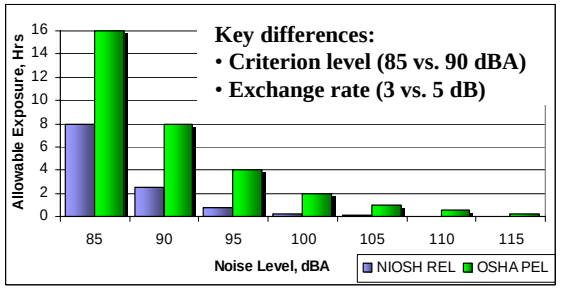
R Neitzel/N Seixas, University of Washington Dept. of Environmental and Occupational Health Sciences

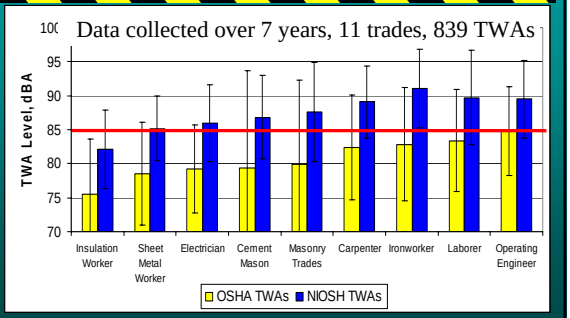
Noise Standards: OSHA vs. NIOSH



Key differences:
- **Criterion level (85 vs. 90 dBA)**
- **Exchange rate (3 vs. 5 dB)**

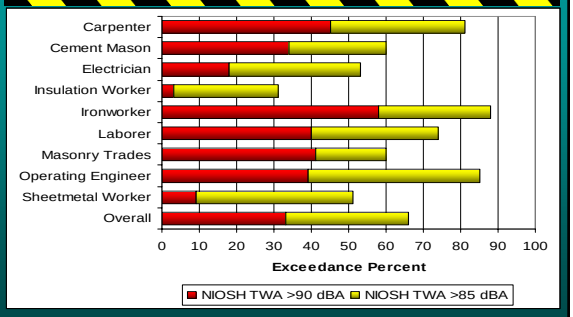
REL more protective, especially in variable noise

UW Construction TWAs



8/9 NIOSH, 1/9 OSHA means >85 dBA; highly variable

NIOSH TWA Exceedances



5 of 9 trades have >66% of TWAs over 85 dBA

HPD attenuation requirements

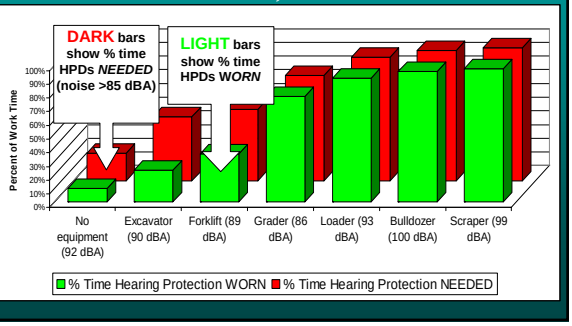
To protect 95% of measured workers from TWAs >85 dBA (assuming 100% use time during exposure >85 dBA), NRR needed for each trade would be...

Trade	NRR (dB)
Sheetmetal worker	12
Insulation worker	12
Electrician	12
Carpenter	14
Cement mason	14
Ironworker	18
Masonry trades	20
Laborer	24
Operating engineer	24

NRR attenuation derated by 50%

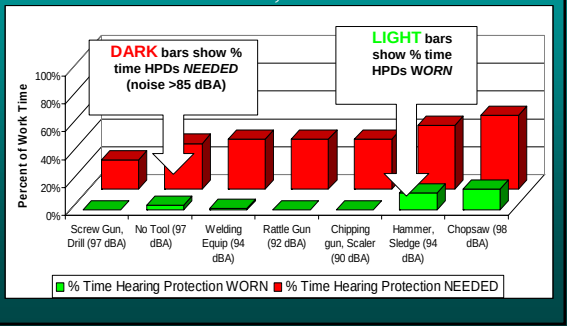
Self-reported HPD use by tool: operating engineers

Mean TWA level 89 dBA; 85% of TWAs >85 dBA



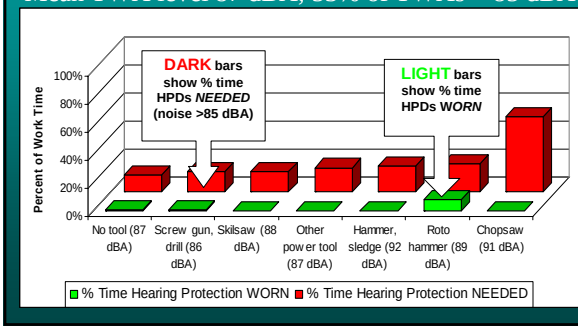
Self-reported HPD use by tool: ironworkers

Mean TWA level 92 dBA; 88% of TWAs> 85 dBA



Self-reported HPD use by tool: electricians

Mean TWA level 87 dBA; 53% of TWAs > 85 dBA



HPD attenuation

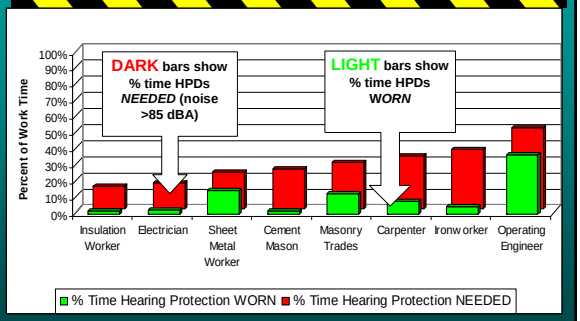
- Attenuation measured in field on construction workers

HPD Model	Number of samples	Noise Reduction Rating	Personal Attenuation Rating
Leight MaxLite	26	29	20.4
Moldex 6800	5	31	17.4
Moldex Sparkplug	6	31	17.7
Other*	7	28	17.7
Overall	**44**	**28.6**	**19.5**

*Other = 3M 1100 x 1, 3M 1270 x 1, DePlug 77200 x 2, E-A-R Classic x 3

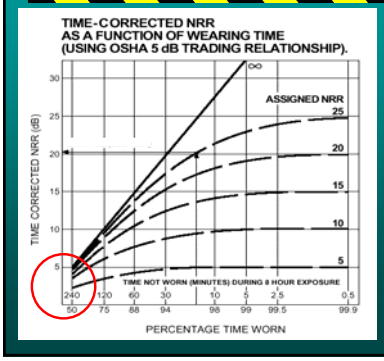
- Reasonably good attenuation, *but* high variability

Self-reported HPD use by trade



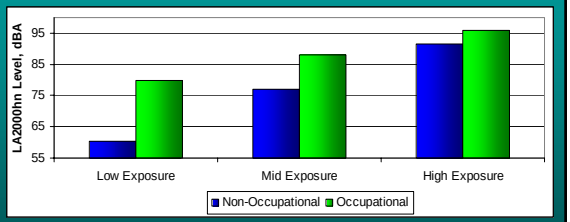
HPDs use largely poor (~33% of overall time needed)

Effect of not wearing HPDs in noise



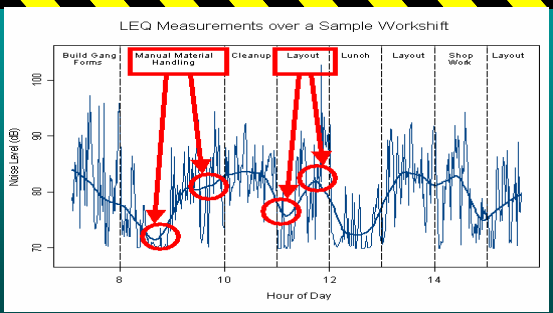
Effective protection negligible overall, given 20 dB mean attenuation and use 33% of time needed

Estimated noise exposure from occupational and non-occup sources



- Given high occupational noise levels, most (80%) construction workers at low risk of non-occup NIHL
  - Firearms users have greater risk due to greater exposure to noisy activities *other* than shooting

L_{eq} average levels: sample workshift



Cannot estimate full-shift exposure from TB-samples alone

Conclusions

- Overexposures prevalent among *all* trades
  - Can't know who will be overexposed on given day, but presumption of overexposure reasonable
- HPD use varies by trade, task, tool; poor overall
- HPD attenuation adequate, but variable
  - Combination of moderate attenuation level and low usage time results in minimal protection from noise
  - Workers need training on *why, when* HPDs are needed in order to increase usage time
- Occupational noise is primary exposure source

Recommendations and guidance

- Noisiest tasks and tools need noise control efforts
- Monitor for exposure prevention, not estimation
  - Full-shift exposure estimates from task- or tool-based samples inaccurate (levels too variable)
- Task- or tool-based strategy may be useful for:
  - Identifying what situations may require HPDs
  - Training workers on when HPDs are needed
  - Determining how much attenuation is needed
- Consider using HPDs with trade-specific NRRs and requiring 100% use onsite

UW noise publications

- Additional info: http://depts.washington.edu/occnoise/

- Neitzel R, Seixas N, Goldman B, Daniell W. "Contributions Of Non-Occupational Activities to Total Noise Exposure of Construction Workers." *Ann Occ Hyg* (in press, 2004).
- Neitzel R, Seixas N, Olson J, Daniell W, Goldman B. "Non-occupational noise: Exposures associated with routine activities." *J Acoust Soc Am*, 115(1): 237-245 (2004).
- Reeb-Whitaker C K, Seixas N S, Sheppard L, Neitzel R. "Accuracy of task recall for epidemiological exposure assessment to construction noise." *Occ Env Med*, 61(2): 135-142 (2004).
- Seixas N, Sheppard L, Neitzel R. "Comparison of task-based estimates with full shift measurements of noise exposure" *AIHAJ*, 64: 823-829 (2003).
- Seixas N, Ren K, Neitzel R, Camp J, Yost M. "Noise exposure among construction electricians" *Am Ind Hyg Assoc J*, 62: 615-621 (2001).
- Neitzel R, Seixas N, Camp J, Yost M: "An assessment of occupational noise exposures in four construction trades" *Am Ind Hyg Assoc J*, 60: 807-817 (1999).