EVA Vibration Analysis Tools Software

EVA Vibration Analysis Tools Software
 - Operates under Windows 3.x, 95, 98, NT, XP, Vista
 - ISO Human Response, Acceleration, Sound Level, Speed, Jerk, Distance Time Histories Display
 - Spectral Analysis Capability, Software Selectable Filters & Sampling Rate
 - ISO Human Response Analysis & User Selectable Digital Filtering
 - User Defined Units of Measure & Graphical Scaling, Box Zoom & Scroll,
 - Project Specification Analysis, Data Base Compilation
 - Multiple Report Printing including Peak to Peak Vibration, Max/Average, Sound Max/Average
 - Elevator Performance Measurements

EVA Vibration Analysis Tools - Science in the Software

Elevator Tools

The included EVA Vibration Analysis Tools software is a powerful suite of analytical tools for elevators and escalators in a fully integrated Windows™ based environment. It offers unmatched analysis of all elevator/escalator motion and sound levels, yet is easily used by the engineering or non-technical staff. Using PMT proprietary methods for automatically extracting information from the vibration recordings, ride quality levels, speed, elevator location, acceleration/deceleration, jerk, and sound levels can be evaluated in seconds. An extremely important feature of the software is the ISO Ride Quality Analysis. It must be remembered that ride quality is not measured by the vibration and sound that the instrument records, but rather by the vibration and sound that people feel and hear. PMT is the first and only company to apply ISO2631 based filtering of the vibration data to get a measure of the vibration that people feel. When diagnosing for ride quality purposes, it is important to improve the vibration that people feel. Analytical capabilities include time history zoom and expand with data measurement, elevator travel time measurement, comparison of data with respect to user imposed vibration limits, spectral analysis (FFT), and RMS vibration and sound level measurement (A-weighted, fast response). Of course, the EVA software also prints standard reports on your office printer.

The above graphical output is actual elevator data as collected by the EVA-625 system. This is the raw, unfiltered data from which all analyses are derived. The graphs are divided into 4 windows. The top window is the sound level at every point in time during the recording. The second window (x channel, front to back) is the motion (in units of milli (g)s) at each point in time during the recording. The third window is the motion as recorded on the y channel (side to side), and the bottom window is the vertical axis (z channel).

The above graphical output is the raw motion data after being filtered using the ISO standard. This is the analysis used for the measure of ride quality. An increase in the level as seen on the graphs corresponds directly with an increase in what is felt in the elevator. Note the bumps that stand out on the x and y channels at about 9 seconds. This is the result of a misaligned rail joint. Using the distance analysis, the problem was located at 12.5 meters (41 feet) above the first floor.

Below are Thumbnail sketches of the four Time Histories which can be derived from the unfiltered vertical axis time history. These are each a measure of elevator performance. While in the EVA Vibration Analysis Tools software, the information can be expanded for study in great detail. For instance, using the Distance Time History, "bumps" as seen in the above "ISO Filtered Data" graph can be located in the hoistway with a high degree of accuracy. Click on these graphs to view each in detail.

Acceleration Time History Velocity Time History

Jerk Time History Distance Time History

Velocity Time History

Distance Time History

Probably the most powerful tool for diagnosing problems is the Fourier transform. This allows the vibration to be analyzed with respect to frequency content. For example, 6 inch roller guides on a 2.5 m/s elevator will rotate about 5.3 times per second (5.3 Hz). If roller guides are creating a significant level of vibration, then this will show up in the spectrum (vibration level versus frequency) of the signal. The example below shows both a high vibration level at about 5 Hz (roller guides) and 26 Hz (gear mesh)

Escalator Tools

The EVA-625 and EVA Vibration Analysis Tools are also optimized to evaluate escalator vibration on hand rails and steps, as well as to meet the special requirements of measuring sound levels at the landings, incline section, and machine. It also leads the operator in measurement of ambient sound level. An optional extension of the EVA-625 is the ETCH01 Tachometer module. This is used for the measurement of handrail & step speed so that differences can be evaluated and addressed. An important feature of the ETCH01 Tachometer and the optimized EVA software is the ability to quickly and accurately measure stopping distances. Contact PMT or your PMT representative for the Escalator Measurement Tech Sheet.