

## Predicting Construction Vibration Impacts on Hospital Facilities

Posted on: 9.7.2010 5:02:33 PM Posted by [Jeff Zapfe](#)

Construction on an existing hospital campus has the potential to affect ongoing activities in neighboring buildings, particularly those that contain vibration-sensitive areas like operating rooms and imaging suites.

Hospital planners would like to know the potential impact of construction early on so that contingency plans can be made to accommodate any disruptions. Unfortunately, the accurate prediction of the impact of construction-related vibration is not trivial, in large part because of the uncertainties associated with vibration propagation in dense settings.

While analytical predictions can be useful to obtain a ballpark estimate of potential impact, more accurate predictions can be obtained with live tests using full-scale equipment. Such tests involve the use of real construction equipment to generate vibrations at the planned construction site while the vibrations are measured inside nearby sensitive spaces. This approach minimizes uncertainty by using real construction equipment, operating at the actual location on the actual soil; with the vibrations propagating through the actual soil into the actual buildings. Unfortunately this approach also requires the cost and logistics to mobilize real construction equipment.

If full-scale tests are not practical, useful propagation data can be reliably obtained using a drop weight as a vibration source. Even though the actual source is not used to produce the vibration, this method still provides an excellent model of the soil propagation and building response characteristics. The vibrations produced by the drop weight can then be adjusted to predict the vibrations from representative equipment.

---

**Jeff Zapfe is the Director of the Noise and Vibration consulting group at Acentech Incorporated.** He specializes in aspects of healthcare facilities related to floor vibration including design criteria, structural dynamics analysis, construction vibration mitigation, site surveys for sensitive equipment and vibration mitigation design. He holds a Ph.D. in Aerospace Engineering from The Pennsylvania State University.

Contact Jeff at 617-499-8033 or [jzapfe@acentech.com](mailto:jzapfe@acentech.com).