Technical Data Sheet

Overturning Moment
TDS-12

The general formula for calculating overturning moment is
(1) W * CG * G = OM where

W = weight of test item and fixture
CG = center of gravity of test item
G = peak g or grms value
OM = Overturning moment

Note that the weight of the armature, slipplate and bullnose are not used in this formula as these items are symmetrical in relationship to the center line of the shaker armature, thereby canceling each other out.

For example, if we assume that the test load is 5,000 lbs and its center of gravity is 36 inches high, then the following conclusions may be determined:

The maximum grms level obtained by a shaker of 34,000 lb rms force would be (2) F = ma where

F = Force (34,000 lbs)
m = mass (Armature + Slipplate + Bullnose + Test item)
$\quad\quad$ 220 lbs + $\quad$ 756 lbs + $\quad$ 100 lbs + $\quad$ 5,000 lbs = 6,076 lbs
a = acceleration (grms)

The maximum acceleration value with a 5,000 lb payload must be 5.59 grms.

Using formula (1), then, for a 5,000 lb load whose cg is 36 inches would require an overturning moment restraint capability of:

5,000 * 36 * 5.59 = 1,006,200 pound inches