

Vibration Impact Monitoring

Kinematics Open Systems and Services (OSS) department is pleased offer a comprehensive Vibration Impact Monitoring (VIM) solution for continuous real-time monitoring and alerting on exceedance of vibration thresholds from natural or man-made sources.

A typical objective for VIM is assessing and monitoring your projects' impact or *perceived impact* on the surrounding environment, nearby sensitive infrastructure, or concerned community. In general, the application is mass transit projects such as light rail, but VIM is applicable for all projects with a potential source of vibration, e.g., seismic, construction, heavy machinery, increased traffic, etc.

Kinematics VIM solution is based on procedures outlined in the Federal Transit Administration document FTA-VA-90-1003-06 "*Transit Noise and Vibration Impact Assessment*" which provides guidance on human perceptibility, measurement, and processing and analysis (see Figure 1). However, our real-time VIM solution goes beyond simple one-time assessment and provides continuous real-time information regarding the extent, or lack of, your projects' vibration impact. With this information, concerns over ground-borne vibrations are quickly and accurately validated or *invalidated*.

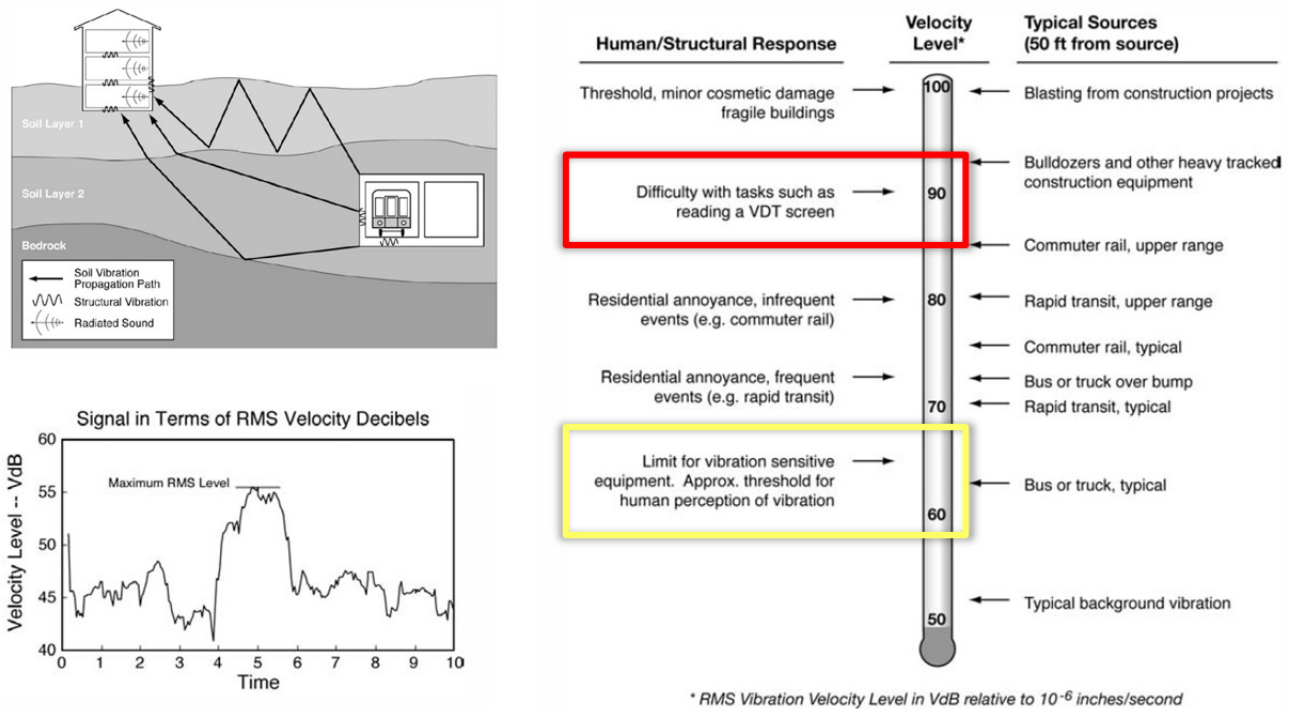


Figure 1. Propagation of ground-borne vibration into buildings (upper left), preferred method of describing vibration signal (bottom left), and typical threshold levels vibration. All figures taken from document FTA-VA-90-1003-06, Chapter 7.

Additionally, Kinematics real-time VIM solution can go well beyond source measurements and directly monitor the response of structures to notify and inform occupants and users on exceedance of the various thresholds of vibration. Figure 2 below displays for a conceptual building, the graphical visualization of the information provided, namely; the duration of time in which vibration amplitudes persist above the threshold of human perception (yellow) and discomfort (red). For example, consider an earthquake as a natural source of ground borne vibrations. In this case, the occupants on levels 75 and above have been subjected to shaking above the

level of discomfort (90dB) for over 20 minutes. This critical information can be used to better inform occupants, owners, and responding engineers—e.g., now they can expect panicked crowds trying to evacuate the very tall building.

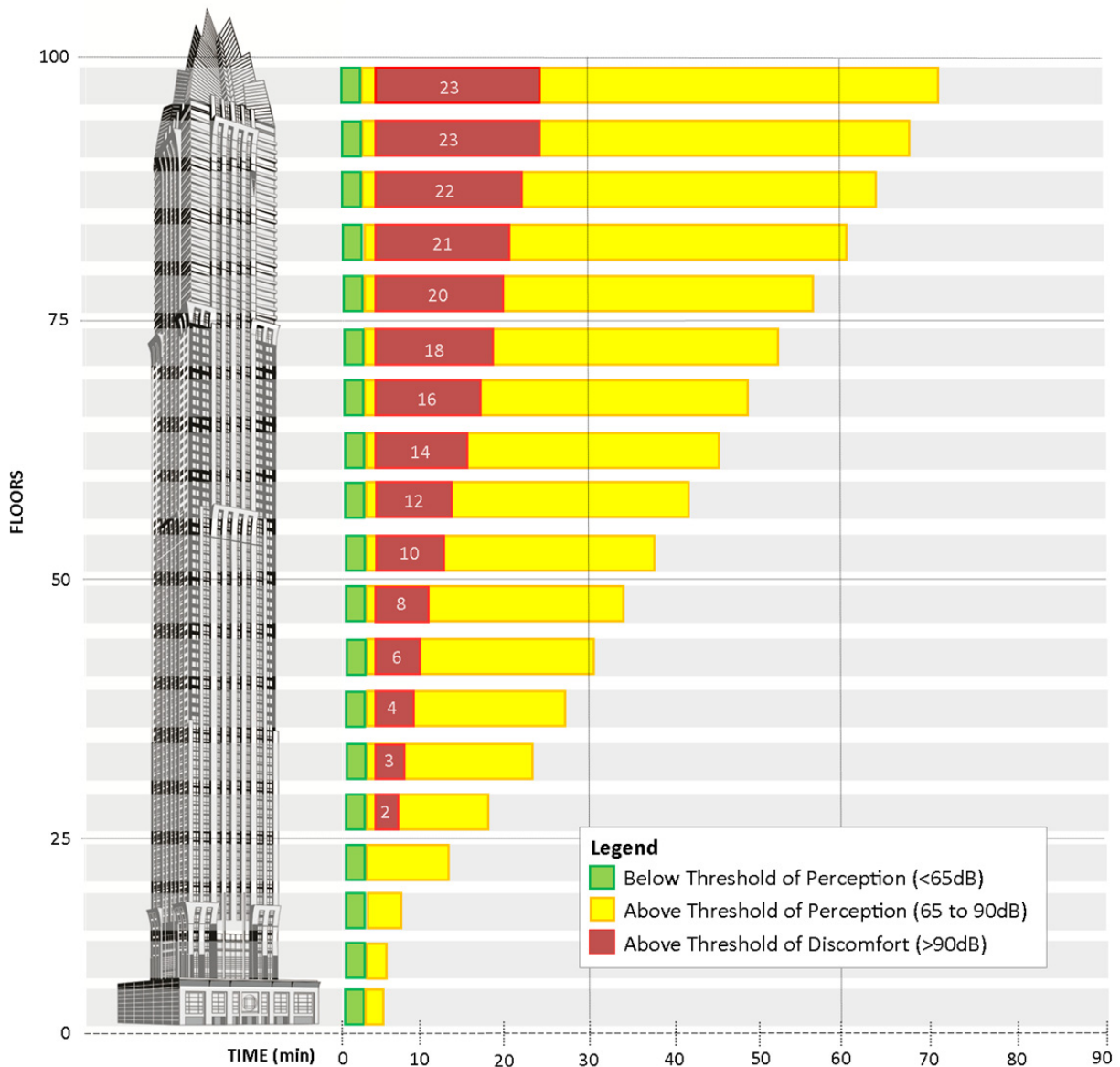


Figure 2. Conceptual building visualization of the information provided by implementing VIM on a structure. The length of the colored bars represents the duration of shaking at the various vibration threshold levels.

Vibration Impact Monitoring Solution Includes:

1. Robust unobtrusive permanent vibration monitoring system for source and structures
2. Customized real-time software platform for RMS velocity data processing and visualization
3. Server-class workstation/storage system for data processing, information dissemination, remote command and control, and secure database management
4. Ambient vibration survey and analysis for source-structure transfer function estimation
5. Comprehensive and detailed documentation, presentation, and reporting
6. Maintenance and remote monitoring service available

Please contact oss@kmi.com for more details or proposal requests.