methods. **Results.** Standardized task-lists were developed for 26 job groups, with five to 23 tasks per job. Work-sampling analysis showed 15-minute sampling intervals were sufficient for analyzed tasks. Of 364 workers, 229 were directly observed during measurement (dosimetry and TB) and 135 had only dosimetry. Variability of time-at-task estimates depended on estimation method. **Conclusions.** Clear task definition is crucial to the success of a TB approach, yet workers, supervisors, and researchers defined tasks differently. Although a TB strategy improves the validity of the exposure assessment and guides control efforts, cost and personnel time are not insignificant relative to other approaches.

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EVALUATION OF NOISE EXPOSURE IN AN INDOOR SKATEPARK. F. Akbar-Khanzadeh, R. England, Medical College of Ohio, Toledo, OH.

Exposure to noise in recreational facilities is widely accepted, and health professionals are rarely called to assess its magnitude and possible harmful effects. Indoor skateparks in particular may generate excessive noise because of their confined structural nature, possibly exposing users and employees to unacceptable levels of noise. This study used real-time sound level meters (Quest Models 400 and 500) to examine the extent of noise exposure at an indoor skatepark with wooden ramps. Noise sources included the activities of up to 25–30 individuals using skateboards, rollerblades, and bicycles on the ramps. At the facility's front counter, where employees worked, minute-time-weighted average area noise exposure ranged from 50–95 dBA (mean ± SD of 65 ± 9 dBA; n = 88) with peak noise levels ranging from 101–145 dB (131 ± 7 dB). A skateboarder and a bystander (at a distance of 2 meters from the skateboarder) wore personal noise dosimeters concurrently for an extended period of time. The skateboarder's minute-time-weighted average personal exposure ranged from 81–99 dBA (89 ± 3 dBA; n = 32) with peak noise levels ranging from 114–143 dB (131 ± 7 dB). The bystander's minute-time-weighted average personal exposure ranged from 73–85 dBA (81 ± 3 dBA; n = 32) with peak noise levels ranging from 111–128 dB (118 ± 5 dB). The users of this facility were mostly children (ages ranging up to 21 years) and some adults including two employees. The noise was dominantly impulsive. According to World Health Organization recommendations, the peak sound pressure attributed to hearing impairment from impulse sounds in children is 120 dB, and for adults is 140 dB. The results of this study indicate that noise exposure levels in this facility exceed recommended limits. In order to protect participants, bystanders, and employees, noise levels should be controlled accordingly.

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NOISE EXPOSURE AMONG EMPLOYEES WHO WORK IN DRINKING ESTABLISHMENTS THAT OFFER LIVE MUSIC. P. Prendergast, Environmental & Demolition Services Inc., Baltimore, MD; M. Gerke, Marshall University, Huntington, WV.

According to the U.S. Bureau of Labor Statistics, nationally, there are nearly 150,000 bartenders and nearly 80,000 waiters and waitresses who work in the job location category, drinking places: alcoholic beverages. Some "drinking places" offer some form of music as entertainment, many times in the form of live musicians. In venues where loud music is played, particularly live music, employees could be at risk for occupational noise exposure.

During the course of an environmental noise experiment, noise level samples were collected in and around a college drinking establishment. The establishment offered live music in the form of two five-person bands. The bands performed what would be classified as "rock and roll" music.

During a two-hour time frame, noise dosimeters were worn by two volunteers. These volunteers were stationed at specific locations within the establishment, but were free to move about the establishment. In addition, a hand-held sound meter set on the A-scale, slow response was used to collected samples from various specific locations within the establishment in 30-minute intervals.

The volunteer's dosimeters recorded averages 99.1 dB and 98.6 dB with maximum levels of 118.1 dB and 121.1 dB, respectively. Recorded sound levels from 10 feet from the stage averaged 100.53 dB (107.8 dB maximum), 30 feet from the stage, 97.35 dB (106.7 dB maximum), and at the front door, 50 feet from the stage, 88.17 dB (99.3 dB maximum). Individuals who worked as bartenders, waitstaff, and security at this establishment could possibly be exposed to levels above the OSHA permissible noise-exposure level and would likely qualify to be included in an OSHA required hearing conservation program.

Individuals who work in establishments that routinely offer loud live music as entertainment should be made aware of the hazards associated with excessive noise exposure.

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EXPOSURE ASSESSMENT OF A COMPLEX RF ENVIRONMENT. J. Cardarelli, W. Lotz, C. Dowell, M. Finley, CDC/NIOSH, Cincinnati, OH.

The National Institute for Occupational Safety and Health was asked to provide technical assistance to the Kentucky Labor Cabinet in monitoring radiofrequency (RF) field strengths on a building roof that housed multiple antennas with various transmitting frequencies. Employees of a window-washing company expressed concern about their exposures to RF while conducting preparation activities on the roof.

Some of the problems encountered were: (1) a previous RF survey neither provided spatial-average measurements nor approximate work locations of the window washers; (2) power levels and transmitter locations had changed over time; and (3) determining the appropriate exposure limits that apply to this occupation. The challenges were: (1) selecting and using the appropriate instruments to account for the different frequencies and power outputs; (2) reconstructing the power output conditions on the day of the suspected overexposure; (3) implementing an appropriate spatial-averaging technique; and (4) determining the appropriate measurement locations.

The problems and challenges were resolved by: (1) interviewing the window washers about their equipment, tasks, work duration, and locations while on the roof; (2) working with the Kentucky Labor Cabinet, the building management, and transmitter owners to gain access and adjust transmission power levels; and (3) using an instrument with a shaped-frequency response probe designed to mirror the appropriate standard.

The need to characterize and assess potential exposures to nonionizing radiation is becoming more important with the increased use and advancement of wireless technology and capabilities. This work illustrates that workers in occupations outside the traditional fields in nonionizing radiation are also exposed to RF hazards. It also demonstrates the need to account for their potential exposures and to develop training specific to their needs. Exposure assessors will also be informed of the latest technology used to assess complex RF environments.

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THE FREQUENCY ASPECT OF LOW FREQUENCY EMF MEASUREMENTS. D. Baron, ETS-Lindgren, Cedar Park, TX.

Low frequency electric and magnetic field measurements can range from the low field levels observed near video display terminals to the substantial magnetic fields often found near induction heating equipment. Asking the proper questions before making measurements is essential to an accurate determination of potential hazards. The frequency of the measured field may have a substantial impact on the measured values because of the variation in safety limits, the characteristics of the measurement instrument, and the harmonic content of the field.

Two case studies are reviewed as examples of the effect of frequency on the recorded data and its impact on interpretation of the results. The need to properly identify the frequencies present and understand the interrelationship between the field environment and the sensing instruments used to gather the data is demonstrated. Ultimately the observed data is used to evaluate compliance with the selected safety guideline.

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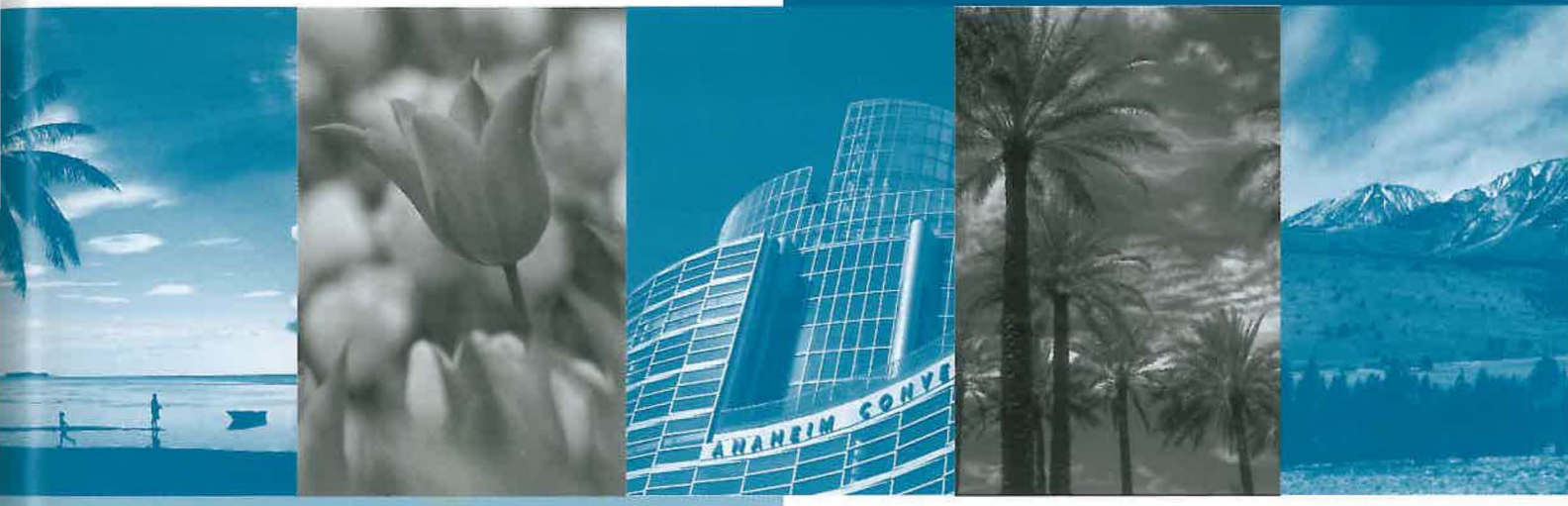

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