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## **Monitoring construction vibration in highly sensitive facilities**

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New construction and renovation projects in populated areas create noise and vibration for both neighbors and occupants, with sensitivities ranging from inconsequential to critical. With proper understanding, consideration, and communication, a project can ensure a smooth process and minimize obstacles to cost and scheduling. This ABX workshop will compare a variety of potential adjacent sensitive facilities, ranging from those that house microscopes to murals to mice, as well as data centers and performance spaces. Some real-world examples and approaches to mitigation will be discussed. By using best practices, any project can proceed agreeably instead of under adversarial conditions, which can be avoided.

Construction work near existing facilities has the potential to adversely affect sensitive equipment and activities. General contractors often employ vibration monitors around the construction site to protect neighboring buildings from vibration-related damage. For sensitive equipment, however, the vibration levels of concern can be more than 100 times lower than those associated with even minor cosmetic building damage. In such cases, more sophisticated monitoring systems are needed to measure and assess the potential adverse effects of construction-related vibration.

Vibration sensitive equipment like electron microscopes and MRIs typically have very detailed vibration criteria, which are often frequency dependent (the allowable level varies depending on the frequency of the vibration). Again, sophisticated systems are needed to evaluate the vibrations at multiple frequencies at the same time.

Widely available remote desktop software has made it possible to place these sophisticated monitoring systems in the field and to monitor the vibration remotely in near real time. With an Internet connection it is also possible to send alarm messages by text or email when the criterion limits are exceeded, allowing the contractor to adjust means and methods to reduce the offending vibration. During times when the vibrations are within safe limits, the monitoring systems can provide peace of mind to researchers and staff in the facility.

Marc Newmark is a senior consultant in noise and vibration and Jeffrey Zapfe, Ph.D. is the president of Acentech Inc., Boston.

Newmark will present "Tiptoeing 101," Session C46 at ABX 2012, on the topic of monitoring construction vibration in highly sensitive facilities.

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