introduction

Socitec UK is the UK market leader in the provision of shock and vibration isolation and monitoring systems.

Our solutions, based on 30 years of experience, have covered multiple applications and have been tested and approved by the world's largest international contractors.

Proven products

The full list of products and services include:

- Unrivalled range of wire rope shock and vibration isolators
- Comprehensive range of standard vibration mounts and fixtures
- Bespoke, isolation component solutions manufactured to meet your individual requirements
- Standardised COTS equipment racking with suspension, for naval applications
- Data loggers for shock, temperature, relative humidity, inclination, air pressure amongst others

Shock and vibration design and consultancy

The specialised product range is supported by the following capabilities:

Comprehensive advice and design support for vibration and shock applications.

- Unsurpassed experience working in all types of shock and vibration applications allows us to provide a complete engineering service to help you and to advise you on: improving the quality and reliability of your products, determining critical design features before going to test, advice on optimising mass and rigidity of components.

- Advanced Non-linear Dynamic simulation techniques using SYMOS, our own *n* Degree of Freedom (D.o.F) simulation software allows us to predict the shock and vibration isolation performance in your application.

- Finite Element Analysis
  For a detailed picture of dynamic and structural loading. FEA analysis allows the fine tuning to meet the most demanding shock and vibration requirements.

- Dynamic simulation of mechanical structures and mechanisms
  Allows us to simulate motion loading directly from 3-D model assemblies enabling us to investigate, linkage layout, size springs/dampers, and determine how contacting parts behave, thus reducing prototyping costs and reducing product development time.

Test

Our specialised environmental test - capability includes:

- Shock and vibration testing
- Temperature cycling -100°C to +200°C
- Humidity

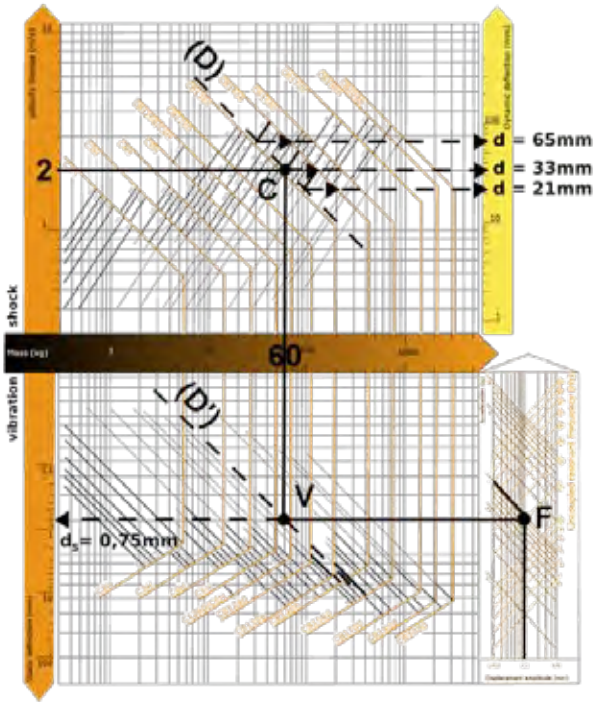
Our list of products, services and capabilities are intended to give you a clear understanding of the wide range of ways in which we can help you deliver mechanical solutions.

Call us to discuss your application

choosing the right cable mount for the job

The nomographs in each section will help you select a suspension system according to the mount orientation: either, compression, 45 degree compression / roll, shear or roll. They use a single-degree-of-freedom model to predict shock and/or vibration behaviour for any input along the 3 principal axes. A full 6-degree-of-freedom analysis is still indispensable in those cases where the system is strongly unbalanced (coupled). Please contact us for advice.

1. Refer to the graph corresponding to the mount attitude



2. Calculate the suspended weight per mount

If C of G is at geometric centre and mounts are identical m = M/n where M is suspended mass and n is number of mounts

Ex.: 240 kg mass on 4 mounts in compression, m = 60kg

3. Select for shock according to type (a) or (b)

(a) Velocity change :

It is assumed that the shock is an impulse or impact (after a free fall drop for example). We regard this as an instantaneous velocity change between the suspended mass and the support

Ex.: Shock 1/2 sine 50g 6ms or drop height 20 cm

- On the nomograph, place point C, intersection of *m = 60kg* (mass scale) and $\Delta v = 2$ *m/s* (velocity change scale)
- Select through position C the optimum mount series (each series is separated by 2 blue longitudinal lines):
  - lower series cannot meet the shock input
  - higher series would be underloaded.

Here in our example, C is within the area corresponding to the CB1400 series.

- Select the right model in the series. Mount selection depends on the protection required on the suspended mass. The diagonal line on the graph corresponds to a 10 g's protection for the model of the series being considered. If point C is below (respectively above) the mount characteristic diagonal line, the transmitted acceleration will be below (respectively above) 10 g's
  The anticipated deflection under shock is read on the dynamic deflections scale at the intersection of D (parallel at C to series separators) and the characteristic line of the model as previously illustrated.

Ex.: Within the CB1400 series, the
CB1400-12 would give d = 21 mm t > 10 g's (~ 16 g's)
CB1400-20 would give d =33 mm t = 10 g's
CB 1400-60 would give d = 65 mm t < 10 g's (~ 5 g's)
d: dynamic deflection, t: transmitted acceleration

(b) Displacement step

It is assumed that the shock is an instantaneous displacement of the foundation (after an underwater explosion for example), which generates an immediate corresponding deflection in the mounts.

Ex.: Displacement step 65 mm, as per typical naval shock response spectrum

- On the nomograph place point C, intersection of *m=60 kg* (mass scale) and *d=65 mm* (dynamic deflection scale)
- Select through C position the optimum mount series each series is separated by 2 orange diagonal lines.

Here in our example, C is within the area corresponding to the CB1400 series.

- Select the right model in the series. Mount selection depends on the protection required on the suspended mass. The diagonal lines (in black) on the graph correspond to a 10 g's protection for the model being considered. If point C is on the right (respectively on the left) of the mount characteristic diagonal line, the transmitted acceleration will be below (respectively above) 10 g's. The deflection of the mounts under shock will be 65 mm.

Ex: within the CB1400 series, the CB1400-40 would give gamma=10 g's and CB1400-50 and 60 would give gamma<10 g's, all with 65mm displacement.

4. Select for vibrations

- Put F on the frequencies scale, intersection of the requested resonant frequency and the vibration input (vertical lines for displacement input or lateral lines for acceleration input).

Ex.: Requested F ~ 15 Hz Vibration input +/- 1 mm or 1 g (whichever less)

- Place point V given by the horizontal line at point F intersecting with the vertical line from mass
- Draw D' parallel to the characteristic vibration lines of the mounts. The mounts which have a line is closest to D' meet the requirements.

Ex.: m = 60 kg The isolators CB1380-12/CB1400-30 on one side, or CB1400-20/CB1500-30 on the other side will meet the 15 Hz (under +/- 1 mm 1 g input) criteria.

- Read the corresponding static deflection on the left vertical scale, here $d_s = 0.75$ *mm*

5. Select for both shock and vibration

In our example will lead to the choice of CB1400-30 or possibly CB1400-20 (slightly harder but smaller). Note: as a rule, shock determines the series and vibration the model within the series.

6. Data checking

Check with the series data sheet that the selected mounts are capable of the calculated deflection and loading in all planes.