of employees can be included in the session

- (1) Those who have common noise exposure.
- (2) Those who fall under common HPD use.

Teacher or presenter in the class.

W.F. -- the knowledge presented should be

- SHORT
- SIMPLE
- MEANINGFUL
- MOTIVATING.

W.F. - Suggested Educational Program contents should be as follows:

How a noise damages our hearing.
Consequences of hearing loss in everyday life.
poor speech understanding.
social isolation from friends and interference with work & leisure activities.
Noise exposures that are hazardous.
off the job (gunfire, power tools etc.)

to the HCP. They should also have complete information on an HCP so that they can answer employee's various doubts in the class and out of the class.

F.V.- Employees in a class should have common noise exposure and fall under a common HPD use.

This Is done to ensure that the employees feel comfortable enough with each other to ask common questions among themselves.

F.V. - The teacher or presenter must be an individual who projects genuine concern for employee's welfare.

F.V. - The knowledge presented should be short, simple, meaningful and motivating.

F.V.-Read out of Video

- ** On the job(sound source resulting from plant).
- (4) Engineering controls implemented or planned.
- (5) HPD choices for the employee's department.
how to use them correctly.
- ** how to care for and replace them.
- ** how to solve common HPD problems or complaint.
- (6) Audiometric Evaluations - Purpose & Procedures.
Understanding your own audiogram results.
- ** hearing changes may mean inadequate protection.
- ** Non occupational hearing loss may be detected.
- (7) Ways to protect your hearing on & off the job:
- ** wear HPDs correctly and consistently.
- ** Auoid unnecessary noise exposures.
- ** Use engineering noise controls.
- (8) The company's HCP policies:
- ** management expresses the importance of HCP.
- ** HCP participation is a condition of employment.
- (9) Questions and Answers.
- (10) Final motivation.
The HCP is a benefit for employees.
- ** Participation is to employee's own advantage.

Vijay addressing the viewers and At this juncture, its better, if we talk sitting in the class room meant tothe presentor or our HCP teacher, for HCP orientation.

CONVERSATION BETWEEN HCP TEACHER B VIJAY

Vijay :- How much information would you like to give to your class ? Would you like to explain and give all the details.

HCP Teacher : Yes , of course ! I have to mention everything but then at the same time , the information content should be shortened making it specific to the employee 's noise exposure , HPD options available to them and the engineering and administrative controls planned in their department .

Vijay :- What are the different ways by which you would like to give information through , making your teaching more effective ?

HCP Teacher - Formal Teaching always helps the best but this teaching can be made interesting by making use of movies , videos , slide presentations , booklets , pamphlets . However , there should not be complete dependence on these .

Vijay :- How regular should the classes be held ?

HCP Teacher - very regularity indeed ! Employees and supervisors should be reminded every now & then about the importance of the HCP and thier active participation . Meet them in their work places , halls , cafeterias . Audio visual aids should be used like video cassettes etc . should be changed every year , otherwise , it becomes boring for the audience .

Vijay :- Would you suggest some kind of reinforcement for those who are active in the participation of HCP ?

HCP Teacher - Oh , yes ! Rewardds can be given for the best candidate . This will definitely emphasize that HCP is a part of company 's climate .

II - SOUND SURVEYS

V

Focus on the PIC-I to the "Five Phases" to the "Sound Survey"

W.F. - The results of sound surveys are needed for many reasons:

- (1) To designate those areas of the plant where hazardous noise levels exist.
- (2) To identify the employees to be included on the HCP.
- (3) To classify employees noise exposure in order to define HPD policies and prioritize the areas for noise control efforts.
- (4) To determine whether noise levels present a safety hazard in terms of interference with speech communication and warning signal detection.
- (5) To evaluate noise sources for noise control purposes and,
- (6) To document noise levels and employee exposures for legal purposes such as worker's compensation.

W.F. - Who conducts the noise survey ?

** an industrial hygienist or safety engineer.

A

F.V. - Now, we shall talk about the second step of five phases of an effective HCP - Sound Survey.

F.V. -- Why is a sound survey important ?

F.V. - Read-out of Video.

But if a detailed noise analysis and noise control are required, we require the services of an acoustical engineer.

W.F. - purpose of noise survey:

- (1) A Survey to determine damage rick
- (2) A survey to determine speech interference level.
- (3) A survey to determine disturbance levels.
- (4) A survey for noise control purpose.

F.V. Read-out of Video.

In Video

REPORT OF NOISE SURVEY

- I. Date of measurements performed :
- II Sketch of the Measurement site :
 - (1) Size of the room:
 - (2) Machine dimensions :
 - (3) Location of the microphone & object.
- III. Standards to which measurements are made :
- IV. Type of the instruments used :
- V. Serial No. of the instrument used :
- VI. Method of calibration :
- VII. Weighing network and detector responses :
- VIII. Description of type of sound:
- IX. Background noise level :
- X. Environmental conditions :
- XI. Data on object being measured :
- XII. Amount of noise measured :
- XIII. Remarks of the Surveyer :

VA

Vijay

Sound Surveys can be conducted and the are of 3 types :

- (1) Basic second survey
- (2) Detailed second survey
- (3) Engineering sound survey

Focus on SLM

(1) Basic Sound Survey : A sound level meter is used to identify work areas which do not have a noise problem and areas which do have a potentially hazardous noise environments. This kind of sound survey determines the departments where employees may need to be included in HCP due to their daily noise exposures.

Focus on Dosimeter & Stop Watch.

[^]Detailed S.S. : SLM and stop watch or Dosimeter are used to estimate the worker's daily noise dose.

Focus on Octave Band Analyver , tape recorder.

(3) Enaineering S.S: SLM , octave band analyzers, tape recorders and other instruments may be used to measure the noise levels produced by machinery in various modes of operation in order to assess the potential for applying engineering controls. When noise exposure is measured, a combination of noise levels with their corresponding duration is measured.

Vijay.

Till now, we mentioned few instruments to measure noise. Let's see what they are and how they work.

Focus on SLM

Sound Level Meter: Surveying an industrial environment to determine whether the noise is hazardous, requires the use of sound level meter or SLM.

Focus on various parts of SLM.

The SLM consists of a microphone, an amplifier, attenuator circuit and some sort of indicating meter.

Focus on freq. Weighting networks. -

General purpose SLM are equipped with 3 frequency weighting networks - A, B and C, which can be used to approximate frequency distribution of noise in the audible frequency range. These 3 freq, networks are chosen because they approximate the ear response characteristics at different sound levels.

W.F- Weighting Networks:

A: Below 55 dB
 B: Between 55 dB and 85 dB
 C: Above 85 dB

F.V - A weighting network measures intensity levels below 55 dB, B, between 55 dB, 85 dB and C above 85 dB.

F.V - Fast Response mode

Focus on Dosimeter A worker wearing a dosimeter and working.

At the end of the day noise exposure level shown in the dosimeter.

W.F - Various other instruments used for noise measurement are:

- (1) Micro phones
- (2) Frequency Analyzers
- (3) Amplitude Distribution Analyzers
- (4) Tape Recorder
- (5) Graphic level Recorder

Vijay addressing the viewers.

W.F - DRC or Damage Risk criteria is the amount of noise exposure associated with an acceptable risk of damage to hearing.

W.F-

Sound levels (dBA)	Permissible Daily exposures.
90dBA	8 hours
92 dBA	6 "
95 dBA	4 "
97 dBA	3
100dBA	2
102dBA	1 1/2
105dBA	1
110dBA	1/2
115dBA	1/4 or less

Pic III

Docimeter: They are the instruments that can be attached to a worker and go with him through out his normal working tasks. The dosemeter measures and records the full noise exposure of the employee.

And at the end of the work shift gives the percentage of allowable noise exposure received by him. It computes the noise exposure for the entire working day.

F.V - A part from these 2 instruments, various others are also used. (Read out of video)

DRC or Damage Risk Criteria is the term which is used very commonly in relationship with an HCP .

F.V - (Read out of video)

F.V- It gives permissible sound levels and the hours for which the individual might be exposed to noise daily.

Vijay addressing the viewers.

There are certain points which should be kept in mind while carrying out the Sound Survey.

(1) HCP personnel must plan the sound survey to obtain information needed to answer relevant questions about protecting employees.

(2) The sound surveyer must coordinate scheduling with production personnel to capture information on variation in noise level.

(3) The last but foremost is that the employees must be cooperative.

III - ENGINEERING & ADMINISTRATIVE CONTROLS

Vijay addressing.

Having measured the noise levels in the work area, the need arises of reducing it.

W.F - Ways to control

Noise:

- (1) Engineering control
- (2) Administrative control

F.V - Noise can be reduced at 2 levels.

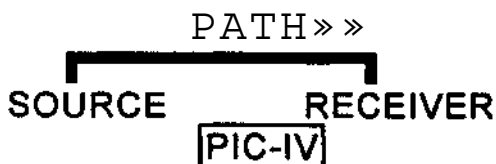
(1) Engineering controls which includes controlling the noise at the level of source and,

W.F - ENGINEERING
CONTROLS

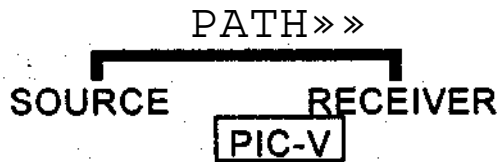
(2) At the receiver end which gets included in Administrative controls.

A noisy machine in a factory.

Surveyes should identify the major noise level and this becomes the starting point of the Engineering control.



This is a block diagram of the sound condition. Sound travels from its source to the receiver end via the path.



W.F - WAYS TO REDUCE SOUND AT SOURCE :

- (1) Replacement of instrument.
- (2) Redesigning of instrument.
- (3) lubrication of machinery.
- (4) Modification - in maintenance procedure.
- (5) Reduction in the speed of instrument.

F.V - Reduce sound at the level of source It can be done by the engineer in the following ways . (Read - out of video)



W.F-ENCLOSURE OF SOUND SOURCE

Vijay, in the background an enclosed machinery is seen. He points to the enclosed machinery while talking.

Enclosing the sound source can be done by building up lead walls around the noise producing machinery but lead has been found to be dangerous in the time of fire. The enclosure can be made such that the sound energy produced is trapped and converted into heat which is let to dissipate.

Vijay, pointing to a machinery which is a part of the production process.

Enclosure of sound source poses some practical problems like the machinery might be a part of the production process, thus it can't be enclosed.

V

Pointing to another machinery which can't be enclosed due to its bulkiness

Vijay again, in the back ground of factory.



W.F. - Placement of barrier In the Near field.

W.F - Barriers have two major functions:

- (1) Redirecting the sound
- (2) Absorbing the sound, and
- (3) Redirecting the sound.

Vijay showing types of barriers.

W. F - ADMINISTRATIVE CONTROLS



W.F - Barrier near the receiver

A

OR

Some other machinery size might not let itself to get enclosed.

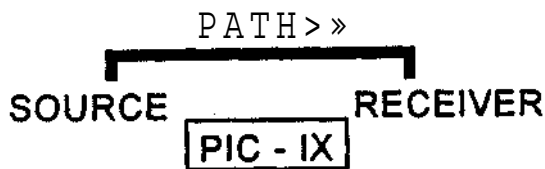
If the sound source is enclosed, it might lead to heat trap which might further decrease the efficiency of machinery.

F.V - Place a barrier in the near field.

Barriers can be in the form of lead curtains, drapes or sol Id shields, and are placed close to a sound source. Barriers become less effective as the distance between sound source & barrier is increased.

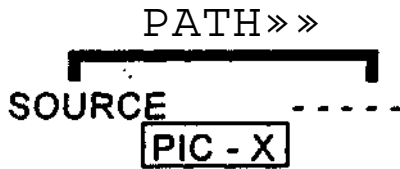
Barrier near the receiver end are hearing Protective Devices. We shall task about them in detail, later.

V



W. F - Enclosing the receiver.

Vijay in a sound treated control room, in the background, a worker is seen.



W. F - Removal of receiver from the noisy area

Vijay addressing the audience. In the background, the factory is seen.

Vijay addressing the audience.

A

Enclosing the receiver can be done by placing the workers in the sound treated control room.

A sound treated control room. These have been found to be useful in press, saw mills and in paper making plants.

F.V - Remove the receiver from the noisy area

This can be best achieved by rotating the worker from one noisy working place to a comparatively quieter one. This will reduce their exposure to noise, by making shifts and letting workers rotate from one working place to another.

Any one of the Engineering and Administrative controls does not help much in noise reduction. It becomes important that two or more of the strategies are used eg. ,using Hearing Protective Device as well reducing noise at the level of source by lubrication etc.

IV AUDIOMETRIC MONITORING

V	A
Focus on the "audiometric monitoring " in the PIC -I	F.V- Coming to the phase "audiometric monitoring" out of the five phases of an HCP
Vijay standing in front of an audiologist's room.	Here, we are standing outside an audiometry room or an audiologist's room. Before proceeding further, we should know who an audiologist is and what does he do. We better have a conversation with him.
Vijay enters the room.	

AUDIO & VIDEO CONVERSATION BETWEEN AUDIOLOGIST & VIJAY

V: Hello ! I hope , we did not disturb you

A: Oh ! Not at all! In fact, I was waiting for you.

V: I want to start with a basic question of mine. Who is an audiologist?

A: An Audiologist is a person who deals in the testing of hearing of people. He should have the basic knowledge about the science of hearing i.e. Audiology and also the vital practical knowledge about how to conduct the tests and the instrumentation.

V: What does he do?

A: As already told, he conducts the tests of hearing. We can divide these tests into 2 categories : -

1) Identification - also called screening & 2) Diagnostic

In identification or screening testing, we mainly see whether the person has hearing loss or not. We don't go beyond this while identifying or screening.

However, in diagnostic, we have to diagnose the degree and type of hearing loss. Depending upon the needs of person, we send him to the ENT Specialist or to the HCP dispenser.

V: You mentioned some instrument. What instrument do you make use of?

A: A calibrated audiometer.

[In video, an audiometer is shown.]

By calibration, we mean, that the instrument measure consistently what it is supposed to measure.

V : What is an audiogram and what do you do with it ?

A : [showing an audiogram and visual focus on audiogram]. It is a graph on which the hearing level of the individual is plotted at different frequencies. Looking at this, we can make out how much the hearing loss is. To make things easy, we have classified the levels at which the person hears as given below:

[In Video]	
0 -25	Normal Hearing
26-40	Mild hearing loss
41 -54	Moderate hearing loss
55-70	Moderately severe hearing loss
70-90	Severe hearing loss
90 & Above	Profound hearing loss

PIC -XI

We check hearing by two modes

One is Air conduction

[In Video, W.F. - AIR CONDUCTION]

i.e. hearing via air. We make use of ear phones.

[In video, ear phones are shown]

They are kept on ears.

[In Video, a person wearing ear phones are shown]

another mode is Bone Conduction.

[In video, W.F. - BONE CONDUCTION]

i.e. hearing via bone. Here, we make use of bone vibrator.

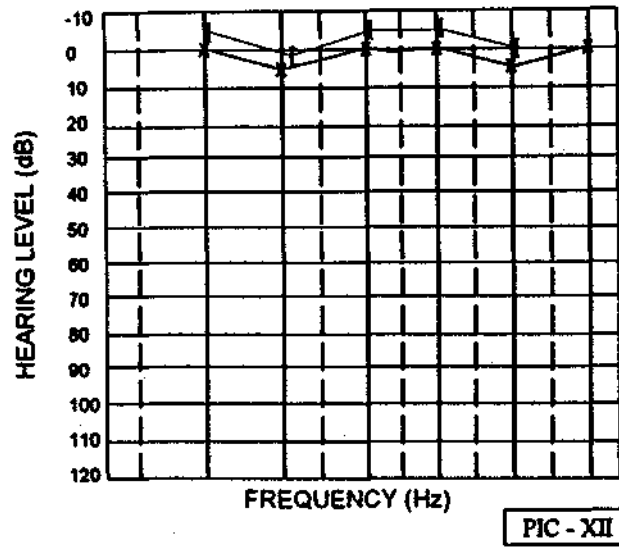
[In Video, bone vibrator is shown]

They are kept behind the ear on the mastoid bone.

[In Video, a person wearing bone vibrator is shown]

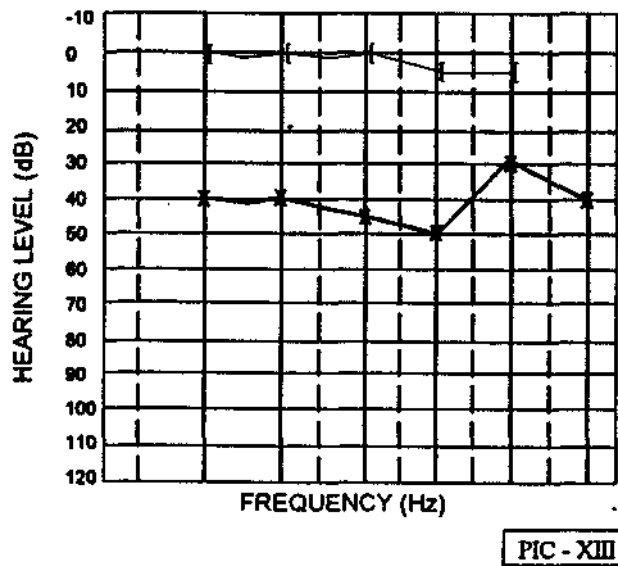
Based on these A.C. and B.C. testing, we further find out how much the noise has damaged the hearing

NORMAL HEARING SENSITIVITY



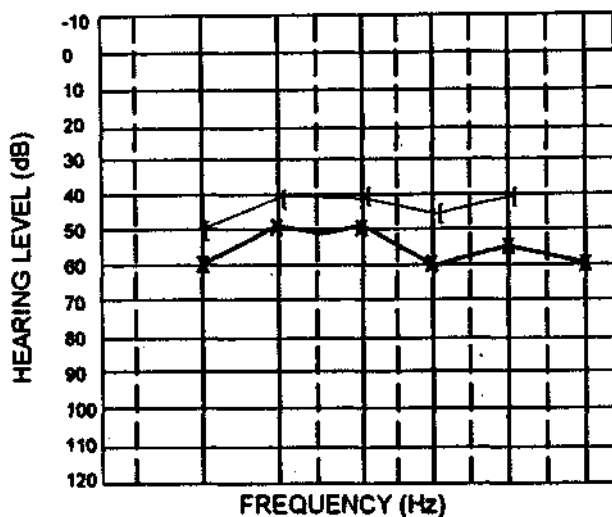
F.V. - This is an audio gram showing normal hearing.

CONDUCTIVE HEARING LOSS



F.V. -- If the B.C. Is within normal range i.e. between 10 and 25 , but A.C. is below it, it is conductive.Hearing loss and is usuall not seen in NIHL or Noise Induced Hearing Loss. It needs attention by an ENT Surgeon.

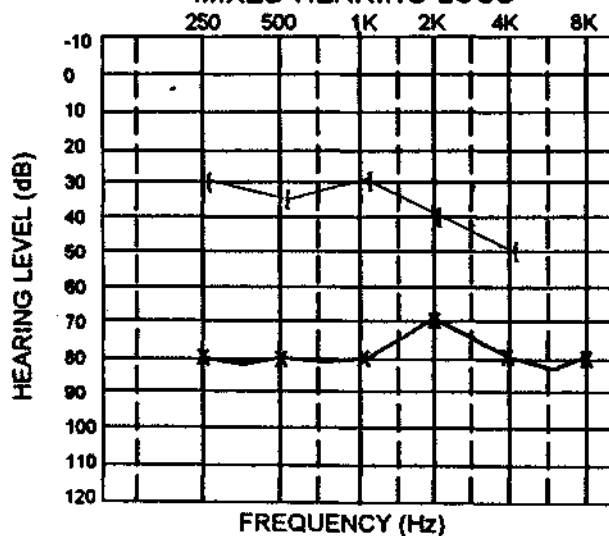
SENSORINEURAL HEARING LOSS



PIC - XIV

F.V. - If both BC and AC are above the range of normal hearing I.e. between 109 and 25 dB, but the difference between them is smaller than 10 dB, it is sensorineural Hearing loss. Here the damage is quite extensive.

MIXED HEARING LOSS



PIC - XV

F. V. -- However, if the difference between the A.C: & B.C is greater than 10 dB and both are above the range of normal hearing i.e. 10 dB and 25dB, it is mixed hearing loss meaning that both conductive and sensorneural components are present.

V : Who, would you suggest should be tested ? Do you recommend that every employee in the factory or an industry should be tested ?

A: Well, logically speaking every worker in the industry/factory should be tested but then, it has many practical problems eg., it will take too much of time, testing will become a costly affair. Because of all this, we have kept some exceptions.

Its better if a new employer is tested at the time of initial employment or the jurisdiction of the company should ask for a written report of hearing test having been done, which should be normal. This would become a baseline audiogram.

Those who are already employed and are being exposed to 85 dB A of noise for 8 hours, a day, should be tested immediately and even after he is wearing an HPD, he should be tested frequently to rule out if his hearing remains same or is deteriorating. This audiogram should be compared to his baseline audiogram.

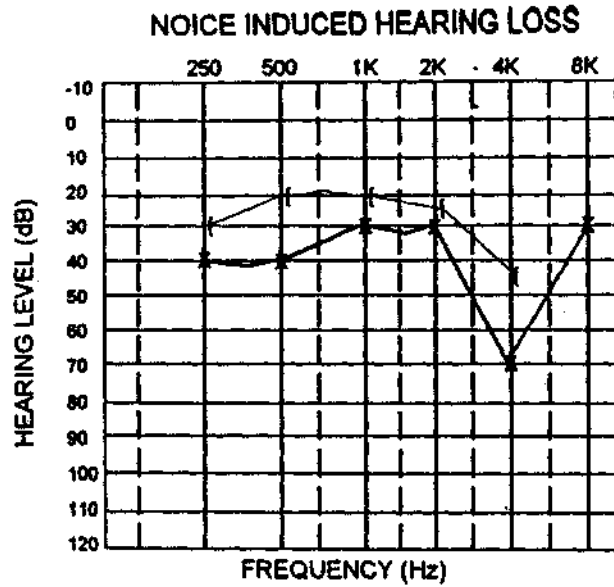
Preferably, audiological testing should be done annually for each employee, especially for the ones who are exposed to noise. This annual audiogram should be compared to the baseline audiogram.

V : Few of the workers might be aged and we usually find, older people having hearing loss. How will you differentiate that the hearing loss seen is due to noise or due to old age - ?

A : A good question ! First of all, we require to know the case history. If an old age employee reports of hearing loss but does not work in a noisy place, his loss is probably related to his age.

Other information like medical history tinnitus i.e. ringing sound in the ears etc. also contribute a lot.

As an objective evaluation, audiograms gives better information.

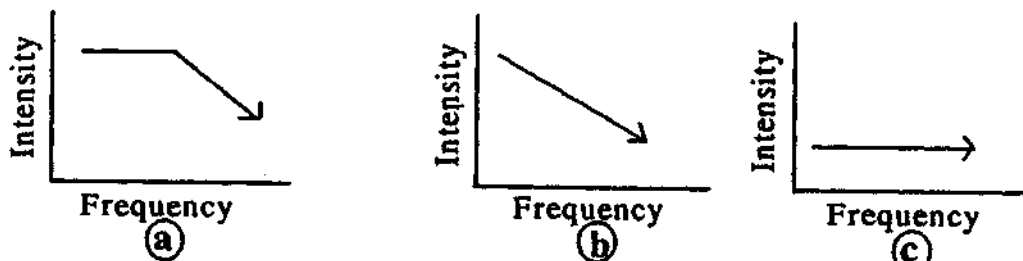


PIC - XVI

It would show a dip at 4KHz indicating that the hearing loss has been caused due to an over exposure to loud noise, which we call NIHL.

V: Do you, as an audlologist, talk to the employee about his condition ?

A: Yes, and If ind it the most right time to talk to the employee, when he has come for his audiological evaluations. This is the time when he sees the actual condition and has time to clear many doubts. We can actually show them how their hearing has gone bad from previous or maintained its condition.



PIC - XVII

We can also explain it better by saying that PIC shows normal hearing

- PIC XVII (a) a going hearing loss
- PIC XVI (b) further going hearing loss and
- PIC XVII (c) showing gone hearing loss

about his hearing status in terms of:

[In video W.F.]

[(1)- Comparison to the expected age - effect hearing levels for the worker's age / Sex and the hearing ability needed for unimpaired communication.

(2) A description of the amount of change seen in the current audiogram compared to past results and the designated reference base line.

(3) Recommendations, including praise for stable hearing, caring to use HPDs more carefully on and off the job, if hearing changes are observed, suggestions to seek medical attention or further audiological evaluation etc.

We can also check the condition of HPDs at the time of hearing testing.

V : Would you suggest keeping record of all the hearing evaluations ?

A: Definitely ! The record of the tests that we perform should be kept. This helps in future referrals. Along with this, the record of previous job exposure should also be kept, this helps the management to decide while giving compensation to workers or employees for the induced hearing loss.

V : Thank you very much ! you have provided us with plenty of important information.

V HEARING PROTECTION

V

Vijay, in front of the section where HPDs are dispensed.

Focus on Hearing protection in the PIC -1.

HPD dispenser examining the ear of the employee before giving HPD.

An ear with redness
An ear with sore,
An ear with discharge
An ear with tenderness
An ear with malformations
An ear with canal obstruction
an ear with excessive wax

W.F. -- HPD's

W.F --Various tyhpes of HPDs .
(1) Ear muffs
(2) Ear plugs

A

We have talked about the engineering and administrative controls. Most of the times, these controls do not do much against noise. Even if they do, its always better, if these controls against noise are enforced along with the distribution of proper Hearing Protective Devices or HPDs. Because this combination has prevented significant hearing loss, only if HPDs are worn properly.

F.V. - Here arises, the need for the hearing protection phase of the five phases of HCP.

F.V. - Before the HPDs are given to the person, an examination of the external ear should be done. the HPD dispenser should check for any redness, sore, discharge, tenderness, malformation, canal obstructions and excessive wax in the ear.

F.V. -- If all these conditions are not checked before hand, then HPD used might not show the control against noise exposure.

F.V. - Now going on to the HPDs .

F.V. - There are various types of HPDs.
(Read-out of Video)

- (i) Premolded Plugs
- (ii) User molded plugs and non expandable plugs
- (iv) Custom Molded plugs.

(3) Semi Insert Devices

W.F. - (1) EAR MUFFS .

Focus on real Ear muffs and a picture also shown along with.

An individual wearing Ear muffs.

F.V. - Ear muffs fit over and completely cover the pinna of the ear.

Ear muffs attached to a helmet and a head band.

F.V. - They may also be attached either to helmets or head bands.

Various sizes of ear muffs

F.V. - There are various sizes in which ear muffs are available. Bigger one might fit a bigger head and smaller one to a smaller head.

An individual wearing the ear muff.

F.V. - While fitting the ear muffs, the HPD dispenser should check that the cups of Ear Muffs, completely cover the pinna of the ear but does not rest on them. The wearer should feel that the cups exert equal pressure on all the sides.

Pulling back if the excess hair while wearing ear muffs.

F.V. - Excess hair should be pulled back while wearing the ear muffs.

And individual lifting one of the cups and replacing it back, in a noisy place.

F.V. - The wearer can check the effectiveness of ear muffs by lifting one of the cups and comparing the noise that he hears when the muff are on and off. He should be able to hear considerable difference when

the ear muffs are worn and when Ear Muffs are not worn.

W.F. -- (2) Ear Plugs.

- (I) Premolded Ear Plugs.

Focus on real premolded Ear Plugs.

The premolded plugs in various sizes and shapes.

Focus on the insert portion of the plug.

Focus on flanges of PMEP.

PMEP made out of Vinyl, plastic, silicons etc.

W.F. (ii) User molded plug and Non expandable plug.

Focus on a real user molder plug.

Focus on expandable and non-expandable types of plugs.

W.F. - (III) Custom molded plugs.
Focus on Real custom molded plugs.

F.V - A large variety of PMEP are available in size and shape.

F.V. - The portion of the plug that is to be put inside the canal of the ear is cone or bullet shaped or might have several flanges.

F.V. - The PMEP are made out of soft materials, eg. Vinyl, plastic, silicons etc. or other soft and flexible compositions.

F.V. - These kinds of plugs are those which the user himself shapes or manipulates to achieve a secure fit. They are disposable after one or several uses.

F.V. - They are made out of either expandable or non-expandable materials including spin fibres, glass, wax impregnated cotton, silicone type putty or polymer.

F.V. - The material used for molding process actually forms the plug

Custom molded Ear plug with a detachable cord or a permanent one.

W.F. -- (3) Semi Insert Devices.

Focus on real SID

Vijay addressing the viewers.

Focus on an ear muff with holes in the cup.

Focus on an ear muff, where initials of name are engraved on it.

here. These are comparatively expensive.

F.V. – They may be fitted with a permanent or detachable cord.

F.V. – They are usually called ear caps too. They consist of tips that particularly insert into the ear canals and are held in place by a head band which might be fixed or adjustable. They are usually preferred in those areas where there is comparatively lesser noise.

In general, three types of problems predominate in the abuse and misuse of devices by users :

(1) An employee may not receive proper training for the proper use of HPD.

(2) Some misuse or abuse results from an innocent desire to make the device more comfortable, attractive or easier to use. In a hot work environment.

eg., a worker may drill holes on the cups of muffs in order to ventilate them. In some cases.

Workers drill their initials in the cups to "personalize" them. Usually such people do not notice that they are sharply increasing the noise that reaches the ear.

(3) Most seriously, users may intentionally modify or alter devices or willfully misuse them. This is

remarkably common even in situations where hearing protection is mandatory. Even if company policy calls for disciplinary action for non-use, workers often alter the devices so that they will appear to be in compliance. On closer inspection, it may be discovered that the altered devices actually provide little or no protection from noise.

To avoid these problems that arise with HPDs, individual orientation and instruction is essential. Every person who wears HPD should be individually fitted and instructed in proper use of the particular device to be used, to ensure that,

(1) Earplugs or ear caps properly fit into the ear canals, and muffs or head sets provide air tight seals around the external portions of the ear and accommodate the wearing of other head gears (glasses, goggles, hardhats, helmets, face-shields etc.).

(2). The individual can easily insert ear plugs or ear caps to achieve maximum comfort and attenuation afforded by the devices.

(3). The individual understands that the device must not be modified or abused in any way that would compromise its noise attenuation properties.

(4). The wearer knows how to clean and care for the device properly.

(5). The wearer knows whom to call or contact if any difficulty arises with the device or if replacement plugs, containers and or muff parts are needed.

W.f. - What exactly does an HPD

F.V. - At this juncture, question arises what is the function of HPD?

Vijay addressing the viewers.

All HPDs reduce noise by creating barrier to reduce the air conducted sound reaching the eardrum. The level of protection achieved depends mainly upon the degree to which the HPD achieves a seal. Ear plugs mainly seal against the wall of the ear canal. While Semi Insert Devices seal against the entrance to the ear canal or its outer edge and ear muffs seal against the skin around the external ear. In each case, the amount of sound reduction achieved depends largely on the completeness of the seal - any air leak will allow some sound to bypass the HPD.

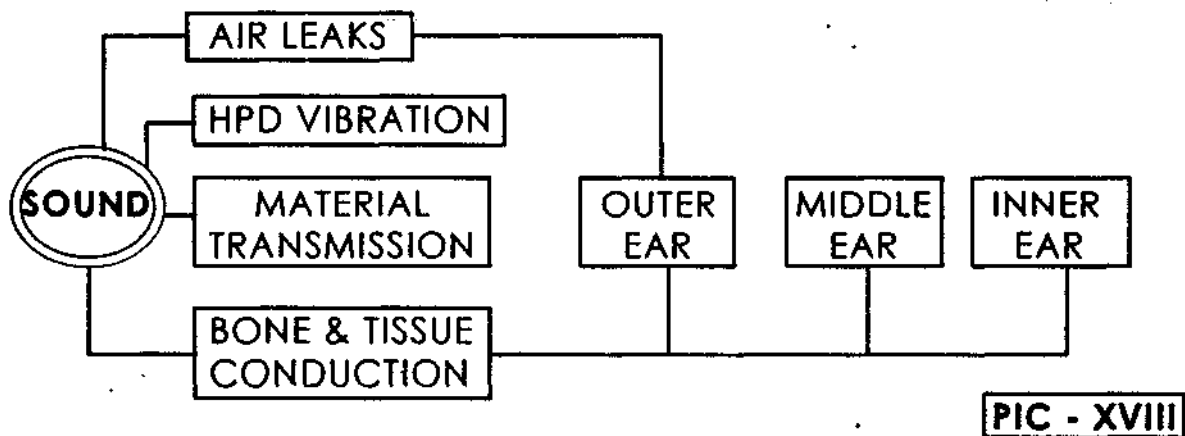
CONVERSATION BETWEEN HM) DISPENSOR AND VWAY

V : The worker is wearing the HPD. He would like to communicate with others, how would he do it ? Since, he is wearing an HPD , he might not be able to hear any body's noise at all.

HPD dispenser : When an individual wears an HPD , the sounds in his environment do not get cut off completely.

There are four major routes through which the person wearing HPD would hear sounds in his environment.

In Video



Air leaks: This takes place when the HPD is not fitting properly and doesn't have an airtight seal with the canal or the side of the head. Because of this 5-15 dB of noise might not reach the ears.

Hearing Protection Device Vibration : The ear canal is flexible and the earplugs might vibrate within the canal and then the ear muffs are not attached to the head band in a rigid manner. Its cups also vibrate against the head. Due to these vibrations, sound reaches the ear.

Material Transmission : Sound can also reach the ear by getting transmitted through the material out of which HPD is made.

Bone Tissue Conduction : Sound, when reaches the ear via bone or tissue conduction bypasses the HPD but the level of sound reaching the ear is quite less by this route.

And now, one can't say that the worker wearing HPD can't communicate, he can communicate with great ease and efficiency.

DESIRED CHARACTERISTICS OF HCP

V

Vijay addressing the viewers.

Focus on 'Desired Characteristics in PIC -I

Focus on Enforcement of Hearing Protection Utilization and Potentially effective HPD in PIC-I.

W.F. - (1) Strict enforcement of HPD utilization.
- NOT PAPER POLICY.

(2) HPDs available are potentially effective for the work environment.

Vijay addressing the viewers.

A

Till now, we talked about Education, Sound Surveys, Engineering and administrative controls, Hearing Protection and audiometric monitoring as the importance five phases of an effective HCP.

F.V. Let's talk about Desired characteristics first.

F.V. -- It should be seen that HPDs are being worn in real and its not a mere paper policy.

F.V. -- HPDs worn are comfortable and do help in the reduction of noise thus preventing hearing loss.

In the success of HCP, one person alone can't show miracles. Whole of HCP is a joint effort of many people, eg., forman, tool crib clerks, safety officers, audiometric technicians, nurses, personnel directors, industrial hygienists, engineers, audiologists, physicians etc. And the team work between all these is must. But, If all of them are not under the supervision of one key individual, everybody might

Focus on key individual in PIC-I

W.F- Qualifications of key individual :

He should have the genuine interest in the company's HCP.

Vijay

Focus on: Active Communication

Vijay

work haphazardly.

F.V Key individual should be made the one, who shows genuine interest in the success of HOP

Rather it should be said that the key individual works as a catalyst and maintains communication between various members of the team.

When, we talk about active communication, we mean that all the team members meet regularly, exchange information and talk about how far have they become successful in achieving the goals of HCP.

PERSONNEL INVOLVED IN HCP

Focus 'Personnel Involved' in
PIC - I

F.V - Coming to Personnel In-
volved, now. The Personnel In-
volved in HCP are:

W.F-- Personnel Involved :

(Read - out of Video)

- 1) Boss
- 2) Top management
- 3) Middle management
- 4) Supervisors
- 5) Employees.

W.F - JOB OF THE BOSS :

- Support the HCP
- Enforce its policies as one facet
of industry's overall health and
safety programme.

F.V - Boss has to support the en-
forcement of HCP to see that the
industry's overall health is main-
tained.

W.F - Job of the management &
supervisor

(Read-out of video)

- monitoring noise exposure
- maintainin engineering con-
trols
- participation in educational ef-
forts
- fitting HPDs
- Reissuing HPDs
- Supervising daily HPD utiliza-
tion
- performming the audiometric
evaluation.
- Giving feedback to employees
about their hearing results.

Vijay

In a nutshell; they have to look after
the five phases of HCP . Last butnot
least is the role of employee. He is
the one whose dedication to the
HCP will determene its success.

EXTERNAL INFLUENCES ON HCP

Focus on: External Influences in
PIC-I

F.V - There are few other external influences which definitely affect the success of HCP along with Desired characteristics and Personnel Involved.

W.F -- Company Head Quarters

- Consultants
- Suppliers
- Second Job
- Community
- Leisure time
- Hobbies etc.

F.V - These are :

(Read - out of video)

Focus on

- Community
- Leisure time
- Hobbies etc.

F.V - The Employee should take care of his hearing even when he is not working i.e., off the job exposures.

W.F - Company Head Quarters

Vijay

If there are few laws which are quite in contrast with HCP enforcement, key individual should ask for some concession in these rules from the top management

W.F - Consultants

Many times, the key individual might require help from outsiders like an engineer holding sound survey or an audiometer technician. Here he has to be careful that the job quality is being maintained, eg. - sound surveyor might show noise level as normal while in actual there is over exposure to noise, or the audiometric technician might show hearing loss, where in actual, there is none.

W.F - Suppliers.

Suppliers include those who supply the HPDs etc. We have

Vijay

mentioned much about them in the hearing protection phase of the five phases of HCP.

With this, we come to an end to HCP or Hearing Conservation Programme.

CONCLUSION

W.F - Benefits of HCP to the employee.

Vijay addressing the viewers

Towards the end, we should know the benefits of HCP to the employee. The primary aim of HCP is to prevent employees from getting a hearing loss due to noise exposure on job.

Hearing loss from any cause reduces the quality of life for the affected individual.

Two employees talking to each other at their work place.

F.V - Hearing loss, interferes with normal communication and communication is a big part of being human.

For many jobs we need adequate hearing to qualify to be hired or promoted, so hearing loss decreases our employment potential.

An employee talking over phone

F.V - On the job, we need good communication ability to give and receive instructions, use the telephone and detect machinery sounds and warning signals.

An employee with his family at home

F.V -- Off the job, our interpersonal communication with family and friends puts much of the pleasure in our lives, and gives us a feeling of being involved with others in recreational situations and at home.

An Individual enjoying nature. More emphasis on the rustling

F.V -- We also need our hearing to enjoy music and the quiet sounds of

sound of leaves, breeze flowing
and birds chirping

nature.

For all these reasons and more maintaining good hearing is important as hearing is an invaluable gift.

The HCP also provides a health screening benefit for employees, since hearing loss not caused due to noise exposure and potentially treatable ear diseases are often detected through the annual audiograms.

W.F - Benefits of the HCP to the
employer.

Vijay

The employer benefits directly by implementing an effective HCP that maintains employee's good hearing, since workers will remain more productive if their communication abilities are not impaired. Employees with good hearing are also more versatile and can be promoted to jobs where communication is even more important. Effective HCPs can reduce accident rates and promote work efficiency as well as reduce the stress and fatigue related to noise exposure.

The HCP should be an integral part of the employer's overall policy towards worker health and safety practice. Employee relations are better and job turnover is lower for companies that pay attention to the working environment. Maintaining a safe and healthy work place contributes to the company's prestige and image as

Vijay addressing the viewers.

a desirable employer.
Many a times, HCP just remains in papers as a paper policy. It becomes a failure. We should know what all can be the cause of HCP failure.

W.F - Common causes of HCP ineffectiveness:

- 1) Inadequate communication and co-ordination among : plant personnel involved in the HCP , on site personnel and corporate head quarters.
- 2) Insufficient or erroneous information used to make HCP decisions.
- 3) No meaningful training for HPD fitters and reissues.
- 4) Inadequate or inappropriate selection of HPDs in stock.
- 5) Failure to individually fit and train each HPD wearer .
- 6) Over reliance on contractors to provide HCP services.
- 7) Failure to use the audiometric monitoring results to educate and motivate employees .
- 8) Failure to use audiometric data to evaluate the effectiveness of the HCP .

F.V - Read- out of video

Vijay

—

We have to be careful about all these causes so that our HCP doesn't fail and shows a grand success.

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