Hospital Noise

Solutions for controlling hospital noise

Noise Evaluation of Arthroplasty Theaters

Hospital noise can cause problems for both hospital patients trying to get better and for the people who work there.

When a group of orthopaedic surgeons noticed that they were going deaf they turned to Pulsar instruments to help them identify the issues.

We worked with Doctors.Net to help them understand the extent of their noise exposure during total hip and knee arthroplasty surgery. We loaned a set of Pulsar NoiseBadge Dosimeters for use in their theatres and helped them interpret the results.

The current Control of Noise at Work Regulations 2005 (Noise Regulations 2005) set legal noise action levels and limits workplaces must abide by.

An action level is basically a noise exposure level at which employers are required to take certain steps to reduce the harmful effects of noise on hearing. There are two main action levels for continuous noise, lower level of 80dB(A) and upper level of 85dB(A) Finally, there is an exposure limit value of 87dB(A), above which no worker can be exposed (taking hearing protection into account).

The Pulsar NoiseBadge Dosimeter

Pulsar Instruments offers a range of noise measurement equipment including personal noise dosimeters. The Pulsar Noisebadge dosimeter is a robust easy to use shoulder-mounted personal sound exposure meter. Ideal for measuring personal noise exposure in tough environments.

FEATURES

- Self-contained noise measurement device and decibel reader
- Easy to use. No cables, displays or controls
- Compact, robust and lightweight
- Meets IEC 61252 & ANSI S1.25 for noise dosemeters
- Accurately and simply assesses and captures the true noise exposure of workers

APPLICATIONS

- Ideal for lone workers, shift workers or those operating in several different locations
- Suitable where people are working with moving machinery, or in difficult to reach areas

"Everything you need for compliant occupational noise measurement"

Case study - Doctors.Net

Pulsar Instruments has helped British doctors understand the impact of noise in the workplace during orthopedic surgery using the Pulsar NoiseBadge. We provided a loan of the noise dosimeter equipment as well as information and advice on how to interpret the results.

Purpose: The purpose of the Doctors.Net study was to look at the levels of noise exposure for an orthopedic surgical team including the surgeon, assistant, scrub nurse, and anesthetist during a total hip and knee arthroplasty surgery. The study also sought to determine whether the noise exposure during these procedures reached or exceeded the noise action values set out in the Noise at Work Regulations (2005).

Materials and methods: Individual noise exposure during arthroplasty hip and knee surgery was recorded using a personal noise dosimeter, the Pulsar NoiseBadge. Recordings were taken in real-time during five separate theater sessions. Each theater session included two arthroplasty procedures and lasted approximately 4 hrs. Personal noise exposure was expressed in terms of peak sound pressure (LCpeak) and average noise exposure over an 8-hour time-period (LEPd8) to reflect the noise experienced by the team's ears over a working day.

Results: In all three sessions involving total hip replacement surgery, the peak sound pressure, for the operating surgeon exceeded the exposure action values set out in the Regulations. Theater sessions involving total knee replacement surgery did not exceed any exposure action values for LCPeak or LEPd.

Conclusion: Arthroplasty surgery is a working environment with significant noise exposure therefore any hospital who is concerned about the noise generated and subsequent noise exposure of their surgical teams should seek to have noise levels formally assessed using appropriately noise measurement equipment, and then should take appropriate action to make sure they are compliant with the Noise Regulations.

References: J Arthroplasty. 2020 Nov 21;S0883-5403(20)31217-1. doi: 10.1016/j.arth.2020.11.026

Pulsar NoiseBadge Specifications

SPECIFICATION:

Applicable Standards
- IEC 61252:1993 Personal Sound Exposure Meters, ANSI S1.25:1991 Personal Noise Dosimeter, and Internal Acoustic Calibrator to IEC 60942:2001 Class 2

Measurement Range (Typical)
- 70dB(A) to 130dB(A) RMS
- 120dB(C) to 140dB(C) Peak

Measurement Functions
- Dosemeter Configuration
- Calibration Record
- Measurement Duration
- Highest Peak(C) Sound Level
- Overload Exceedence
- Battery Status
- 115dB(A) Maximum Sound Level Exceedence

One-Minute Time History of:
- LAeq (3dB) or LAVG (4dB or 5dB)
- Peak(C) Level
- Battery Level

3dB 4dB & 5dB Exchange Rates
- LAeq, LEX,8h, LAE, % Dose, Exposure (Pa2h),
- Estimated % Dose,
- Estimated Exposure (Pa2h)
- LAVG, TWA, % Dose, Estimated % Dose

Weightings
Frequency:
- 'A' for all RMS measurements
- 'C' for Peak Sound Pressure

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