

stravibase

by CDM Stravitec

STRUCTURAL VIBRATION ISOLATION SOLUTIONS

**PROTECTING BUILDINGS & PEOPLE
FROM GROUND-BORNE NOISE AND VIBRATION**



Why CDM Stravitec?

Founded in 1951, CDM Stravitec is a multi-generational family-owned company specialized in building acoustics, noise and vibration control.

For more than 70 years, CDM Stravitec has been focusing on solving structural acoustic challenges and protecting buildings from ground-borne vibrations by providing full-service solutions, covering design, manufacturing, installation and inspection. Our long-standing experience in the field makes us a knowledgeable and reliable partner committed to delivering sustainable noise and vibration isolation solutions..

CDM Stravitec has always taken R&D and its people at heart and commits to support the evolving needs of its customers and its employees. Together, we are ready to making your world a quieter place.

CDM Stravitec, a [Structural Acoustics](#) & [Vibration Isolation Technology](#) company.

CHITECTUUR



In 1964, CDM Stravitec isolated 'deSingel,' a concert hall and arts building in Antwerp, Belgium. This was the very first building in Europe to be supported by elastomeric bearings for vibration isolation.

Paul Vermeir, the Technical Director of deSingel, shared in a recent interview that *"[...] the isolation doesn't require any maintenance and doesn't show any signs of deterioration after more than 50 years."*



CDM
STRAVITEC

CDM Stravitec, your committed partner to making your world a quieter place.



EXPERIENCE

With over **70 years of experience**, we have been supporting our clients globally with our technical know-how and a wide range of solutions.



FULL-SERVICE PROVIDER

We are a **client-focused** and **full-service** solution provider (design, manufacturing, delivery and installation). From conception to completion, we guide our client every step of the way and make sure projects are brought to a good end.



CUSTOMIZED SOLUTIONS

Our **engineering capabilities** and wide ranging **product portfolio** enable us to offer the appropriate solutions for each type of application. All solutions are long-lasting and do not require any maintenance.



LONG-TERM VISION

Our **R&D program** and in-house testing capabilities, continuously expands our **understanding of resilient materials**, allowing us to offer long-lasting solutions and innovative techniques for replacement when required.



SUSTAINABILITY

We recognize the responsibility we bear in creating a more sustainable future and commit to the environment by integrating **strategic sustainability initiatives** in our governance model. We are committed to provide our clients:

- the most optimal building base isolation solutions;
- the use of recycled products when possible;
- a long-term strategy implementation;
- when possible, the information needed to support green building ratings.

Building Base Isolation

Why & Where

In the vicinity of rail transit corridors (railways, subways, light rail transit, etc), buildings can be subjected to excessive levels of ground-borne vibrations. These ground-borne vibrations can generate inside the building, noise levels which might exceed the levels prescribed by regulations and/or guidance's.

Buildings as receivers of those vibrations, can be decoupled from their surroundings using a Building Base Isolation (BBI) system. The integration of BBI systems into the building structure, will help mitigate the structure-borne vibrations and the associated indoor noise by controlling the ground-borne vibrations transmission into the building structure.

The design of a BBI system is dependent on the proper assessment of the ground-borne vibrations at the building location. In practice, this will include the identification and characterization of the main sources of vibrations and the spectral information related to the ground vibration.

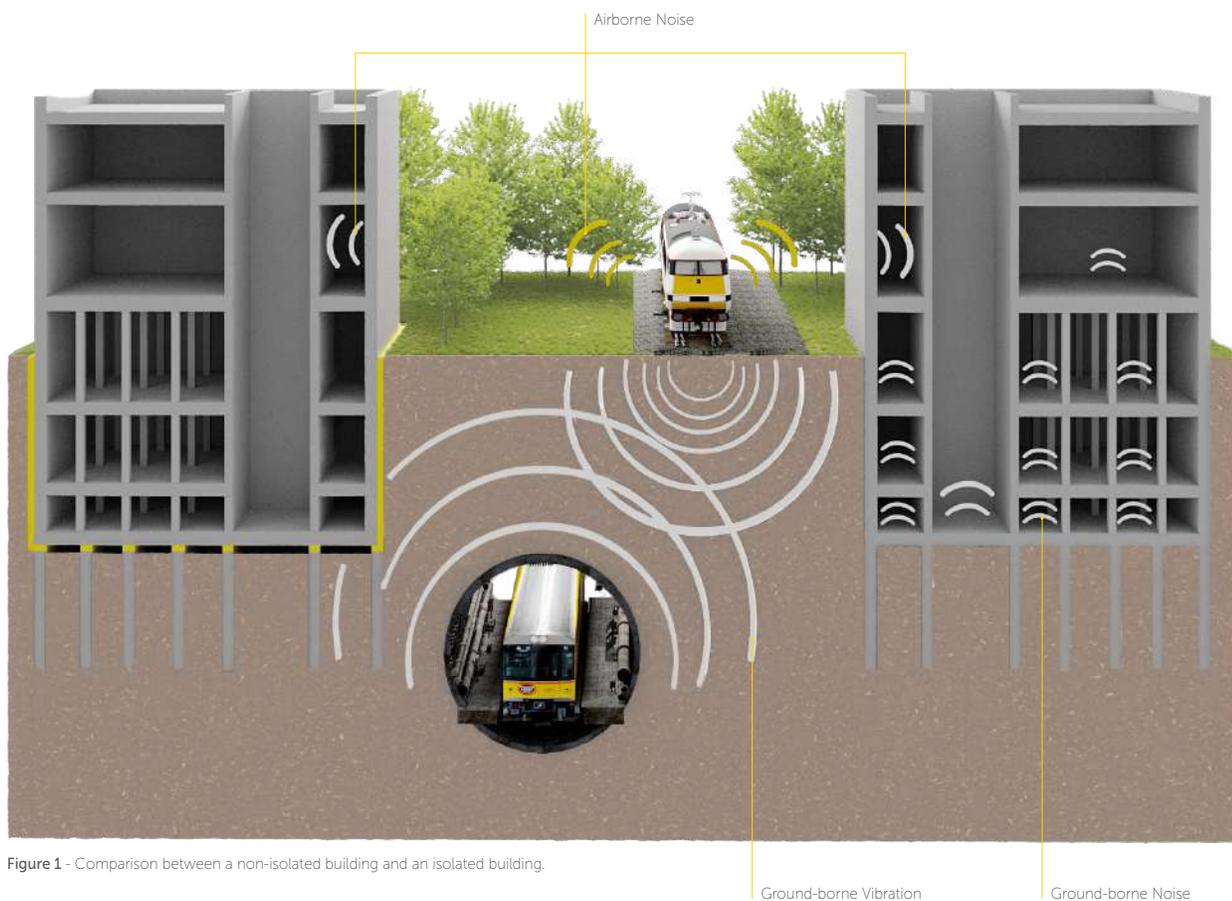


Figure 1 - Comparison between a non-isolated building and an isolated building.

Integrating an economical and sustainable vibration control into a building requires the introduction of a Building Base Isolation solution in the early design phase of a project. In close collaboration with the structural and architectural design teams, a decoupling strategy is proposed. This decoupling level, commonly called the "vibration cut" will include the BBI solution and depends on:

1. the vibration source and the environment of the building (soil type, quality of the rail tracks, connection with existing buildings, road conditions, etc.)
2. the acoustic requirements, typically set by an acoustic consultant
3. the building's structural and architectural design
4. financial implications of each proposal on the overall budget

Vibration cuts can be integrated at different levels, but will depend on different factors. Some of which are:

1. The connections with external buildings (non-isolated and industrial buildings, subway ventilation shafts, etc.)

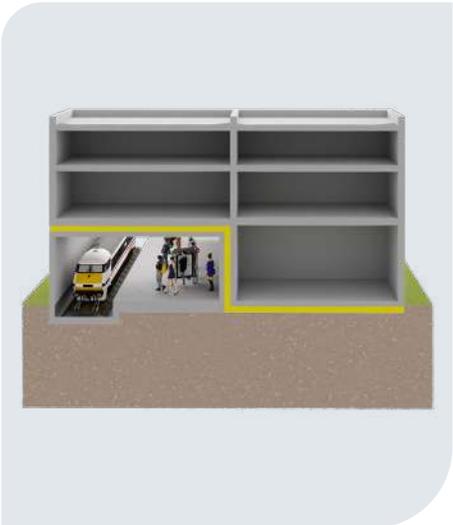


Figure 2 - Decoupling a new building from an existing structure/soil

2. The structural and architectural design considerations (elevator shafts, staircases, facade considerations, etc.)

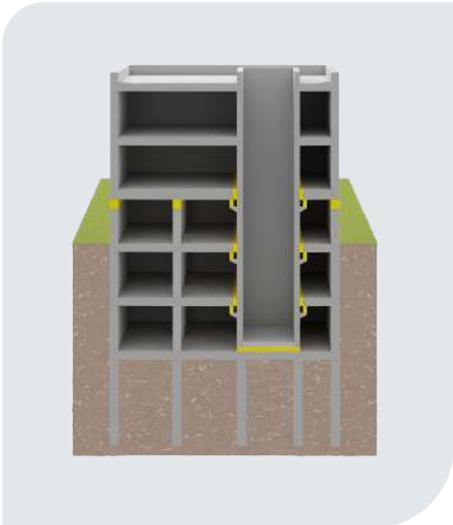


Figure 3 - Isolation of the building considering the elevator pit

3. The areas which need to be isolated:

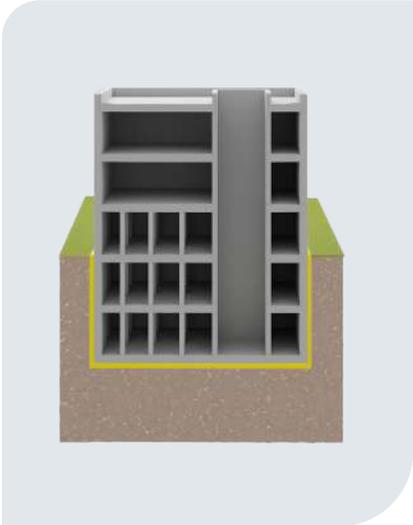


Figure 4.1 - Decoupling the entire building from the soil



Figure 4.2 - Decoupling at ground level

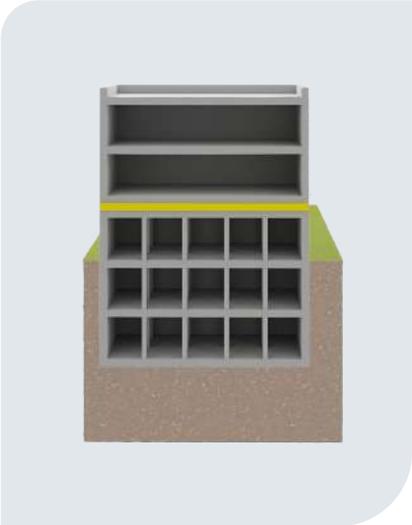


Figure 4.3 - Decoupling at floor level



Buildings & Structures

How To Isolate

A building can be decoupled at different levels, from the foundation level to the upper floor levels. The type of Building Base Isolation system to be implemented at the vibration cut is chosen to meet both the acoustic and the structural requirements of the building, which are defined by the acoustic consultant and the structural engineer, respectively.

BBI systems can generally be grouped into three categories depending on the type of isolator being used:



Helical steel springs
(Stravibase SpringBox,
Stravibase Spring)



Discrete elastomeric
load bearings
(Stravibase SEB, Stravibase VHS)



Continuous
elastomer strips/mats
(Stravibase Mat)

Each with their merits, the primary decision to use one isolator type over the other is usually made based on:

1. the performance requirements (resonance frequency/deflection) that needs to be achieved
2. the type of support structure
3. the available structural footprint (Figure 5)

BUILDING BASE ISOLATION SELECTOR

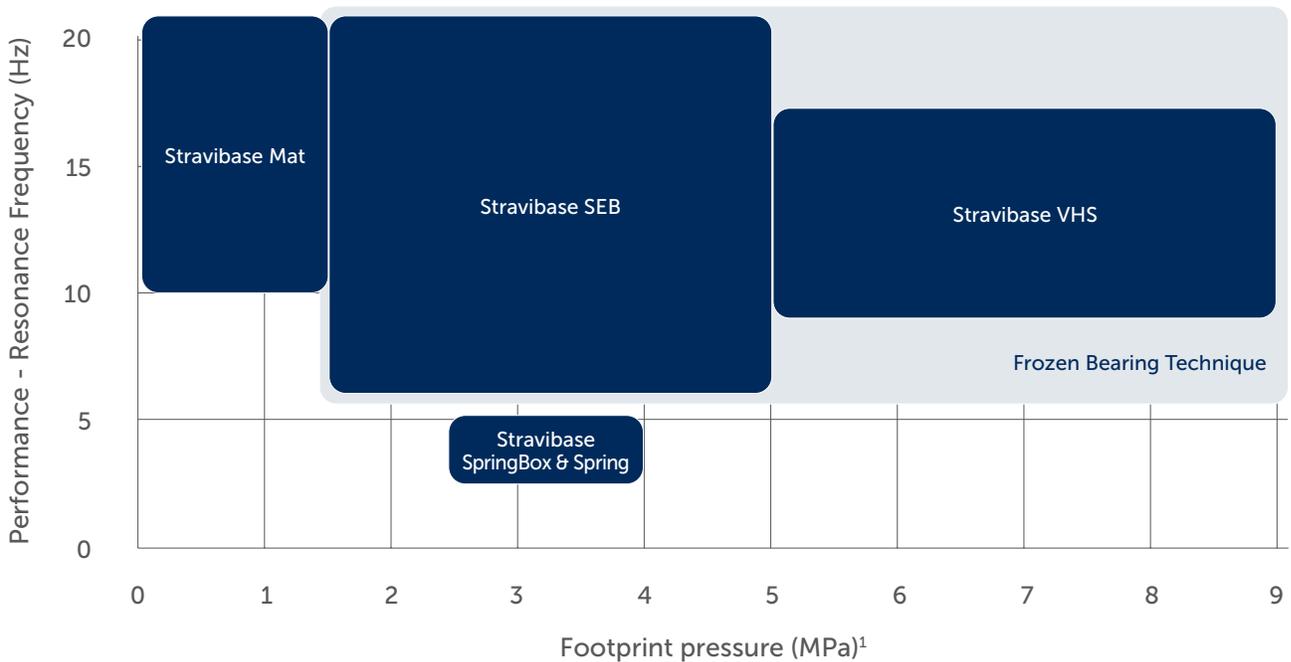
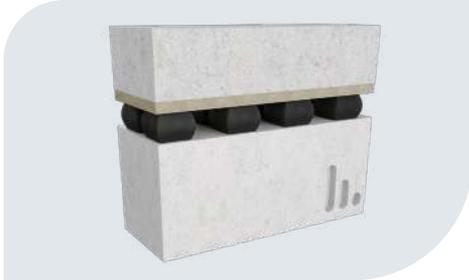


Figure 5 - Selection of Building Base Isolation solutions

(1) Effective pressure on the contact surface

Solution Portfolio

BBI Solutions & Structural Fixations



Cost Effective



Easy Installation



Replaceable



High Load Capacity



Easy Installation



Replaceable



Extra Performance



Easy Installation



Cost Effective

Stravibase SEB

Structural Elastomeric Bearing

- 6-20 Hz natural frequency
- Series of elastomer pads, which can be laminated to formwork on one or both sides
- Variety of dimensions available
- Acoustic design loads up to 10 MPa
- Static, dynamic and long-term behaviour of all the materials used are detailed in the material datasheets
- Long-lasting and maintenance free



Stravibase VHS

Very High Stress Bearing

- 7-16 Hz natural frequency
- Very high load capacity for a reduced footprint
- Integrated fail-safe possible
- Cost-effective and high-performance solution
- Long-lasting and maintenance free
- As performant as an elastomeric bearing twice its size



Stravibase Spring

Structural Spring Bearing

- 2.5-5 Hz natural frequency
- Static deflection between 10 mm and 30 mm
- Long-lasting and maintenance free
- Single or double nested springs with a top and bottom cover plate including an elastomeric anti-slip layer
- Custom sizes available depending on the loads, footprint, and performance requirements





Replaceable



Extra Performance



Limited Deflection

Stravibase SpringBox

Precompressed Spring Bearing

- 2.5-5 Hz natural frequency
- Easily replaceable
- Limited deflection of the building during construction
- Customization possible to meet specific anchorage needs
- Spring and box sizes depending on the loads, footprint, and performance requirements



Extra Performance



Easy Installation



Horizontal & Vertical Application

Stravibase Fix

Structural Elastic Fixation

- 4-20 Hz natural frequency
- Horizontal or vertical installation
- High degree of structural stability
- Can accommodate any size or load
- Designed with either springs or elastomeric isolators
- Complete vibration decoupling from the non-isolated structure
- Precompression is possible to control deflection during construction



Medium Performance



Easy Installation



Horizontal & Vertical Application

Stravibase Mat

Resilient Continuous Mats

- Wide range of thicknesses for performances as low as 10 Hz
- Low water absorption solutions possible
- Low creep behaviour
- Stable long-term stiffness and dynamic performance
- High resistance to external factors as alkaline water (wet concrete)
- Horizontal and vertical installation



Fire Protection



Fire Safety is an important aspect to consider in each and every building construction.

CDM Stravitec's design team works closely with the assigned fire experts to find the best possible protection strategies to respect fire rating requirements and to protect the integrity of the building in case of possible fire scenarios.

Extra Design Features Our Expertise

Depending on the clients' need and the intended use of the building, additional architectural and structural design considerations may be required by the project design team.

CDM Stravitec will support the design team with integrating all possible additional features to the Building Base Isolation solutions; with the objective of maintaining the integrity and durability of the solutions without compromising the acoustic performance of the bearings.

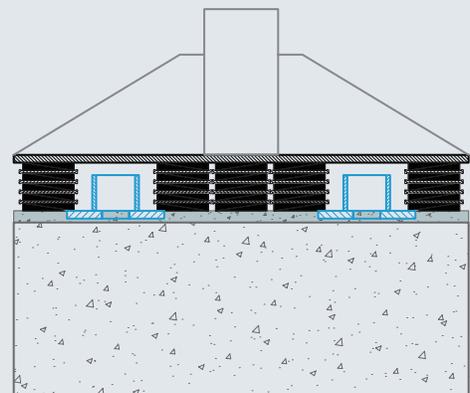
Failsafe



If required by the design team, CDM Stravitec can integrate failsafes to both its products and/or bearing assemblies.

Failsafes are sometimes used to prevent significant accidental deflections in case of major events (such as fires, explosions, subsidence, etc). All failsafes proposed by CDM Stravitec are tailored to needs based on the available footprint and the loading conditions. They allow for remedial actions if necessary by providing the required space for placement of new bearings.

The nature of the failsafes will vary depending on the type of structural elements and the supporting surface.

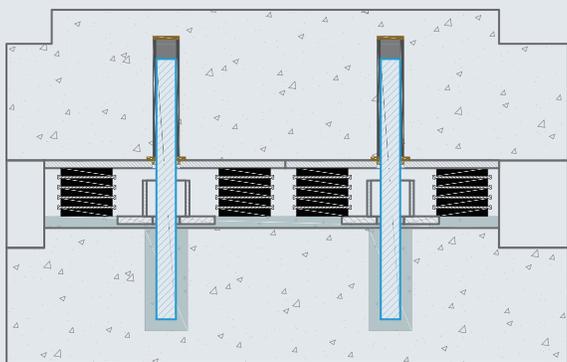


Lateral Restraints



In situations where lateral loads are present (such as wind, etc.), consideration should be given to the lateral restraint of the building.

In some settings, a local lateral decoupling could be needed as well, to ensure the stability of the structure. In this case, CDM Stravitec proposes solutions to ensure a constant alignment of the bearings supported surfaces, such as the use of isolated shear keys or isolated dowels. Those elements are tailored to need depending on the vertical and horizontal loading conditions and the type of the structural elements.

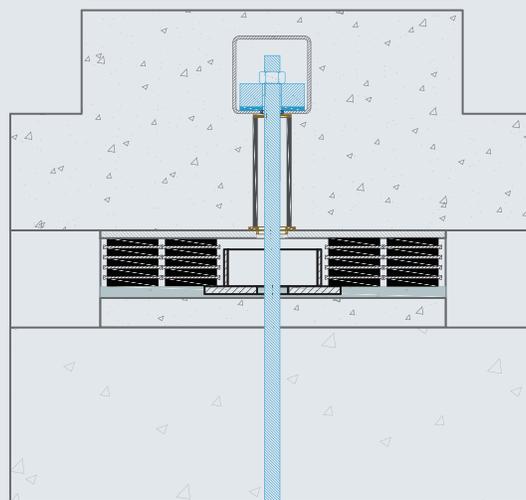


Uplift Restraints



In situations where significant uplift loads are expected, CDM Stravitec can design uplift restraint solutions to provide stability and displacement control.

These solutions are very much recommended especially with medium and high rise buildings, where an overturning moment could be generated causing uplift on some loading points. The uplift restraint will act as a tension restraining device by taking the uplift forces.



Building Base Isolation Tailored Designs & Solutions

CDM Stravitec proposes 'fit for purpose' bearing solutions following an iterative process, which considers all the requirements of the buildings' design team. In this regard, CDM Stravitec will request:

1. the required resonance frequency
2. a detailed load scheme
3. the structural footprints
4. all specific regulatory or architectural considerations which may bring additional features to the bearing designs

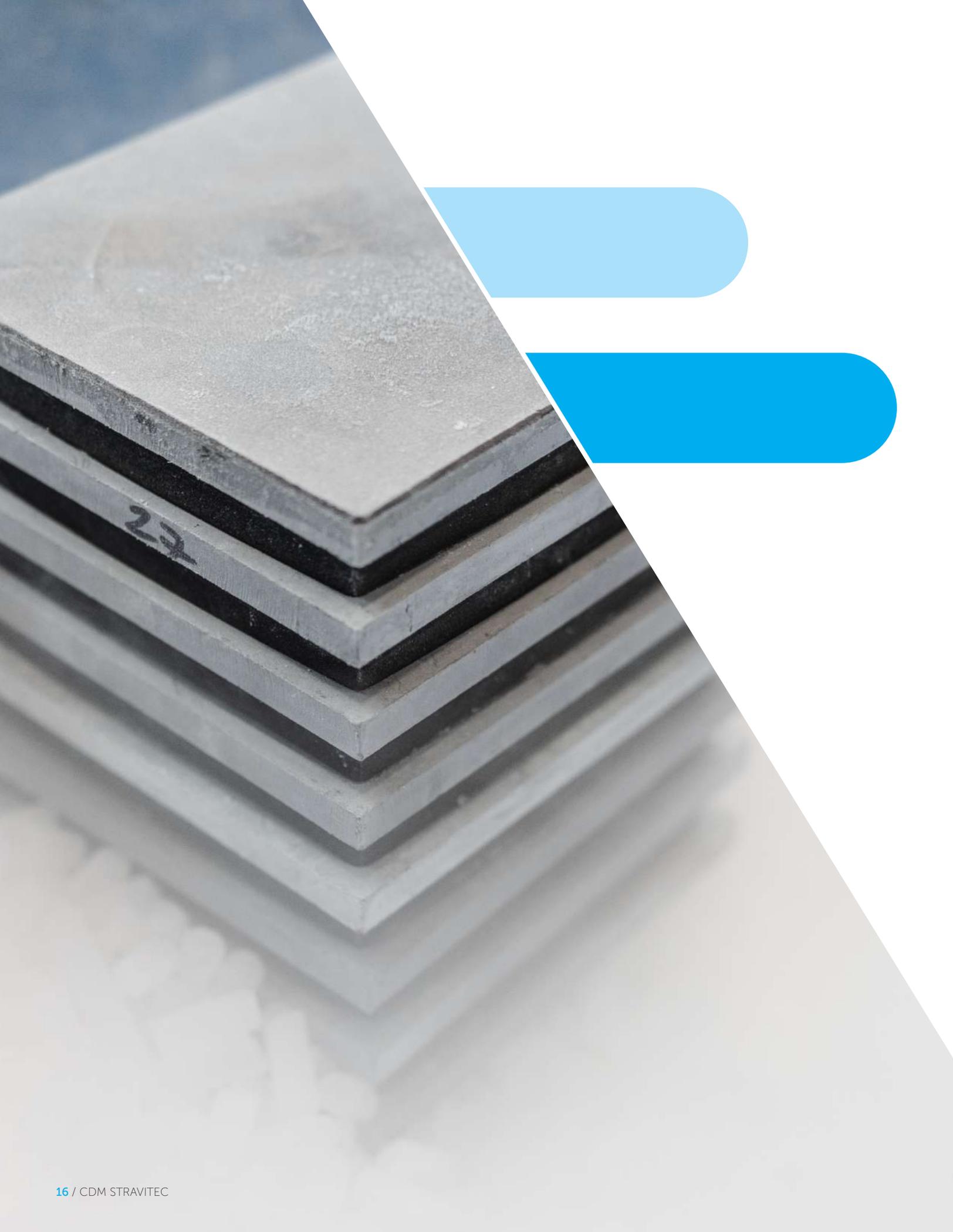


stravifloor
by CDM Stravitec

Various Stravifloor solutions may be suited for a Building Base Isolation strategy.

For more information about our Stravifloor solutions, please visit www.cdm-stravitec.com.





Long-term Vision

Frozen Bearing Technology

Nowadays, buildings need to be flexible enough over their service life to address the changing needs of owners and users. Thanks to our **Frozen Bearing Technology (FBT)**, buildings integrating a BBI system, can be adopted to:



Reinforce existing isolation bearings, to meet new acoustic requirements, or new loading conditions.



Renovate existing buildings which do not include yet a BBI and require limited jacking up and specific installation conditions.



Replace bearings, in case of accidental events such as fire explosions, unexpected occasional loads, etc.

At design phase, CDM Stravitec engineers will support the design team to make sure replacement and inspection provisions, such as jack-up spaces, are considered in the structural design. Once the building owner decides to renovate his building, CDM Stravitec will support the owner, designers and contractors, all the way from design to installation of new bearings.

During replacement, it is important to consider the specific installation conditions which strongly differ from the installation conditions during construction. Therefore, the Frozen bearing technology of CDM Stravitec is ideal. It allows a correct positioning and an easy replacement of isolators under replacement conditions.

In practice, this innovative technology consists of freezing pre-compressed elastomeric bearings before installation.

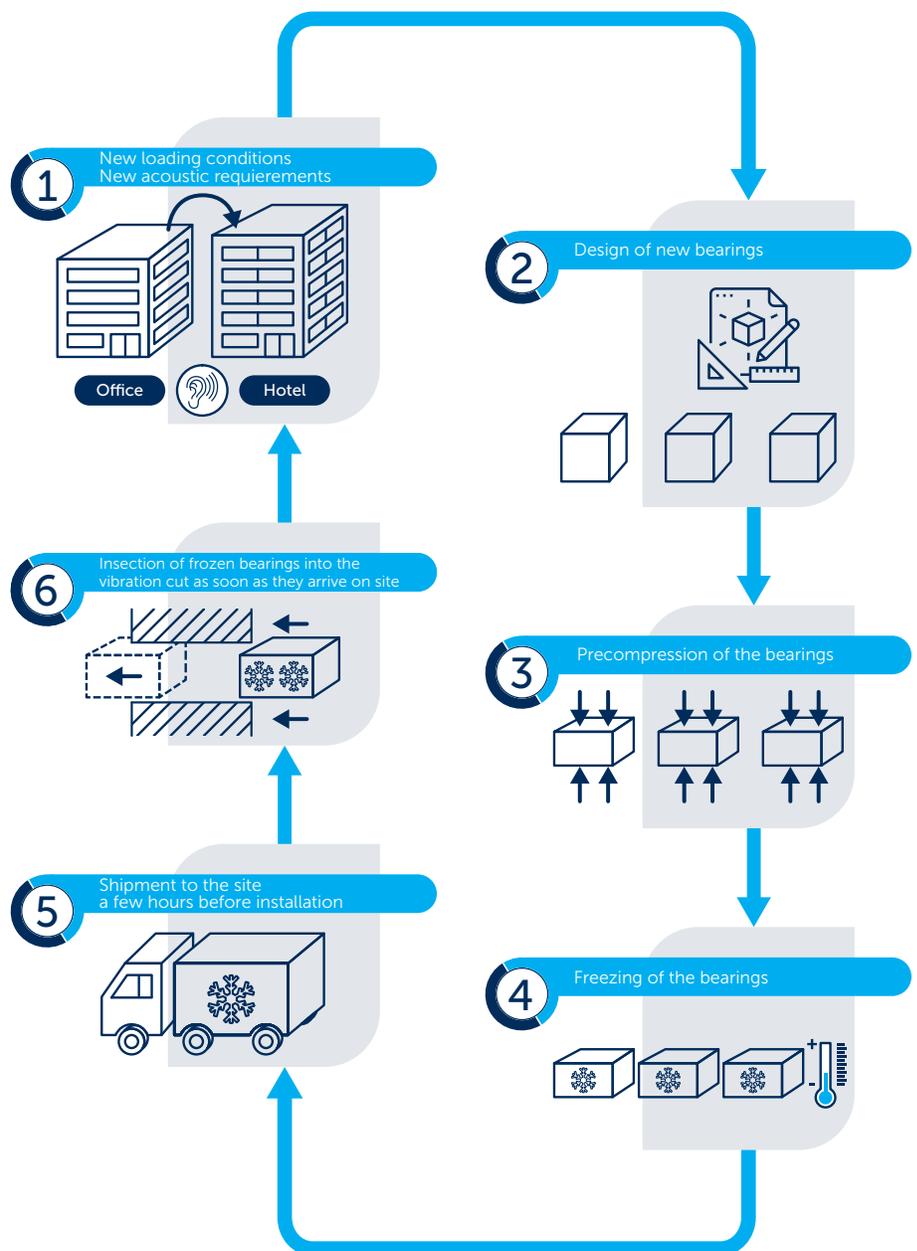


Figure 6 - Frozen Bearing Technology Process: Main Steps

References

At CDM Stravitec, we take pride in the quality of work that we produce. Our extensive resume is comprised of over 10,000 projects completed since 1951. Our diverse project list includes commercial and residential buildings, manufacturing plants, medical facilities, schools, hotels, gyms, and more. Over the decades, we contributed to the technical design of numerous buildings and our engineered products are used to successfully overcome noise mitigation challenges.

K1 Knightsbridge

London (UK)
Stravibase VHS



© Skanska

High Park Condominium

Toronto (CA)
Stravibase SEB



© Tom Arban Photography Inc.

Museum of Modern Art

New York City (US)
Stravibase Fix



© Iwan Baan Photography

Clínica Girona

Girona (ES)

Stravibase SpringBox



Theater Zuidplein 'Kunstenpand'

Rotterdam (NL)

Stravibase Fix



Zahálka Residence

Prague (CZ)

Stravibase VHS



New York University Abu Dhabi

Abu Dhabi (UAE)

Stravibase VHS



cdm stravitec

Making your world a quieter place

We have qualified engineers in noise and vibration based at different locations around the world – they are only a phone call away.

For general enquiries please contact our head office or visit our website.

Canada

100 Sunrise Avenue, Unit 202
Toronto, Ontario, M4A 1B3
T (905) 265-7401
info-ca@cdm-stravitec.com
www.cdm-stravitec.com

United States

342 N. Queen St., Warehouse D
Lancaster, PA 17603
T (888) 454-6236
info-us@cdm-stravitec.com
www.cdm-stravitec.com



Version 2023/1 - © 2023 CDM Stravitec n.v. All rights reserved.

DISCLAIMER

This information is accurate to the best of our knowledge at the time of issue. Information, data and recommendations provided are based on industry accepted testing and prior product usage. It is intended as descriptive of the general capabilities and performance of our products and does not endorse applicability for any particular project. We reserve the right to change products, performance, and data without notice. This document replaces all information supplied prior to the publication hereof.