



Control of Mechanical Vibrations

Services:

Building Acoustics

Wind and Snow Loading

Environmental Noise

Air Quality Studies

Structural Wind Loading

Wind Tunnel Testing

Cladding Pressures

Long Span Roofs

Control of Mechanical Vibrations

Computational Fluid Dynamics

Microclimate Engineering

Design of Mass Dampers

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Vibrations are produced by natural phenomena and mechanical sources. Earthquakes, wind, waves and even thunder represent natural processes that produce a wide range of vibration effects and magnitudes. Artificial sources, including mechanical equipment and building use, are often more pervasive and sometimes disruptive to daily operations. *GmE* has a depth of experience with identifying vibration sources, monitoring them, and devising innovative solutions.

Our broad experience in the following areas provides our clients with a sound basis for undertaking new assignments, which are often unique.

- ◆ Monitoring and control of vibrations for sensitive equipment in high-technology laboratories;
- ◆ Control of vibrations from external transportation sources (roadway vehicles and trains);
- ◆ Control of structural vibrations from mechanical equipment in buildings;
- ◆ Assessment and control of vibrations in residential spaces.

Chillers are common sources of strong vibrations (and noise) in mechanical rooms of large buildings. Vibration control often requires specially designed isolation springs



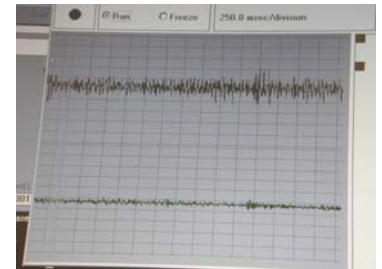
Floating floors are also incorporated above the floor structure to isolate noise from sensitive areas below.



Mechanical Penthouse above sensitive areas.



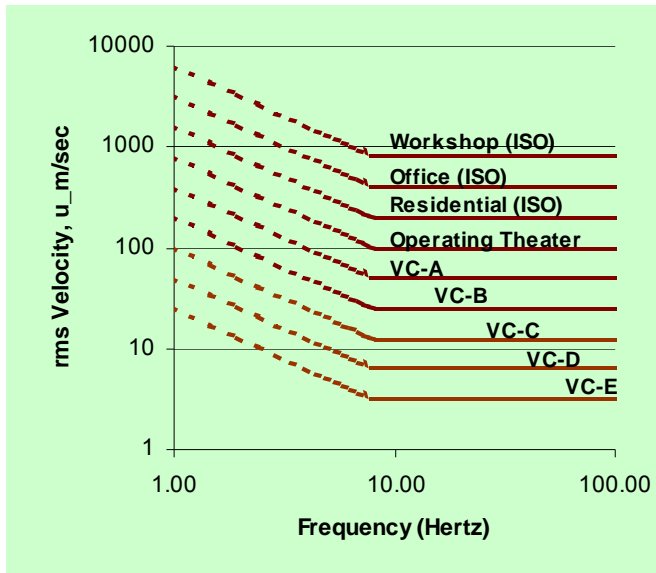
Using accelerometers to monitor and control vibrations from a mechanical penthouse



Vibration traces for vertical (top) and horizontal motions (bottom)



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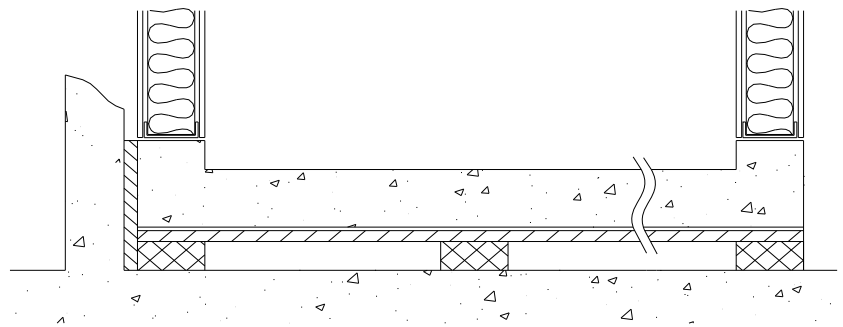
Vibration Criteria For Sensitive Equipment

High-Technology facilities housing micro-chip and photonics research functions often have demanding requirements of vibration control technology. Steppers, probing electron microscopes and e-beam tools are a few among other equipment that require very low ambient vibration levels. In the absence of instrument specific criteria, industry accepted generic vibration criteria are used for baseline comparisons.

GmE provides expertise in the following areas:

- Reverberation & listening quality in large spaces;
- Control of noise from mechanical equipment;
- Silencer selection, design of floating floors;
- Partition selection for privacy and noise control;
- Design for specific NC and RC requirements;
- Control of vibrations related to noise reduction.

Floating Floors Are Used To Isolate Mechanical Room Noise From Sensitive Spaces



With an extensive knowledge of microclimate engineering, forensics, building vibrations, as well as environmental noise and building acoustics, *GmE* is uniquely suited to provide cost effective solutions on a full range of assignments. *GmE* uses the latest equipment and computer simulation tools to investigate and resolve difficult noise issues.