Noise Exposure for Bus Drivers

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Background

Exposure limits are recommended to keep 8-hr time-weighted average exposures to occupational noise below 85 dBA to prevent adverse health outcomes and NIHL for all workers.

Limited studies have examined noise exposures in for public transit (bus) drivers.

Recent noise guidelines from the Transit Cooperative Research Program (TCRP) focus on reducing bus driver noise exposure to < 75 dBA in order to prevent public safety hazards such as distracted driving.

Objectives

Characterize U.S. urban transit bus driver noise exposures above 75, 85, and 90 dBA, time-weighted

Identify statistically significant determinants of noise exposure in this transit system

Methods

Equipment:

- Calibrated Quest Edge Noise Pro dosimeters
- Setting at both OSHA and modified NIOSH recommendations (threshold=70 dBA)
- Pre- and post-sampling calibration (3M™ Calibrator QC10)

Data Collected:

- Driver-shift TWA noise exposure measurements on five bus routes
- Qualitative data such as radio usage and window status
- All drivers operated 40-foot Gillig Low Floor buses

Measurements and Calculated Data:

- Personal driver-shift TWA exposures
- Personal projected 8-hour TWA equivalent exposures
- Equivalent 8-hour TWA exposures across combined sequential participants on a shift-route

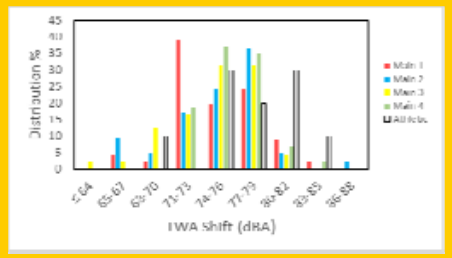
Analysis:

- Unpaired t-tests to compare exposures
- Factors: Route, time of week, community activities, community population, and operator conditions

Results

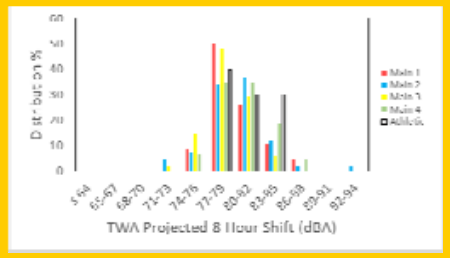
Measured exposures for 188 driver shifts
Mean shift length = 3 hr (s.d. = 1.2 hr)

Shift-average TWAs (N=188)



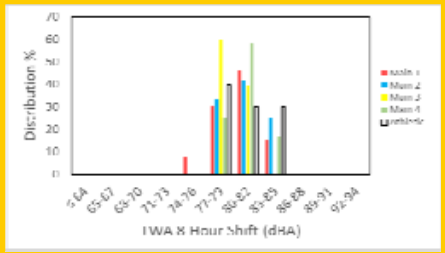
Shift-average TWA range: 64-87 dBA
55% ≥ 75 dBA 0.5% ≥ 85 dBA 0% > 90 dBA

TWAs Projected to 8-hr (N=188)



Projected TWA range: 72 - 91 dBA
95% ≥ 75 dBA 4% ≥ 85 dBA 0.5% ≥ 90 dBA

8-hr TWAs Using Sequential Measures (N=62)



8-Hr TWA range: 76 – 85 dBA
100% ≥ 75 dBA 3% ≥ 85 dBA 0% ≥ 90 dBA

Results, continued

Insignificant differences in exposure by:

- Route (p = 0.27)
- Time of week (p= 0.28)
- Community population (university in session vs not) (p= 0.14)
- Windows open vs closed (p= 0.59)

Significantly louder noise when driver used radio (p=0.004)

- Radios and speakers were mounted in an area directly behind the driver's head
- 84% of drivers used radio when driving

Conclusions

No driver exceeded the OSHA HC (85 dBA) limits

Since 55% of TWA exposures > 75 dBA, drivers might be at risk of distractions

For those driving longer shifts (e.g., 8 hours), 3% exceeded the NIOSH recommended exposure limit

- For this 3%, the radio was on for a mean of 324 minutes for 8-hr equivalent shift.
- Reducing the radio volume or use would reduce the risk to drivers

Acknowledgements

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