

Motivating Prevention with the NIOSH Hearing Loss Simulator

Bob Randolph



Mining Hearing Loss Prevention Workshop
June 21-22, 2005

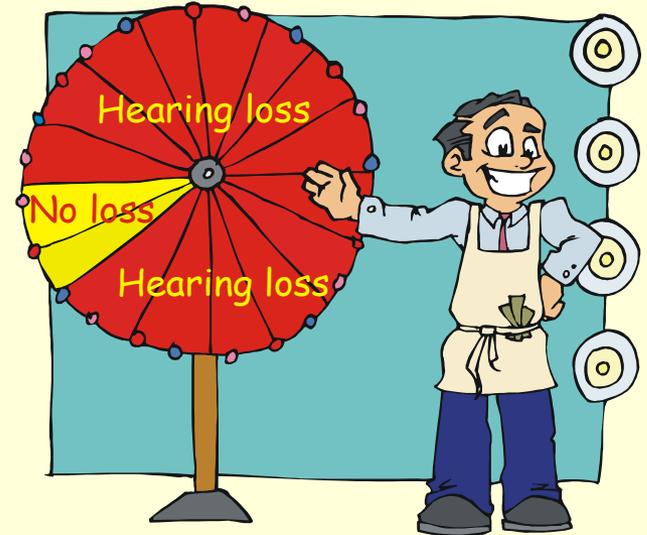
NIOSH Hearing Loss Simulator

- Windows-based software
- Trainees can hear the effect of noise exposure
- **Best** for instruction led by an instructor or expert
- **Can** be used for self-teaching *after orientation*



Objective: *Motivates Prevention*

- Hearing loss is **likely**



- Hearing loss is **severe**



Objective:

Teaches Specific Knowledge

Hearing loss...

...is affected by noise levels.

...is related to the time of noise exposure.

...is permanent.

...makes it harder to hear what others say.

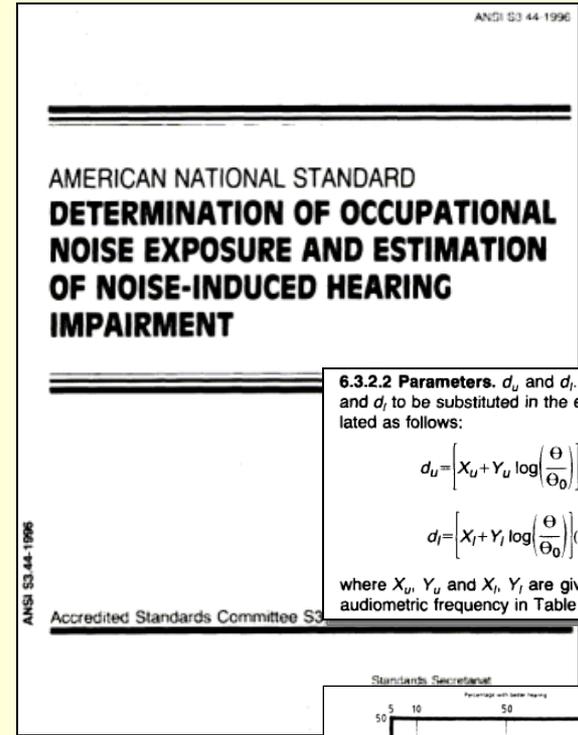
...mostly **NOT** caused by aging.

...due to noise makes it harder to hear high pitch sounds.

...due to noise has less of an effect on hearing low pitch sounds.

Simulation based on real-world data

- Large population studies of noise-exposed & noise-free males & females
- ANSI standard for predicting effects (S3 44-1996)
- *But – how many miners read ANSI standards?*

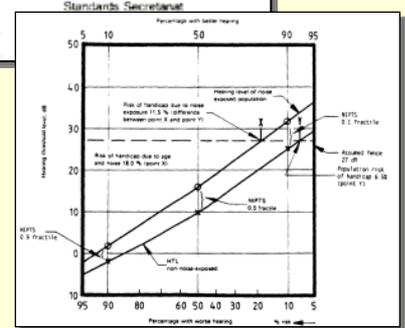


6.3.2.2 Parameters. d_u and d_l . The parameters d_u and d_l to be substituted in the equations are calculated as follows:

$$d_u = \left[X_u + Y_u \log \left(\frac{\Theta}{\Theta_0} \right) \right] (L_{A8hr} - L_0)^2, \quad (19)$$

$$d_l = \left[X_l + Y_l \log \left(\frac{\Theta}{\Theta_0} \right) \right] (L_{A8hr} - L_0)^2, \quad (20)$$

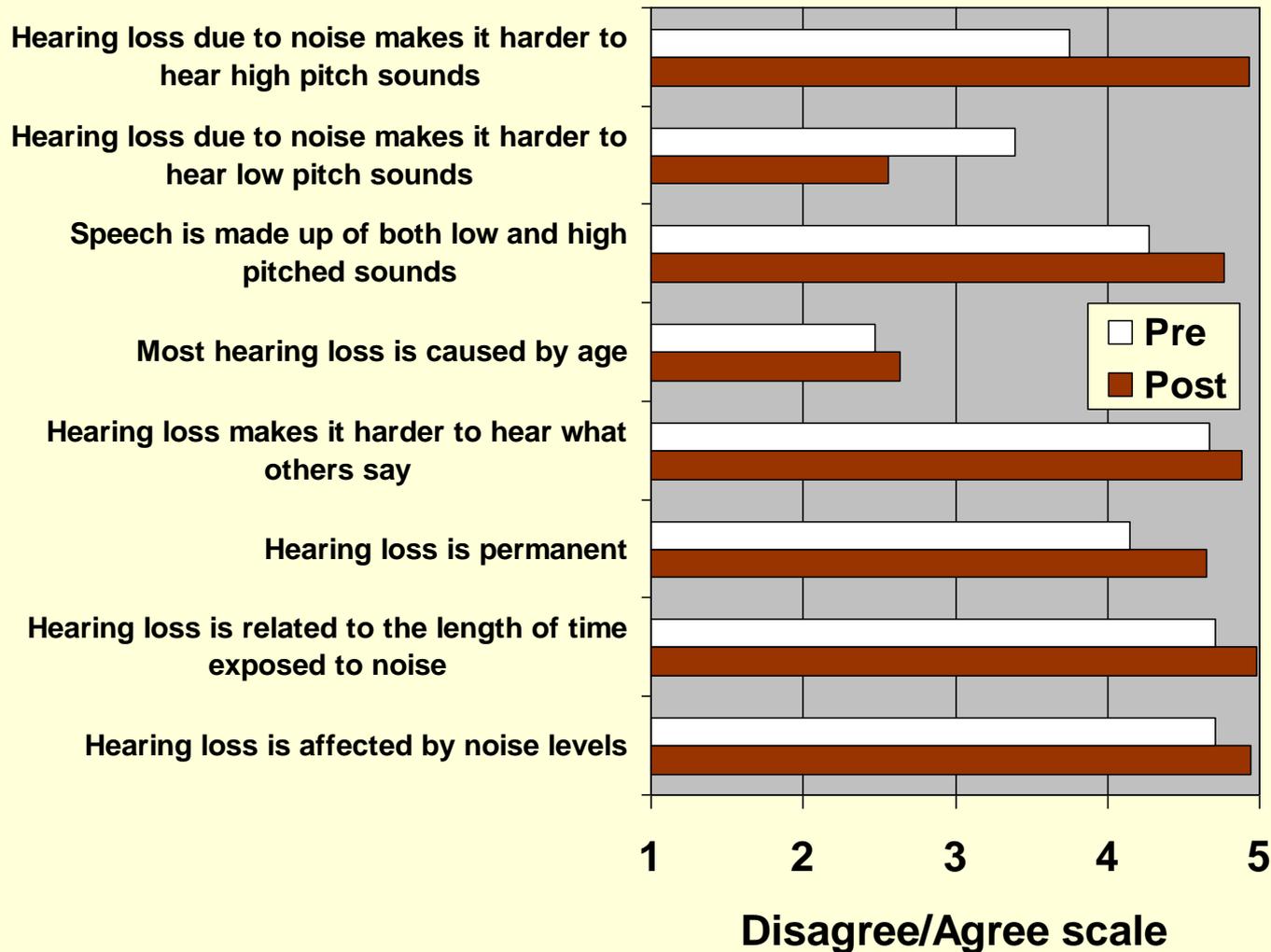
where X_u , Y_u and X_l , Y_l are given as a function of audiometric frequency in Table 4;



Hearing Loss Simulator Demonstration



Trainees are more knowledgeable

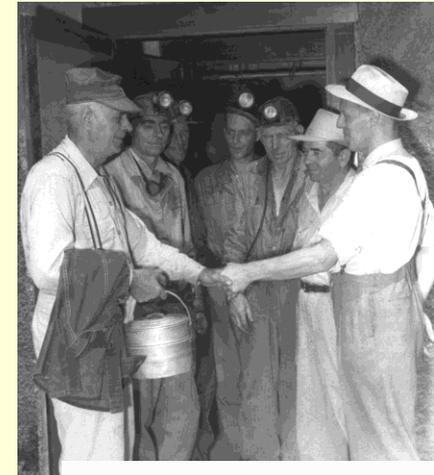


Trainees plan to take action



Who's using it and how

- Mine trainers:
 - Annual refresher training
- CAOHC course directors:
 - Teaching hearing test techs
- Audiologists:
 - Family of hearing-impaired patients
- Audiology professors:
 - Doctoral class on hearing conservation



CMU

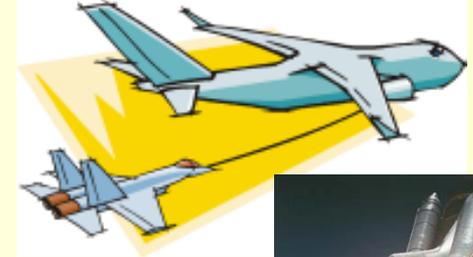
CENTRAL MICHIGAN
UNIVERSITY

Other Customers

- Pittsburgh Air Refueling Wing
- NASA Ames Research Center
- Sandia National Laboratories

- Global: Australia, Canada, Denmark, Israel, Mexico, New Zealand

- *Over 300 requests*



What you need

- Copy of the simulator
- Windows-based PC
- Big monitor or projector
- Loudspeaker system
- *Follow examples in online help*



For more information

Bob Randolph



Phone: 412-386-4660 Fax: 412-386-4864

rRANDOLPH@CDC.GOV

Simulator CD orders: **MINETRAINING@CDC.GOV**

www.cdc.gov/niosh/mining