ACCELERATED RANDOM VIBRATION WITH TIME-HISTORY SHOCK for Improved Laboratory Simulation (Written 2001)

ABSTRACT

Currently, the most accepted way to simulate transport vibration in the laboratory is through the use of a shaped random vibration profile derived from environmental measurements. Power spectral density (PSD) analysis/control of random vibration permit the compiling of quantities of data for statistical significance, and allow "accelerating" the test (increasing intensity and reducing test time). These techniques will be discussed. Then the question of large transient shocks (for example, as caused by pot holes, rail crossings, etc.) is addressed. While not strictly vibration, these occur during transport and may cause damage directly or create a condition whereby vibration causes damage later. Presently, there is no accepted laboratory simulation to account for these shocks. A new technique is suggested that combines transient time-histories with accelerated random vibration for a new, efficient, and effective simulation.