

BRAIN AND COGNITIVE SCIENCES PROJECT

Massachusetts Institute of Technology (MIT)
Cambridge, MA



Photo: MIT/David J. Conlon

PROJECT DESCRIPTION

A rail line carrying 2-3 heavy freight trains per day passes through MIT's Brain and Cognitive Sciences Center. The Institute was initially concerned about vibrations from the trains that may effect sensitive equipment planned for the Center, including 2-photon microscopes, electrophysiology rigs, and MRI machines.

Acentech measured the vibrations from freight trains and performed transfer mobility tests to determine ground vibration propagation at the site. We measured the vibrations from 36 freight trains over two-weeks. We recorded vibrations from six sensors (3 surface sensors and 3 subsurface sensors at the bottom of boreholes up to 115 feet deep). The recorded data was later post-processed to obtain the vibration time waveform as well as vibration spectra (frequency distributions) from each train passage. Acentech's seismic hammer (pictured at right) imparted a known force pulse to the ground near the train tracks. We used transfer functions between the sensors and the applied force to calibrate a numerical model of the ground which in turn was used to evaluate the vibration isolation potential of various foundation schemes and building constructions.

Acentech used the rail-induced vibration data to determine the required vibration isolation to protect the sensitive equipment in the building and to assess the effects of rail vibration on the building's researchers.

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Acentech

CONSULTING SERVICES

- Rail vibration
- Transfer mobility testing

REFERENCES

Mr. Arne Abramson
MIT, Department of Facilities
77 Massachusetts Avenue
Cambridge, MA 02139
(617) 452-4962

Roger Goldstein, AIA
Goody Clancy Associates
334 Boylston Street
Boston, MA 02116
(617) 262-2760



Acentech's seismic device measured ground vibration propagation characteristics near the rail line prior to construction.