

IH&S 627: Noise Control Engineering

**Chapter 5: Auditory and Nonauditory  
Effects of Noise**

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**Bad things about noise**

- Hearing loss prevalent in the working population
- Masks informative sounds, reducing warnings and other information
- Masks speech, reducing communication in the workplace
- Annoying
- Problems in the community

## Some Statistics about Hearing Loss

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- 5-30 million workers exposed to noise (@ or >85dBA)
- 10 million US workers have hearing loss
- 28 million US citizens have hearing loss
  
- Far more important than most other occupational diseases

## Effects of Noise on humans . . . 2

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- Constriction of the blood vessels
- Causes subjective communication problems @ or >55dBA
- Causes nausea (disturbed balance)
- Headache
- Reduction in life span (chronic stress effects)?

## Social Handicap

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*“ . . . Blindness cuts people off from things; whereas, deafness cuts people off from people . . . ”*

[Helen Keller]

## Social handicap

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- Socially: people are annoyed if asked to repeat themselves,
  - so victims pretend to hear when they don't
  - Inevitable mistakes in following conversations
  - Hearing impaired are made butt of jokes
- Victims reluctant to call attention to their impairment
  - Deafness associated with senility
  - Hearing aids made small to conceal them

## Social handicap

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- Hearing loss can:
  - Create tension between partners,
  - Make children feel uneasy
  - Reduce enjoying music and other enjoyments in life

## Quality of life

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- Hearing loss as related to workers:
  - Reduces detection of changes in a machine due to poor performance of the machine
  - Reduces on the job communication
  - Masks warning sounds that must be heard
  - Increases accidents/mishaps
  - Reduces productivity and performance
  - Increases absenteeism
  - Reduce employee morale on the job

## Tinnitus

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- 36 million Americans suffer from “Tinnitus”
- These are sounds heard in the head in the absence of an actual sound source
- Can be disabling
- Dramatically affects the quality of life

## **Paracusis**

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## **Speech Misperception**

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## Physiological Measures of Damage

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## NIPTS

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## **Susceptibility**

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## **ONIPTS from Steady-state Noise**

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## **ONIPPTS from Nonsteady Noise**

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## **ONIPPTS from Pure Tones**

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## **ONIPITS from Very High Sound Levels**

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## **Infrasonics and Ultrasonics**

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## **Nonauditory Effects of Noise**

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## **Other Effects of Noise on Humans**

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- Dilatation of the pupil
- Secretion of thyroid hormone
- ↑Heart palpitation
- Secretion of adrenaline/adrenaline cortex hormone
- Movements of the stomach and intestines
- Muscle reaction
- Increased levels of stress hormones (Cortisol)

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# The End Questions?