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APPENDIX A. CALCULATION OF VIBRATION ACCELERATION LEVELS FOR EPIDEMIOLOGIC STUDIES

A. All individual values for acceleration data (e.g., tables, spectra, etc.) for any and all vibration coordinate axes were first converted into m/sec^2. Decibel (dB) levels were also converted into m/sec^2 using the formula

$$L_{dB} = 20\,Log\,\frac{a}{a_o}$$

where

a_o is the reference acceleration value, and
a is the measurement value.

In the cases where only mechanical displacement was given, the following formula was used,

$$g_{peak} = (.02)\,(D.A.)\,f^2$$

where

D.A. is the double amplitude displacement (cm), and
f is the frequency (Hz).

The peak values were then converted into m/sec^2.

B. Where applicable, each vibration direction (axis) was tabulated forming a m/sec^2 rms sum for each direction. The total vector sum equivalent vibration was next obtained using the following formula for each tool:

$$a_t = \left[(a_x)^2 + (a_y)^2 + (a_z)^2\right]^{1/2}$$

C. Once vector sums for each of the tools were obtained, then a daily average in m/sec^2 rms across each of the tool types or family of tool types was obtained for each study. Where applicable, when the worker's incremental vibration exposure time for each tool type in a given study was *stated therein and known,* then a "time weighted average" (TWA) was obtained using the following formula:

$$TWA = \left[(a_1)^2 \frac{T_1}{T} + (a_2)^2 \frac{T_2}{T} + ... (a_n)^2 \frac{Th}{T} \right]^{1/2}$$

where

a_1 is the acceleration with tool Type 1,
a_2 is the acceleration with tool Type 2,
a_n is the acceleration with tool Type n,
T_1 is the time of using tool Type 1,
T_2 is the time of using tool Type 2,
T_n is the time of using tool Type n, and
T is the total daily exposure time in hr.

APPENDIX B. DECIBEL (dB) EQUIVALENTS

Table B-1.—Decibel (dB) equivalents in m/sec^2 (acceleration)

dB*	m/sec^2
100	0.1
120	1.0
140	10
160	100
180	1,000

*10^{-6} m/sec^2.

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