

ANDRE

Structural Bearings for Vibration and Acoustic Isolation



The unseen stable factor

The ANDRE brand of structural bearings was first developed in the 1950's to support bridges. In 1957, Andre bearings were the first ever fitted to support a bridge, the Pelham Bridge in Lincoln, England. Today hundreds of thousands of bridges around the world are mounted on laminated bearings. It's now standard construction practice. From these early beginnings ANDRE further developed laminated rubber bearings to support and isolate buildings. ANDRE was the first company in the UK to isolate buildings from vibration. The Albany Court apartment block in London became the world's first building to use ANDRE laminated natural bearings, for vibration isolation from the underground railway station.

Isolation Principles

The isolation of a building is achieved using composite bearings that are usually manufactured of rubber and steel, placed between the ground and the structure to be protected. As the bearings are designed to be flexible they greatly reduce the transmission of vibration from any disturbance to the structure. The bearings do not however absorb the energy of the disturbing vibrations from the ground, but prevent energy transfer by mismatching the frequencies between the ground borne vibration and the structure.

Isolation bearings to operate efficiently must:

- Support the weight of the building and its contents;
- Confer a natural frequency on the building that is below the ground-borne dominant forcing frequency;
- Reduce the transfer of resonant vibrations;
- Have proven longevity in service;
- Provide long term stability against the effects of ageing.

Longevity

Buildings all over the world are supported by mounts that prevent occupants feeling vibration or hearing noise. Longevity and proven track record are vital in this business when the minimum life of 60 years is required for a building. It is important to know for structural engineers and architects that our product has a proven longevity.

An inspection of the first Andre building bearings revealed that after more than 50 years they are still in good condition, performing as they were intended, with no perceptible vibration felt in the building.





Inhouse expertise

For Trelleborg, the best result is when the job its bearings are doing is not noticed. When the noise and vibration they are there to isolate, is not even considered an issue.

Bearings were installed under the luxury Albany Court apartment block that literally sits on top of the busy St. James's Park tube station.

Involvement in these early projects gives Trelleborg direct access to test data that allows the characterization of rubber compounds in building isolation bearings. Perhaps differently to other applications, we do not spend research and development time ompounding new rubber formulations. Instead we need to fully characterize the rubber compound of our bearings. Specifiers require this. They expect to be able to rely on the technical standards we give, especially when the building they are constructing may represent an investment of 500 million dollars or more."

Inherently all polymers stiffen with age, but the bearings must remain flexible to isolate noise and vibration in the long term. Tests on the Pelham Bridge bearings in 1994 showed that after 37 years they had stiffened by less than 10 percent, an amount that could easily be allowed for in the design stage.

Park House, Oxford street London, United Kingdom

The largest development in Oxford Street for the last 40 years, Park House occupies an entire island site opposite the Selfridges department store in the West End of London. It is a high-quality urban regeneration development which integrates three floors of retail space, prime west-end offices and 39 high specification residential units in one impressive building. The exclusive retail space lifts the quality and vitality of the surrounding public realm, anchoring and revitalising this important, western end of the world famous Oxford Street.

One of the major challenges during construction was its proximity to Marble Arch Tube Station, part of London's underground rail system, because of vibration and noise from the trains. Trelleborg Ridderkerk has contributed to the design and finally supplied individually engineered, specially manufactured rubber bearings, which are installed underneath and within buildings to protect them from problems of this sort. The bearings are installed at the sub-basement level, under the building's two central cores – complex towers of steel-reinforced concrete that form the backbone of the building.

There are three different types of bearing in use, each one individually specified and tested. The highest level of noise and vibration isolation is needed on the second floor, where the luxury accommodation begins. The steel columns here are supported by high-specification bearings included in 44 modular steel assemblies, some of which weigh more than two metric tons. There are bearing assemblies at lower levels to isolate the towers and several hundred smaller bearings, 110 millimetres across, fitted around the perimeter of the first floor to ensure that the exterior cladding cannot transmit vibrations from below.

More than two hundred million people a year will pass London's Park House complex in Oxford Street, never knowing it's so quiet above the retail units inside because of the Trelleborg bearings.

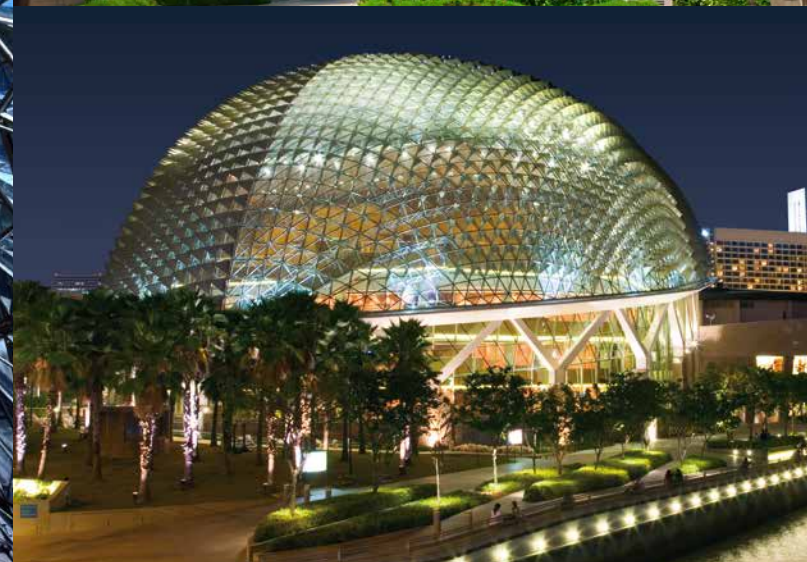


Symphony Hall

Birmingham, United Kingdom

Esplanda Theater

Singapore



A design team of prominent consultants and architects built the eleven auditoriums of Birmingham's International Convention Centre (ICC). They faced a variety of challenges, notably the fact that a rail tunnel runs directly under part of the site. Among its functions, the building houses the City of Birmingham Symphony Orchestra (CBSO), so perfect acoustics was one of the prime design criteria. The proposed solution was to isolate the building raft on Andre rubber laminated bearings. The final design involved over 2,000 bearings each measuring 300mm x 300mm x 125mm deep (12 inches x 12 inches x 5 inches). These were precisely compounded to take working loads of up to 40 tonnes each and to isolate dominant frequencies of around 40Hz. Positioned in groups of eight on the column heads rising from the piled foundations, they carry the concrete raft from which the superstructure of the building rises. The rubber supports provide a physical barrier between the building and its foundations.

The national heritage board The Netherlands

Bishopgate and Broadgate tower United Kingdom



The National Heritage Board of the Netherlands (in Dutch called “Rijksdienst voor het Erfgoed”) is the research institute for archeology, monuments and cultural landscape. The board examines what aspects of the nation’s heritage should be preserved and how it’s to be maintained. Based on that research the NHB advises others on the preservation of the valuable artifacts.

Since 2009 the NHB has been based in a new building in Amersfoort, which accommodates a unique heritage library, monuments archives and a rich collections photos and drawings. The building is especially notable for its breathtaking architecture. The contemporary building is designed by the Spanish architect Juan Navarro Baldeweg.

The building has been built less than 9 meters from the busy high-speed Amersfoort to Zwolle rail line. To isolate and protect the building from severe ground vibrations the building is supported on ANDRE’s high-performance vibration isolation bearings.

Two buildings are standing prominently in London’s renowned Broadgate business district. One is the 165m, 35-storey Broadgate Tower, with a tight plan based on a parallelogram and distinctive external diagonal cross-bracing. The other, 201 Bishopsgate, is a 13-storey office block roughly triangular in plan with a central atrium. The two are linked by canted glass roofs over a seven-storey galleria. This is big-city architecture, with Broadgate Tower set to be London’s third tallest tower, after Tower 42 and the Gherkin. The buildings are located above Liverpool Street’s railway tracks and because of this supported by Andre’s vibration isolation bearings.

