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

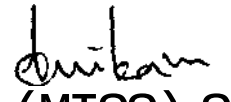
THIS is to certify that the Project entitled: "VIDEOSCRIPT FOR HEARING CONSERVATION PROGRAMME" is a bonafide work, done in part fulfilment for the First Year Degree of Master of Science (Speech and Hearing), of the student with Reg. No. M. 9216.

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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CONTENTS

INTRODUCTION

Hearing is one of the God-gifts. We all being able to hear, can not imagine the life of an individual who looses 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 loose it even before being bom, few right at the time of birth and few others in the later part of their lives. When an individual looses 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 indistrial 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 importence 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 regularily 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; Roysteret. 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 becomesextremelyimportanttoteachthemthehazards of noise and benefits and strategies of an effective HCP. And, we can considerthis videoscnpt 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 PRASES

VIDEO (VISUAL)	AUDIO
Presenter of the film, named vijay	Hello, veiwers ! 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 (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.	F.V. - Read-out of the Video.

(4). Noise is a source of annyoyance.

(5). Noise interferes with the performence of complicated tasks and can especially disturb peformence when speech communication or response to auditory signal is demanded.

(6). Noise can adversly affect the mood of the person.

(7). Noise is a major sourse 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 -?

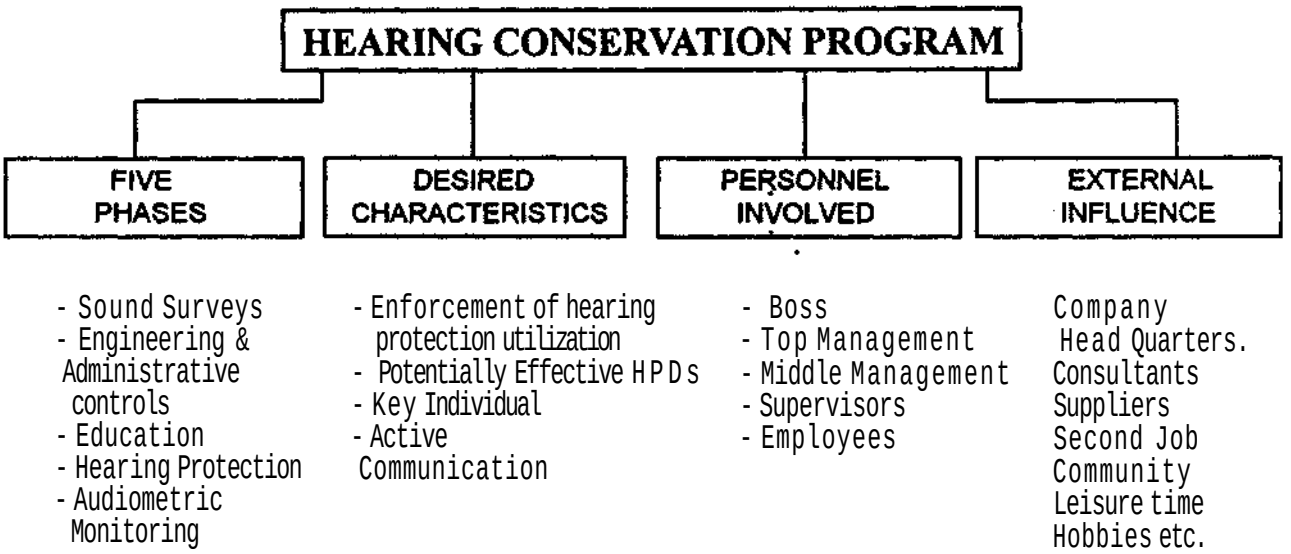
W.F. - The prevention of or reduction of hearing problems in a population through a program of hearing screening, follow up, testing, referral, protection and education.

[Read- out of Video]

Focus on workers wearing Hearing Protective Devices, machines on rubber pads, audiometery 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 veiwers, 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)lf 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.

There is an instantaneous knowledge of injury.

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

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

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

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 assistence 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
–attendence in these classes is maintained.
–includes education for those who are regularly overexposed to loud noise.
–includes education for those who are occassionally exposed.
–includes supervisors and managers responsible for production areas with hazarduous noise.

F.V. Read-out of Video.

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

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

W.F. Manager's role :
(1) Outline Company's policies.
(2) Demonstration of company's commitment to HCP.

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.

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.

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

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

(1) Those who have common noise exposure.

(2) Those who fall under common HPD use.

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

Teacher or presenter in the class.

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

W.F. -- the knowledge presented should be
- SHORT
- SIMPLE
- MEANINGFUL
- MOTIVATING.

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

W.F. - Suggested Educational Pro, gram 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 & leasure activities.
Noise exposures that are hazarduous.
off the job (gunfire, power tools etc.)

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 importence 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. IVIeet 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	A
Focus on the PIC-I to the "Five Phases" to the "Sound Survey"	F.V. - Now, we shall talk about the second step of five phases of an effective HCP - Sound Survey.
W.F. - The results of sound surveys are needed for many reasons: (1) To designate those areas of the plant where hazarduous 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 priortize 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.	F.V. -- Why is a sound survey important ? F.V. - Read-out of Video.
W.F. - Who conducts the noise survey ? ** an industrial hygienist or safety engineer.	

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 insturments 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 :

V A

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 hazarduous 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.

V	A
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 hazarduous, requires the use of sound lenel 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 freg. Weighting networks. -	General purpose SLM are eqripped 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 characterities at different sound levels.
W.F- Weighting Networks: A: Below 55 dB B: Between 55 dB and 85 dB C: Above z4	F.V - A weighting network measeres intensity levels below 55 dB, B, between 55 dB, 85 dB and C above 85 dB.
	F.V - Fast Response mode

V

Focus on Dosimeter A worher wearing a dosimeter and working.

At the end of the day noise exposuse 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

A

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 emplayee.

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.

V

Vijay addressing the viewers.

A

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 relevent 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.

W.F - Ways to control Noise:
(1) Engineering control
(2) Administrative control

Having measured the noise levels in the work area, the need arises of reducing it.
F.V - Noise can be reduced at 2 levels.

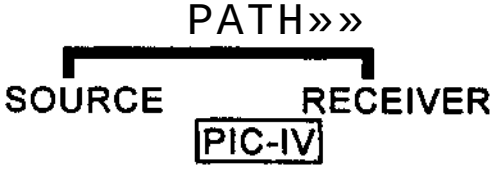
(1) Engineereing controls which includes controlling the noise at the level of source and,

W.F - ENGINEERING CONTROLS

(2) At the receiver lend which gets included in Adminstrative controls.

A noisy machine in a factory.

Survveyes should ideatify the major noise lovrel and this becomes the starting point of the Engineering control.

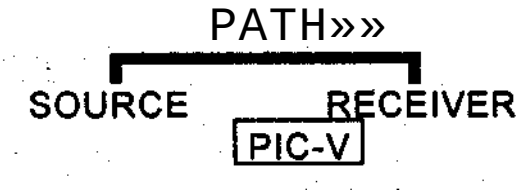


PIC-IV

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

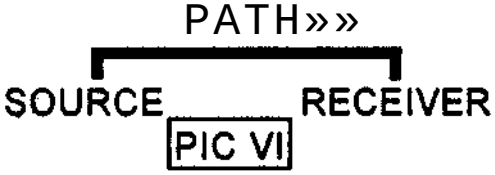
V

A



W.F - WAYS TO REDUCE SOUND AT SOURCE:
(1) Replacement of instrument.
(2) Redesigning of instrument.
(3) lubrication of machinery.
(4)Modification - in maintenence 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 bachground an enclosed mechinery 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 enclusure can be made such that the sound energy produced is trapped and converted into heat which is let to dissipate.

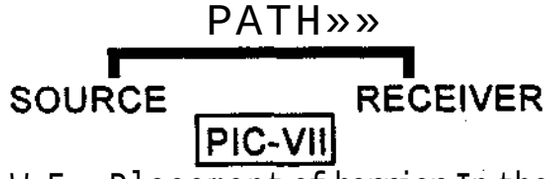
Vijay, pointing to a machinery which is a part of the production process.

Enclosure of sound source poses some practical problems like the machinery might be a part of the prodution 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.



PIC-VII

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.

A

OR

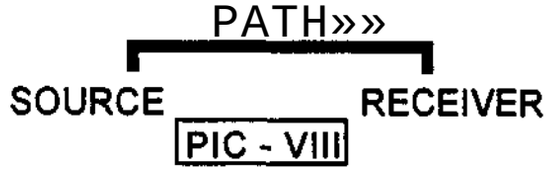
Some other machinery size might not let itself to get enclosed.

If the sound source is enclosed, it might lead to heat trap which miht 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.

W. F - ADMINISTRATIVE CONTROLS

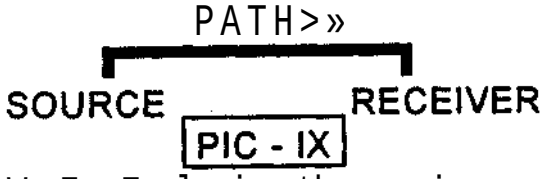


PIC - VIII

W.F - Barrier near the receiver

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

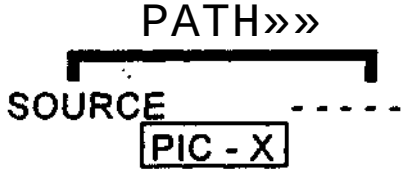
V



PIC - IX

W. F - Enclosing the receiver.

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



PIC - X

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 acheived 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 MOITORING

V

Focus on the "audiometric monitoring " in the PIC -I

Vijay standing in front of aan audiologisis room.

Vijay enters the room.

A

F.V- Coming to the phase "audiometric monitoring" out of the five phases of an HCP

Here, we are standing outside an audiometery room or an audiologists room. Before proceeding further, we should know who an audiologist is and what does he do. We better have a conversation with him.

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 pepole. 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 categoires : -

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 diaginose the degree and type of hearing loss. Depending upon the needs of person, we send horn to the ENT Specialist or to the HPD dispensor.

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 contistently what it is supposed to measure.

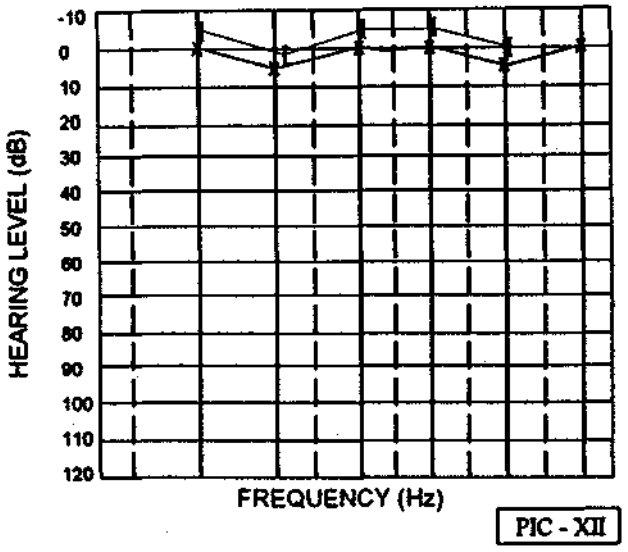
V : What is an audiogram and what do you do with it ?
A : [showing an audiogram and visual focus on audiogram]. It is a graph on which the hearing level of the individual is plotted at different frequencies. Looking at this, we can make out how much the hearing loss is. To make things easy, we have classified 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

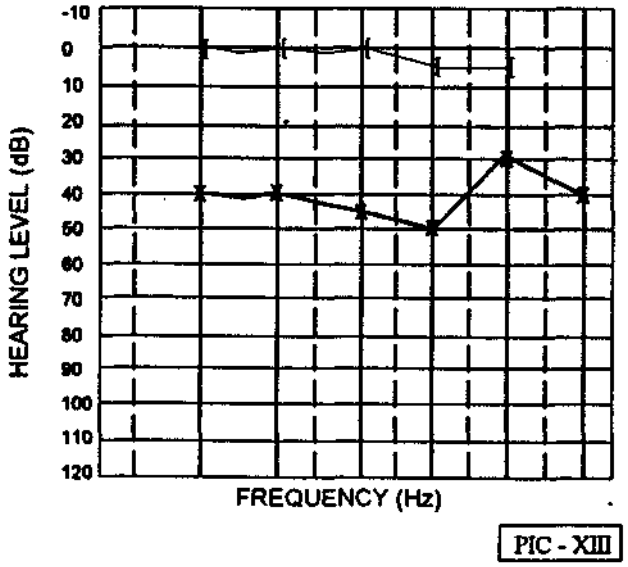
NORMAL HEARING SENSITIVITY



PIC - XII

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

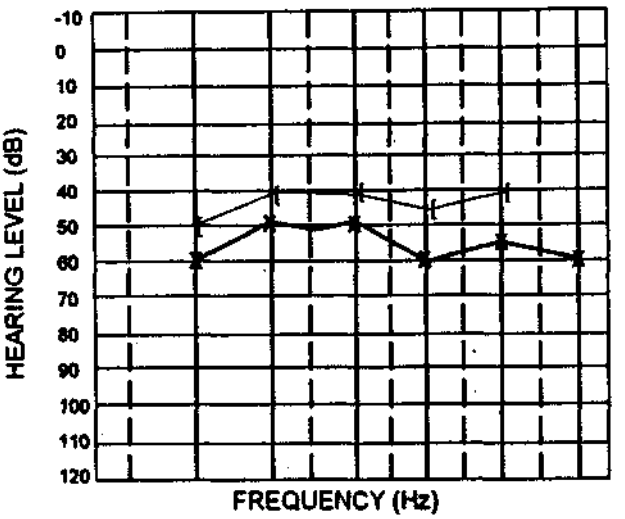
CONDUCTIVE HEARING LOSS



PIC - XIII

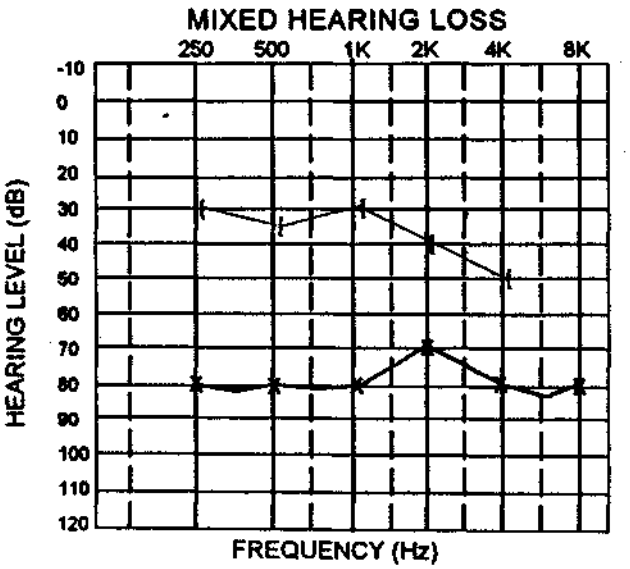
F.V. -- If the B.C. Is within normal range i.e. between 10 and 25, but A.C. is below it, it is conductlve.Hearing loss and is usuall not seen in NIHL or Noise Induced Hearing Loss. It needs attention by an ENT Surgeon.

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.



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.

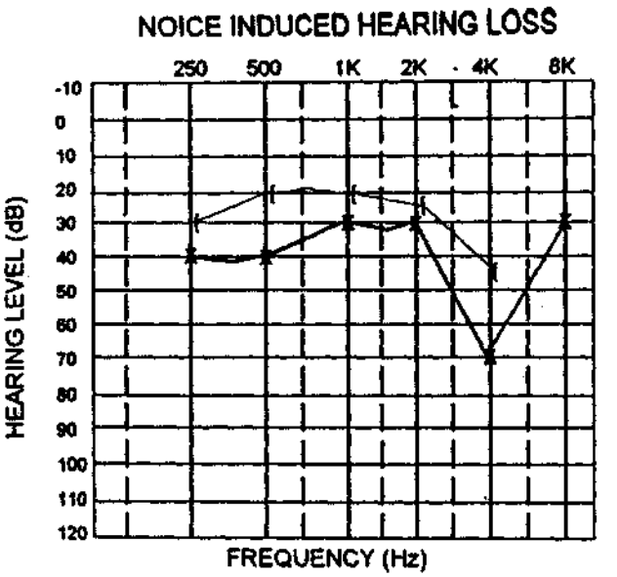
Preferably, audiological testing should be done annually for each employee, especially for the ones who are exposed to noise. This annual audiogram should be compared to the baseline audiogram.

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.

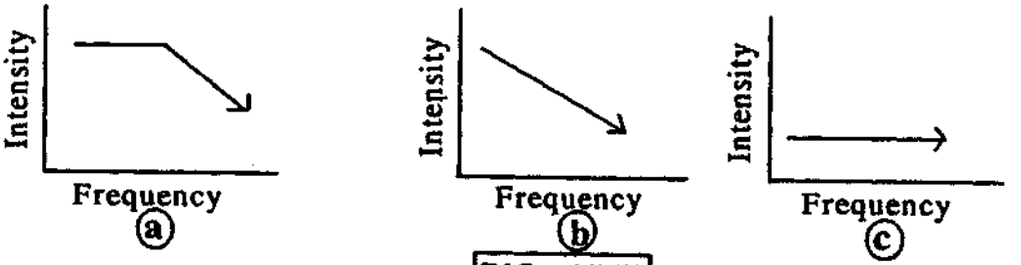
As an objective evaluation, audiograms gives better information.



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 audlologlst, 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 forstable 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	A
Vijay, infront of the section where HPDs are dispensed.	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 aginst 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.
Focus on Hearing protection in the PIC -1.	F.V. - Here arises, the need for the hearing protection phase of the five phases of HCP.
HPD dispensor 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	F.V. - Before the HPDs are given to the person, an examination of the external ear should be done. the HPD dispensor 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.
W.F. -- HPD's	F.V. - Now going on to the HPDs.
W.F --Various tyhpes of HPDs. (1) Ear muffs (2) Ear plugs	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 IVIolded 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 dispensor should check that the cups of Ear Muffs, completerly cover the pinner 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 indvidual 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.	F.V - A large variety of PMEP are available in size and shape.
Focus on the insert portion of the plug.	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.
Focus on flanges of PMEP.	
PMEP made out of Vinyl, plastic, silicons etc.	F.V. – The PMEP are made out of soft materials, eg. Vinyl, plastic, silicons etc. or other soft and flexible compositions.
W.F. (ii) User molded plug and Non expandable plug.	
Focus on a real user molder plug.	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.
Focus on expandable and non-expandable types of plugs.	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.
W.F. - (III) Custom molded plugs. Focus on Real custom molded plugs.	F.V. - The material used for molding process actually forms the plug

here. These are comparatively expensive.

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

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

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

Focus on real SID

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.

Vijay addressing the veiwers.

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.

Focus on an ear muff with holes in the cup.

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

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

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-sheilds 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 werarer 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 acheived depends mainly upon the degree to which the HPD achives 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.

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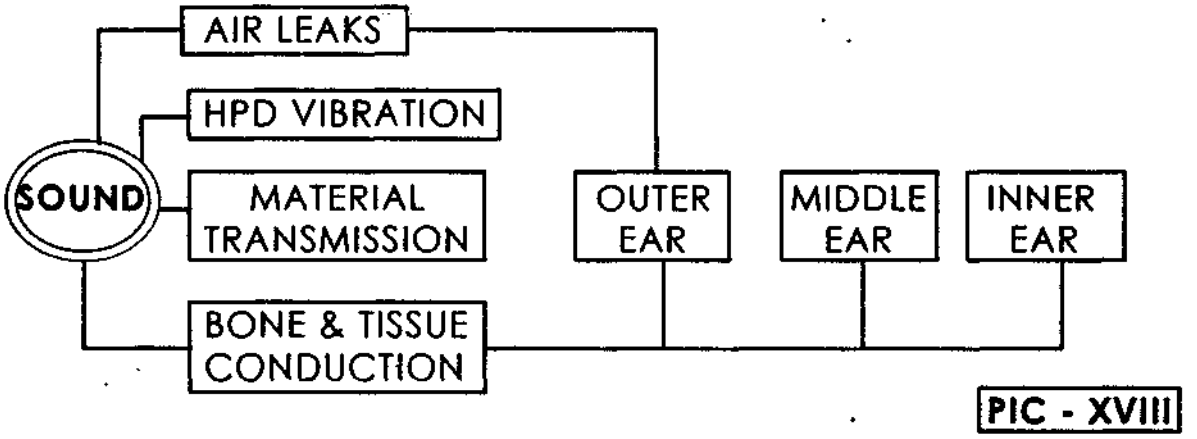
CONVERSATION BETWEEN HM) DISPENSOR AND VWAY

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 noice at all.

HPD dlspensor : 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



PIC - XVIII

Air leaks: This takes place when the HPD is not fitting properly and doesn't have an airtight seal with thecanal or the side of the head. Becuase 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 second 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	A
Vijay addressing the viewers.	Till now, we talked about Education, Sound Surveys, Engineering and adminstrative controls, Hearing Protection and audiometrio monitoring as the importance five phases of an effective HCP.
Focus on 'Desired Characteristics in PIC -I	F.V. Let's talk about Desired charactersitcs first.
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.	F.V. -- It should be seen that HPDs are being worn in real and its not a mere paper policy.
(2) HPDs available are potentially effective for the work environment.	F.V. -- HPDs worn are comfortable and do help in the reduction of noise thus preventing hearing loss.
Vijay addressing the viewers.	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 Grib clerks, safety officers, audiometric technicians, nurses, personnel directors, industrial hygeinists, 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 indiuidual in PIC-I

work haphazardly.

W.F– Qualifications of key indiuidual :
He should have the genuine interest in the company's HCP.

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

Vijay

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

Focus on: Active Communication

Vijay

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 sucessful in achieving the goals of HCP.

PERSONNEL INVOLVED IN HCP

Focus 'Personnel Involved' in PIC - I

F.V - Comming to Personnel Involved, now. The Personnel Involved in HCP are:

W.F-- Personnel Involved :

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

(Read - out of Video)

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 enforcement of HCP to see that the industry's overall health is maintained.

W.F - Job of the management & supervisor

- monitoring noise exposure
-maintainin engineering controls
- participation in educational efforts
- fitting HPDs
- Reissuing HPDs
- Supervising daily HPD utilization
- performming the audiometric evaluation.
- Giving feedback to employees about their hearing results.

(Read-out of video)

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.

W.F - Company Head Quarters

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

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

IVIany 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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