



VACC Recent Key Projects: Pharmaceutical Research Laboratory Tool Installation Floor Vibration Testing Lilly Corporate Research Center Indianapolis, Indiana

Client
Physical Electronics, Inc.

Owner
Lilly Corporate Research

VACC Project Scope
Ambient Lab Vibration Testing
Ambient Lab Noise Testing
Ambient Lab EMI Testing
Vibration Mitigation Consulting

Vibro-Acoustic Consultants was asked to perform surveys of laboratory micro-vibration, noise, and EMI to support the installation of three spectroscopy tools at a research laboratory operated by Eli Lilly & Co.

Physical Electronics (PHI) was contracted to provide three surface analysis tools for the lab. These spectroscopy tools work in the X-ray, Auger electron, and secondary-ion mass domains and are used to characterize surfaces. All three tools require demanding vibration, noise, and EMI environments due to the micro- and nanometer scale on which these tools operate.

We performed comprehensive environmental surveys of the preferred tool installation locations. In these surveys, we quantified vibration, noise, and EMI. While the EMI and noise environments were found to be acceptable, the vibration environment failed to meet the PHI criterion.

The vibration failure occurred in two different frequency bands: 6.3Hz and 31.5Hz. Both failures were intermittent; vibration levels at these frequencies varied dramatically over time. We immediately identified the exceedances and were able to determine the vibration sources the same day.

The 6.3Hz exceedance was found to be due to the passage of heavy trucks on nearby streets. The site soil condition resulted in efficient propagation of vibration around this frequency. The building foundation *could* be modified to mitigate this. Because traffic was outside of Lilly's control, and because addressing the exceedance would require expensive modifications of the foundation, Lilly staff decided to accept occasional interruption of their work due to this vibration source.

The exceedance in the 31.5Hz band was caused by a nitrogen supply compressor that served the lab. The installation of a simple vibration isolation system was suggested to mitigate the impact of the compressor. Since this exceedance occurred many times per hour, the costs of mitigation became a reasonable investment.

