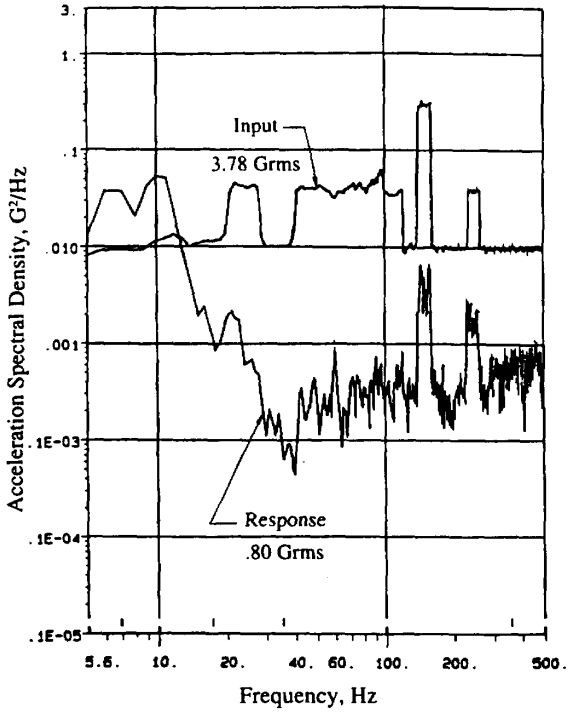

Figure 2. Tracked-vehicle, vertical-axis, test phase 1A, monitor input and tray response.

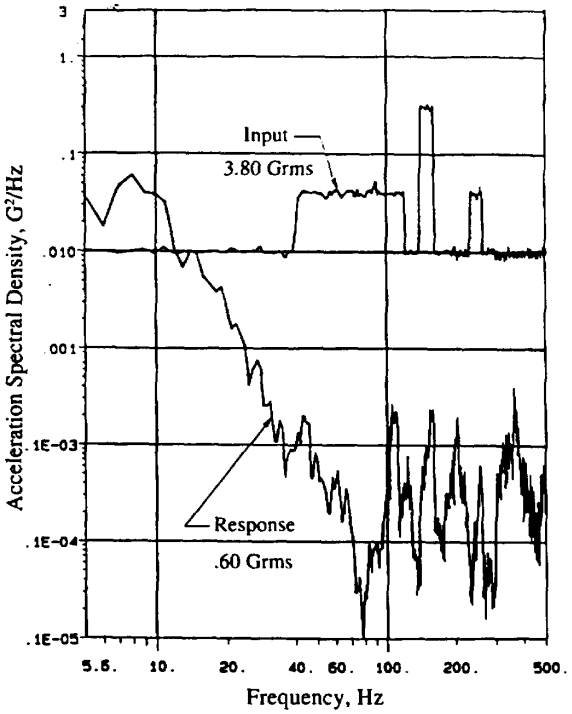

Figure 3. Tracked-vehicle, vertical-axis, test phase 1B, HP 735 Computer input and tray response.

in. While most shakers are capable of this displacement, subjecting an isolated system to this displacement amplitude for 40 min could result in bottoming and premature failure of the isolators.

For brevity, only two of the 15 phases used in the tracked-vehicle vibration test are included in this paper. The remaining 13 phases show results similar to those found in the two phases which were included here. No quantitatively defined stress life is associated with these profiles. However, they have been used successfully to qualify and field army electronic equipment.

Test Performance

As in the wheeled-vehicle vibration test, the HP 735 Computer and CMD, in their vibration-isolated trays, were tested separately in vertical-axis vibration, and together in transverse and longitudinal-axis vibration. The computer mounting trays used four isolators and the CMD used six isolators. Accelerometers were placed directly on the mounting trays of the test items to monitor their response characteristics in the three axes of vibration. Accelerometers were also placed on the top of the monitor, on the central processor unit (CPU) circuit card of the computer, and on the hard drive of the computer. Each of the test items was vibrated for 2 hr/axis, for a total test time of 6 hr. Pre-operability and post-operability tests were performed on both the computer and the CMD to determine successful operation and to display any system errors.

Test Results

The resonant frequency of the isolated CMD is approximately 10 Hz, with attenuation of the input vibration energy beginning at approximately 12 Hz (see Figure 2). The relatively high energy spikes, between 20 Hz and 300 Hz, have been significantly attenuated.

The ratio of the root-mean-square (RMS) G-level of the output to the input is:

$$T_{avg} = \frac{Grms,out}{Grms,in} = \frac{0.796}{3.78} = 0.21 \qquad (2)$$

This is equivalent to an average transmissibility over the frequency range of 5 to 500 Hz. The square of this number, 0.044, or 4.4 percent, is the amount of vibration energy transmitted through the isolation system. Thus, 95.6 percent of the vibration energy is removed by the isolation system of the CMD.

Figure 3 shows the vertical-axis, test phase IB, *tray* response plot for the computer. The resonant frequency of the isolated computer is approximately 8 Hz, with attenuation of the input vibration energy beginning at approximately 12 Hz. The relatively high energy spikes between 40 Hz and 300 Hz have been significantly attenuated. The ratio of RMS G-levels is:

$$T_{avg} = \frac{0.602}{3.80} = 0.158 \qquad (3)$$

and

$$\left(T_{avg}\right)^2 = 0.025 or 2.5\% \qquad (4)$$