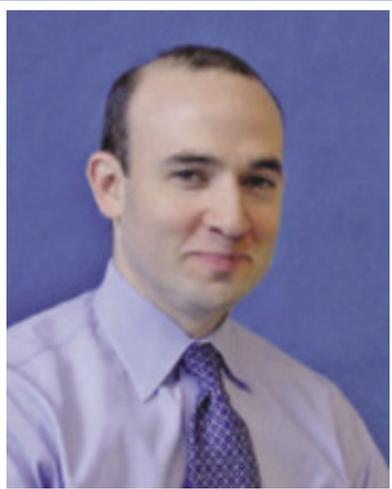


# Monitoring construction vibration in highly sensitive facilities



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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. Construction work near existing facilities has the potential to adversely affect sensitive equipment and activities, including microscopes, MRIs, and mice, as well as data centers and performance spaces. With proper understanding, consideration, and communication, the project manager can ensure a smooth vibration monitoring process and minimize obstacles to cost and scheduling.

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, such as electron microscopes and MRIs for example, typically have very detailed vibration criteria, which are often frequency dependent (the allowable level varies depending on the frequency of the vibration). And until recently, electron microscopes and MRIs were typically located on grade-supported slabs, often in a hospital's basement. This type of equipment is now being used on higher floors where it is closer to patients. Above-grade building floors are more flexible and are more prone to vibrations, which may interfere with the equipment's efficient operation. Sophisticated systems are needed to evaluate the vibrations at multiple frequencies at the same time.

With an Internet connection, these sophisticated monitoring systems can be placed in the field to monitor the vibration remotely in near real time and 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.

Remote monitoring - where measurement systems are installed in critical areas and their data are observed at other convenient locations - has been found to be especially useful not only for coping with construction, but also for evaluating the suitability of sites being considered for sensitive activities. Remote monitoring can be a cost-efficient tool in view of its capability to provide data and alarms in real-time and thus to protect hospital environments and other buildings from undue vibrations - all without the need to have specialists on site for extended periods.

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