

## Viscously Damped Coil Spring Suspended Tuned Mass Dampers

The most commonly used suspension mechanism in TMDs is the parallel combination of coil springs and viscous dampers.

Springs are sized (their stiffness decided on) so that they, in conjunction with the mass/inertia elements, realize the desired tuning frequency of the TMDs.

Viscous dampers are sized so that the TMDs possess adequate amount of energy dissipation capacity enabling them to dampen the vibration of their target mode, effectively.

TMDs are appended to the vibrating structure at locations where they can most effectively couple with the target mode(s). Figure 1 shows two TMDs appended to that floor. The TMDs are tuned to the first resonant frequency of the floor at 6 Hz.

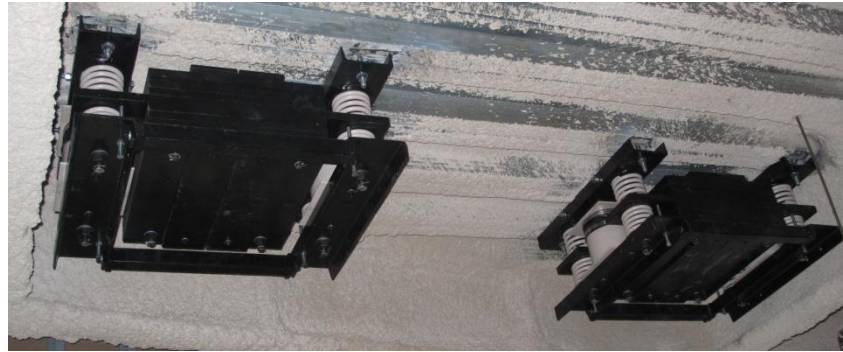


Figure 1 Two TMDs appended to the bottom of a floor

Figure 2 depicts the spectral and time traces of acceleration measured on the floor shown in Figure 1. The blue trace in Figure 2 presents the response of the floor to a heel drop perturbation without the TMDs operational. The red and green traces depict the same measurement when the TMDs are brought online, one at a time. Clear from this figure, tuned mass dampers have effectively dampened the structural mode they are tuned to dissipating its vibration.

When designed, built, installed, and tuned properly, TMDs effectively absorb vibrational energy of the structure and dissipate it internally, reducing the undesirable motion of the structure.

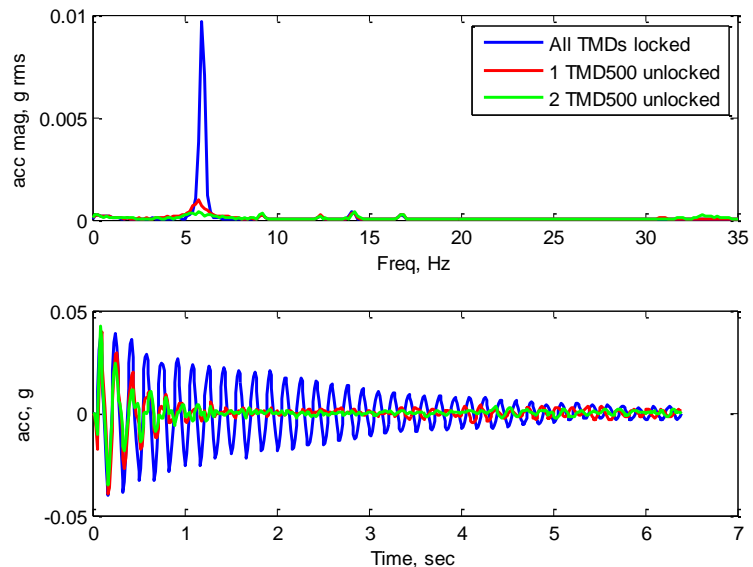


Figure 2 Linear spectrums and time traces of acceleration measured without and with the TMDs operational