



Benedum Hall Nanotechnology Labs University of Pittsburgh, Pittsburgh, PA

Ambient vibration testing

Low-vibration and low-noise concept review

Client

University of Pittsburgh

Work Scopes

Ambient Vibration Testing

Low-vibration review

Low-noise review

Architect/Engineer

IDC (Planning)

DRS Architects

Clean Room Classes

100, 1000, 10000

Benedum Hall houses the University's School of Engineering. The facility includes laboratories, offices, classrooms, lecture halls, and a library. The University wanted to convert existing basement space to nanoscale research laboratories.

Due to the size and complexity of the building, vibration from existing rotating mechanical systems presented a special challenge. Since the building was not originally designed with micro-vibration control in mind, rotating equipment selection and maintenance of vibration isolators become special issues. In addition, environmental vibration sources could be ignored in such an urban setting.

During ambient testing, significant impact from rotating mechanical equipment was observed. Fans, compressors, and vacuum pumps - some located as far away as the penthouse at the 14th floor - were identified as culprits. In the absence of vibrations from these, the site was very quiet and met the most demanding of tool criteria.

In addition to the stringent vibration requirements, noise control became important as the design progressed. The tools desired by the researchers demand very quiet environments, which conflicts with the noise levels of the support equipment required for cleanroom spaces. An additional challenge was the desire to implement mezzanine level office space above the cleanrooms. We discussed with the design team the challenges inherent in quietly moving large volumes of air in tight spaces.

Our design input included a review of the intended tool list and validation of the site from a vibration perspective. In addition, we provided guidance for the design team with respect to the concept design.

