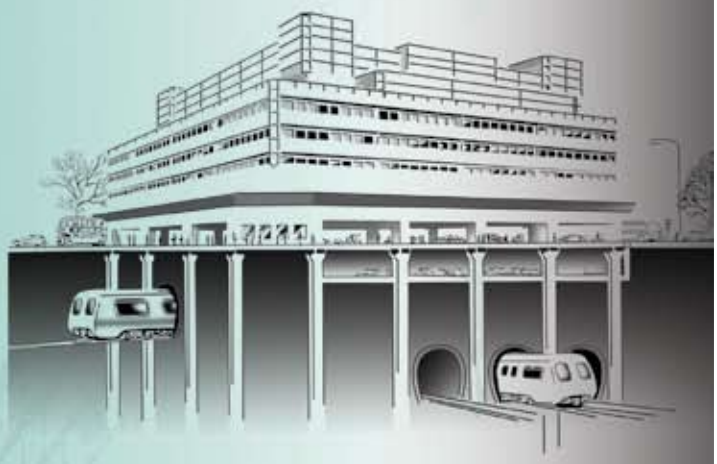
Vibration Isolation of Buildings & Structures

TICO Structural Bearings

Vibration travelling throughout a structure can cause great annoyance. If unchecked it can be transmitted to the most remote parts of a building and re-radiate as noise. This noise can be a particular nuisance in rooms and buildings where quiet is of paramount importance.

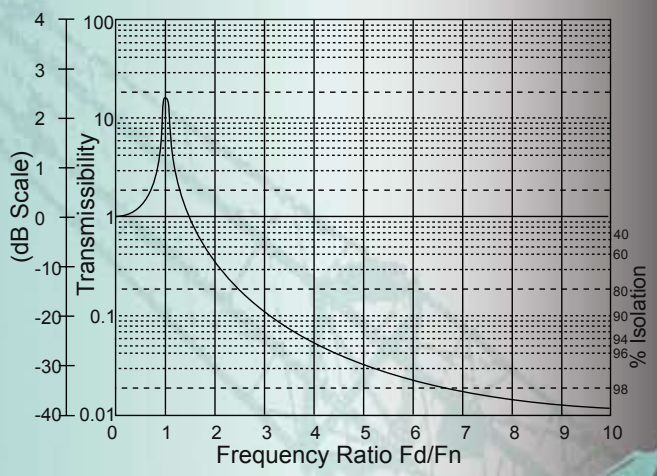


The sources of vibration are numerous and may involve ground-borne vibration transmitted from nearby transport networks through foundations, or noise from one room in a building, e.g. a plant room, travelling through floors and walls to another.

TICO Structural Bearings, in combination with TICO Resilient Seatings, provide a complete solution for the problem of structural borne vibration and can be used to isolate an entire building from its foundation, or one part of a structure from another.

TICO Structural Bearings can be engineered to provide the optimum performance requirements of a particular project. They are easy to install, are maintenance free and offer a long dependable service life.

Transmissibility



One of the key factors in designing an isolation system is ensuring that the system's natural frequency is significantly less then the main frequency of the vibration causing the disturbance- the 'disturbing frequency'. To illustrate this, the graph (above) shows the theoretical reduction of vibration one can expect for a range of different conditions, based on the assumption that both the substrate that the bearings are seated on and the structure above are rigid. The horizontal axis shows the ratio of the natural frequency of the resilient bearing pads to the disturbing frequency of vibration.

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When the natural frequency is approximately 30% of the disturbing frequency, the vibration transmitted into the structure will be attenuated by more than 80%. Flexibility of the structure and foundations will affect the final result and as such the dynamic behaviour of a resiliently mounted structure can sometimes be difficult to determine.
In modern applications, the typical design natural frequencies normally required of an isolation system are of the order of 8-12 Hz, although this can vary. It is a fundamental requirement that the disturbing frequency is accurately identified as any vibration near to the natural frequency of the bearing may cause resonance and amplification of the disturbance within the structure.

The selection of bearings for a particular application is dependant on many factors. It is Tiflex' custom to work closely with consultants and engineers who are specialists in the fields of acoustics and construction to provide the best solution. When considering isolation of buildings and structures we strongly recommend consulting a suitably qualified acoustic consultant.
It is of paramount importance that the design of an isolation system is considered at an early stage as it has wide ranging implications for the rest of the building structure. Our Technical department will be pleased to assist at every stage in the design process.

Elastomeric bearings form a critical component in many structures and thus it is important that they are specified correctly, and that their properties are suitable for the intended application. The use of elastomeric bearings in structures is covered by British Standard BS6177:1982 'Guide to selection and use of elastomeric bearings for vibration isolation of buildings'. This comprehensive standard covers aspects of design and also sets physical parameters for the performance of bearing materials. Tiflex test and manufacture all of our bearings in accordance with this standard.

TICO Structural Bearings Range

TICO CV/LF and TICO CV/CF low stress, low frequency pads - Suitable for isolation of lightweight structures, particularly for internal parts of a building. Typical applications include floating floors, recording studios and theatre auditoria.

TICO CV/M medium stress structural bearings - Suitable for isolation of light to medium-weight structures. TICO CV/M can be used to successfully isolate internal parts of a building, or the entire building from its foundations. Typical applications include floating floors and isolation of small buildings or blocks of flats.

TICO CV/CA high stress Structural Bearings - Suitable for isolation of medium to large sized buildings and constructions. TICO CV/CA has a long history of use in isolating major structures and large high rise buildings from ground-borne vibration in cities, and can also be successfully employed in some bridge bearing applications.

Casa Da Musica, Porto, Portugal, under construction 2002
TICO Structural Bearings and Bond Slip Sliding Bearings were specified.

All TICO materials are manufactured in accordance with BS EN ISO 9001: Part 2:2004

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