Anti-vibration Mounts – Equal Deflection

Engineering – Equal Deflection All Round

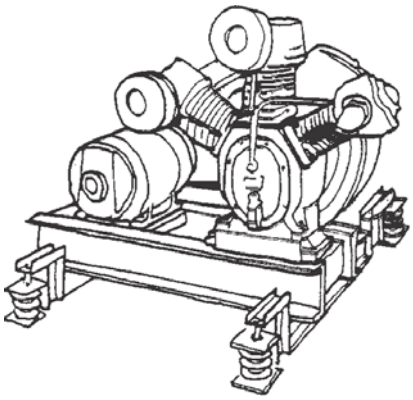
Usually equipment on a common base such as an electric motor driving a fan, pump or compressor does not have its centre of gravity in the middle of the base. The belt driven compressor illustrated obviously weighs more than the motor and the spring mounts located at the four corners are obviously not all supporting the same load.

On the other hand, since efficiency is determined by deflection, we want the four mounts to compress equally. If one of them compresses less than the others, that would be the one that limits the efficiency.

It is very often the case that different mounts have to be selected so that the same, or nearly the same, deflection is provided by all of them, despite their carrying different loads.

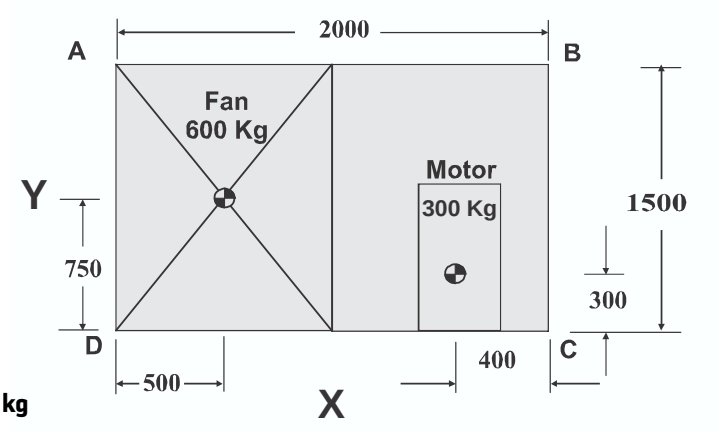
When selecting spring mounts it is important, if the equipment is not symmetrical, to calculate or estimate the different weights at each mounting point, and then to select as nearly as possible for equal deflection all round.

The box gives an example of a simple procedure for "taking moments" to calculate the different loads on mounts in the four corners, given the equipment masses and the positions of their centers of gravity.



EXAMPLE

A fan weighing 600Kg is belt driven by an electric motor weighing 300Kg, both standing on a rectangular steel base weighing 280Kg. The size of the base and the position of the fan and motor are shown in the sketch. If mounts are located in the four corners of the base what load will each carry ?



Distribution of fan weight 600Kg

As seen from X take moments about D

Then B & C combined support 600 x 500/2000 = **150 kg**

Therefore A & D combined support the balance = **450 kg.**

As seen from Y : B = C = 75 kg and A = D = **225 kg**.

Distribution of motor weight 300Kg

As seen from X take moments about C.

Then A & D combined support 300 x 400/2000 = **60 kg**

Therefore B & C combined support the balance = **240 kg**

As seen from Y, take moments about A.

Then of the total of 60 kg, supported by A & D combined.

A supports 60 x 300/1500 = **12 kg**. Therefore D supports **48 kg**.

Of the total of 240 kg supported by B & C combined.

B supports 240 x 300/1500 = **48 kg.** Therefore C supports **192 kg**

Distribution of base weight 280Kg

A, B, C and D will each support 70 Kg

SUMMARY - TOTAL LOADS AT A-B-C-D

	A	B	C	D
Fan	225	75	75	225
Motor	12	48	192	48
Base	70	70	70	70
Total	307	193	337	343

ACTOM

ACTOM Mechanical Equipment

4 Branch Road, Driehoek, Germiston, 1401 P.O. Box 1300, Germiston, South Africa, 1400

Tel : +27 11 8783000 Fax : +27 11 8783001 E-mail : arnotavs@actom.co.za