

07/03/2023

Engineering Quite Buildings

Noise & Vibrations isolation solutions

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cdm  **stravitec**

Making your world a quieter place

Mission & Vision

OUR COMMITMENT

MISSION

We strive to be global market leaders; offering high quality, customised and innovative solutions for the urban environment, made possible by investing in our highly skilled, committed and empowered people.

VISION

To make the world a quieter place where people are happier, healthier and more productive in an environment where levels of noise and vibration are responsibly managed.



Our Slogan

WHAT DRIVES US

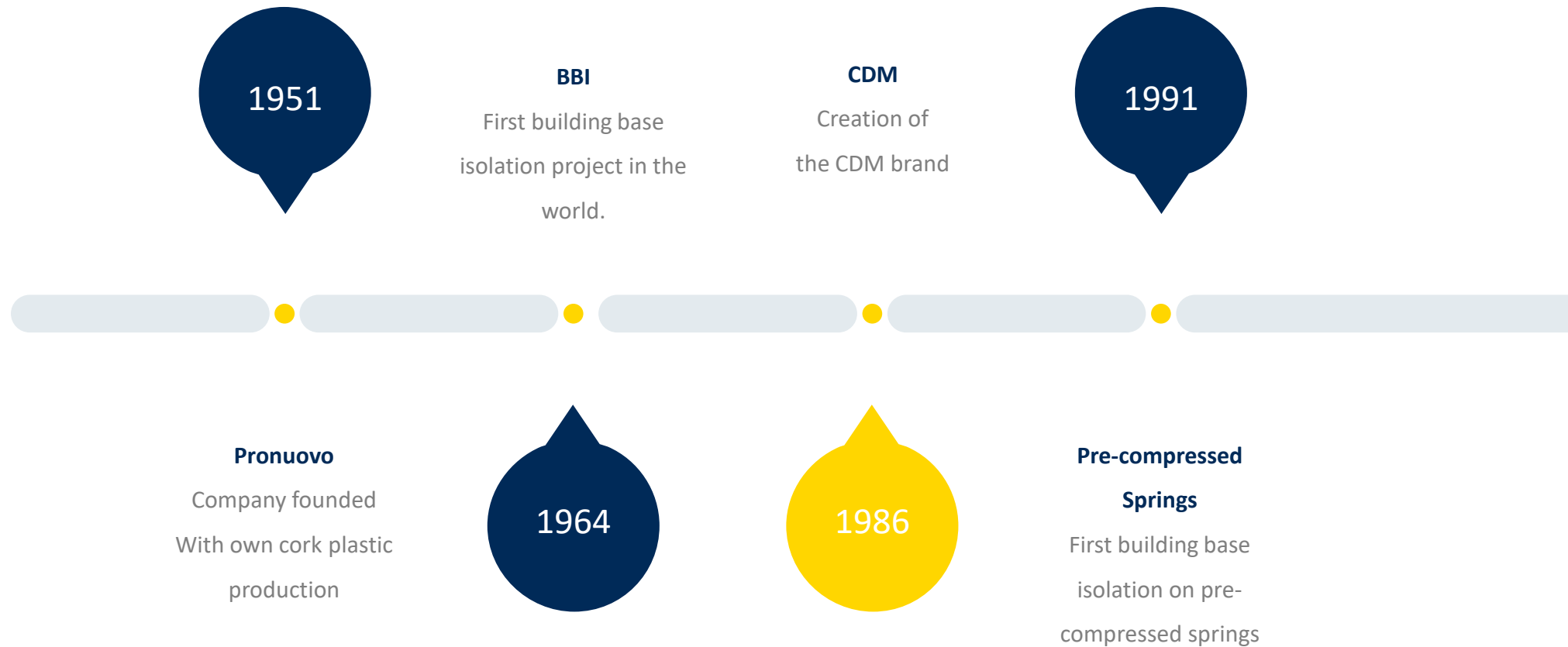


“Making your world a quieter place”

CDM Stravitec’s many years of experience in the building market, our highly skilled engineering team, sophisticated computer analysis software and extensive knowledge of materials enables us to research, design and deliver the optimum solution for any noise and vibration specification.

Our Company History

MILESTONES



Our Company History

MILESTONES

1992

New Materials

Introduction of resin bonded rubber with own production and strong focus on rail transit applications

2002

CDM Systems

Opening United States branch

2021

New Materials

Introduction of high-resilience rubber composites

1997

New Foam Material

Introduction of polyurethane foam

2016

Rebranding

Birth of CDM Stravitec

Our Services

OUR PROMISE



CDM Stravitec is a solution provider offering customized products and systems for noise & vibration isolation. Since 1951 the company is offering **design, assembly**, and if required **installation** of its solutions.

01

**Design &
Know-how**

Noise & Vibration
Isolation for Building
& Industry

02

Assembly

Resilient material
characteristics (wide
range)

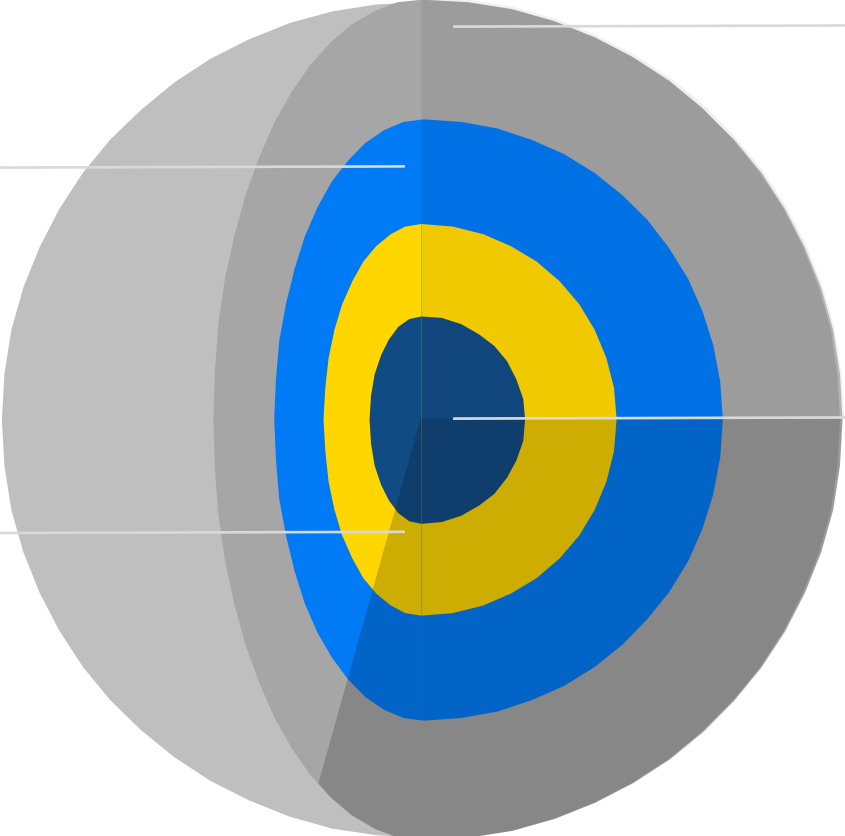
03

Installation

Application experience
(references)

Core Values

OUR PROMISE



Right Solution

Engineering the right solution for each project

Right Performance

Selecting the right materials, to guarantee optimal performance

Correct Price

Offering effective solutions at a correct and competitive price

Necessary Warranties

Our solutions come with the necessary warranties; it covers qualified physical damage or defects to load-bearing elements

CDM Stravitec

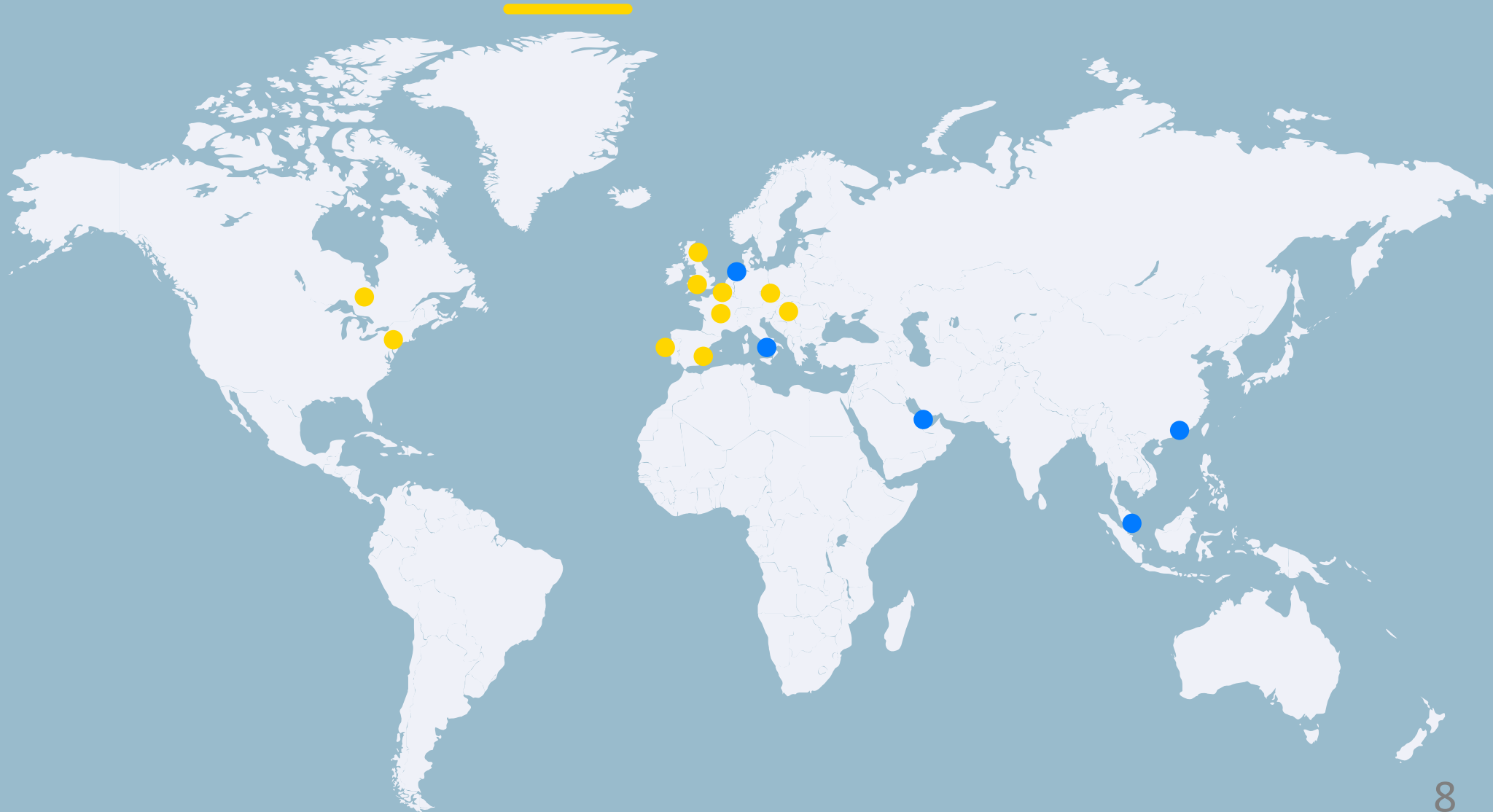
WORLDWIDE PRESENCE

BRANCHES

- Belux (HQ)
- Canada
- Czech Republic
- France & Maghreb
- Hungary & Central Eastern Europe
- Ireland
- Portugal & CPLP
- Spain
- United Kingdom
- United States of America

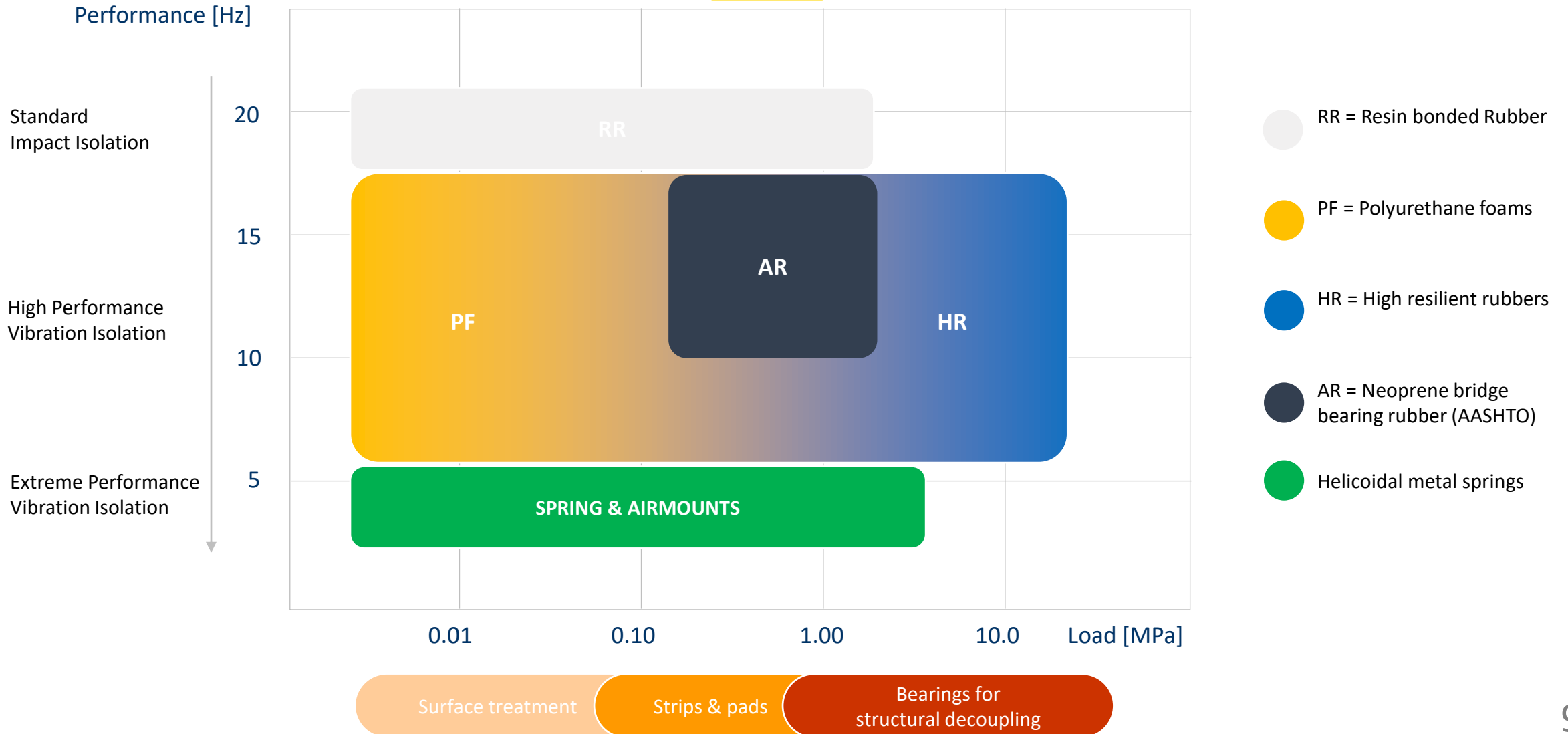
PARTNERS

- Architectural Acoustics (HK)
- Wilhams Insulation Group (MY)
- Pantecnica & Consonica (IT)
- AGD (UAE)
- Delta-L (NL)



Range of Resilient Products

OUR MATERIALS



In-House Testing

DESIGN & EXPERIMENTAL TOOLS

EXPERIMENTAL TESTING

- HQ Lab facilities (Instron Hydropuls, CTS, resilient material characterization, creep, t° testing ...)
- Collaboration with different University Labs with up to 2.5 MN Hydropuls presses

NUMERICAL MODELLING

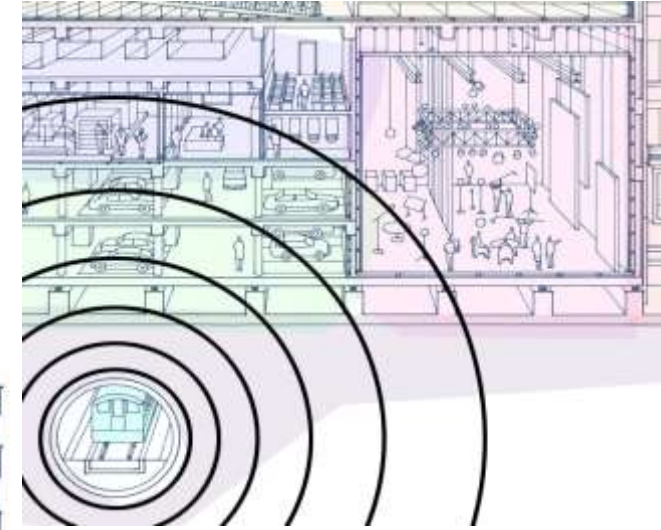
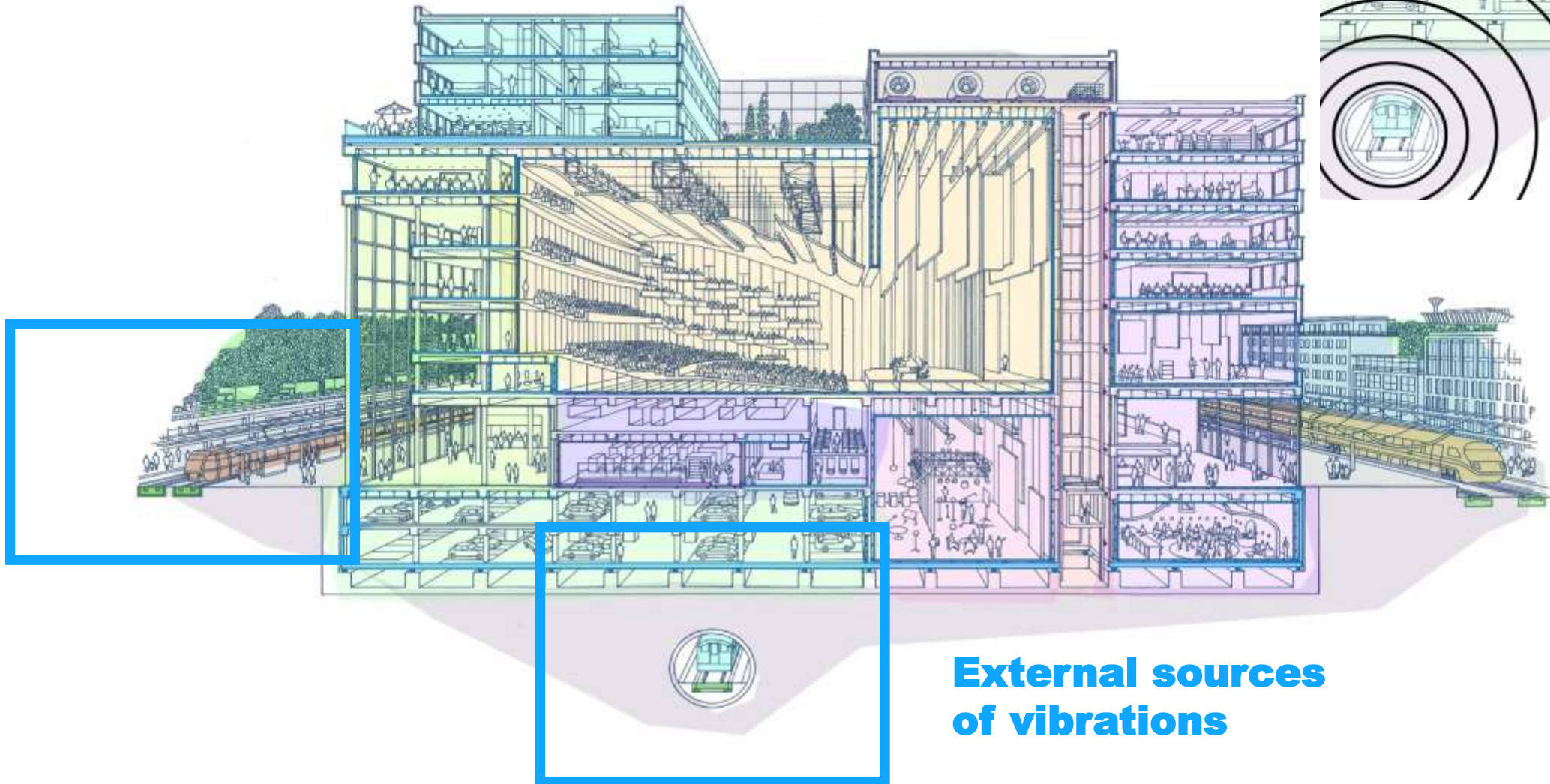
- Mechanical modelling by FEM
- Parametric studies
- Solution and material requirement optimization
- Hyper-elastic characterization of elastomers
- Test result prediction
- Elastomer bearing design (SOLIDS software)

ACOUSTICAL MODELLING



Vibration sources

EXTERNAL

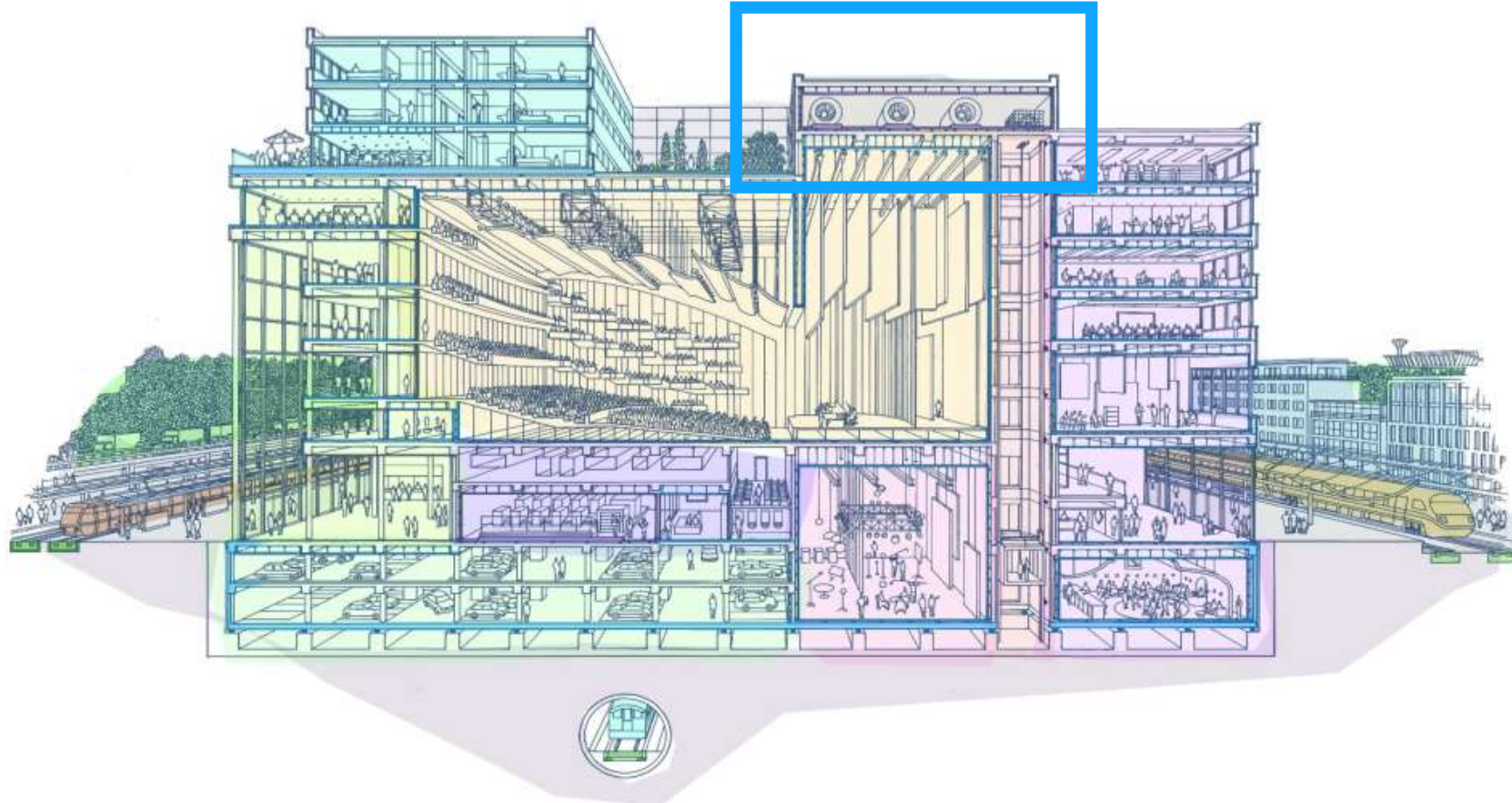


**External sources
of vibrations**

Vibration sources

INTERNAL

Internal sources of vibration: HVAC, generators, pumps, elevators, soil impacts, gyms, pools, garage doors, ...

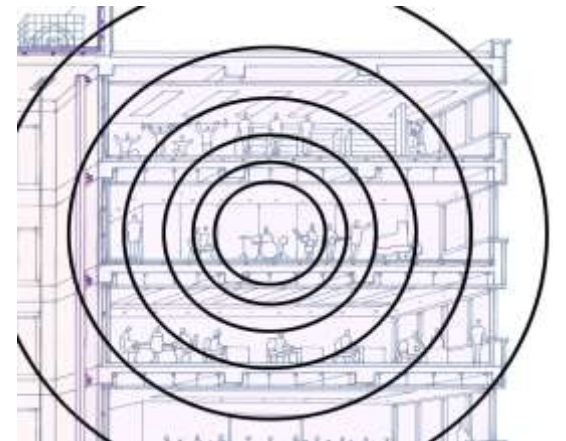
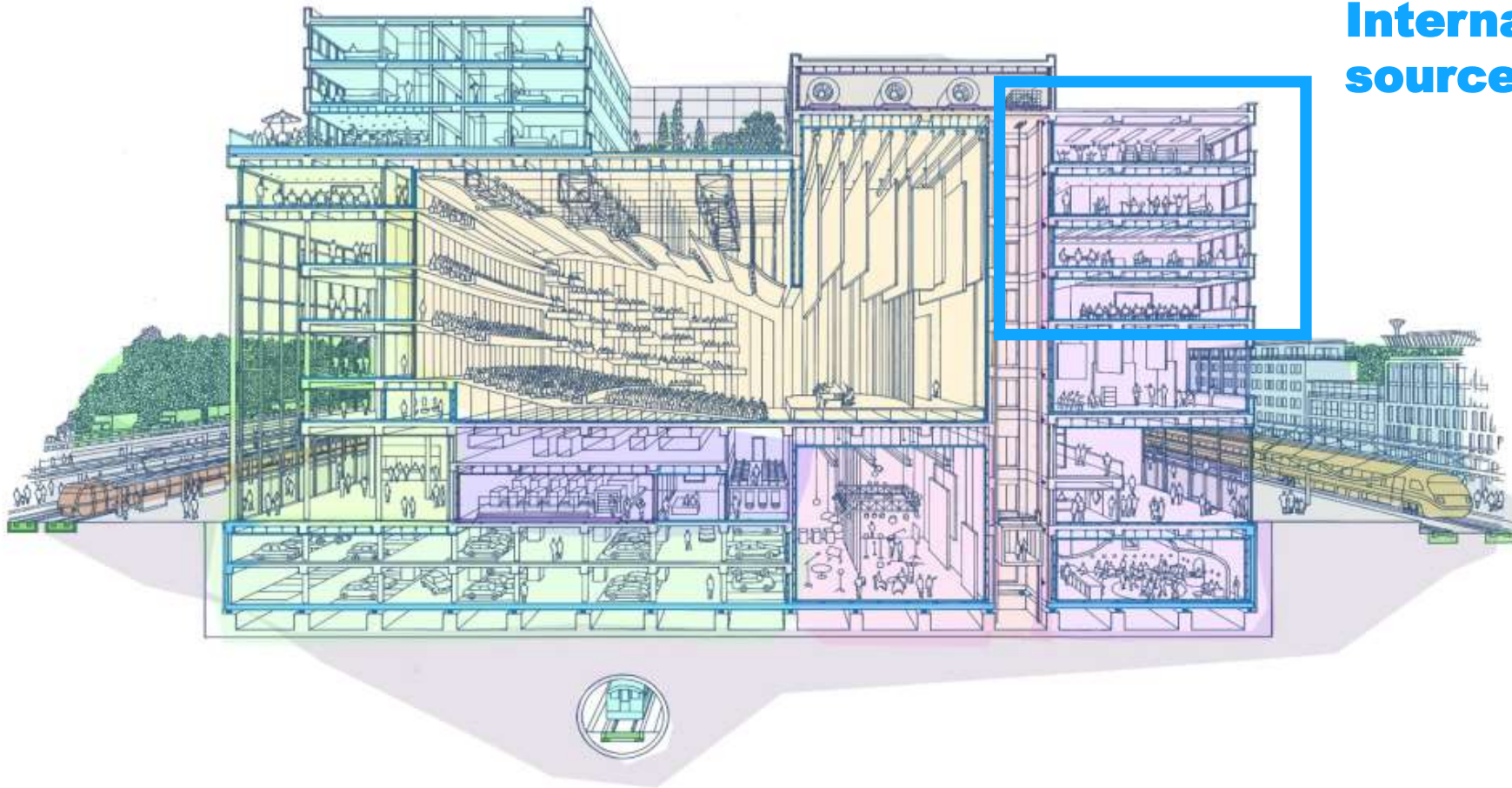


Noise sources

INTERNAL



Internal noise sources



Intervention Levels

A SOLUTION FOR EACH SPACE

stravibase
by CDM Stravitec

Building Base Isolation
& Structural Fixation

stravilink
by CDM Stravitec

Wall & Ceiling
Elastic Decoupling

stravimech
by CDM Stravitec

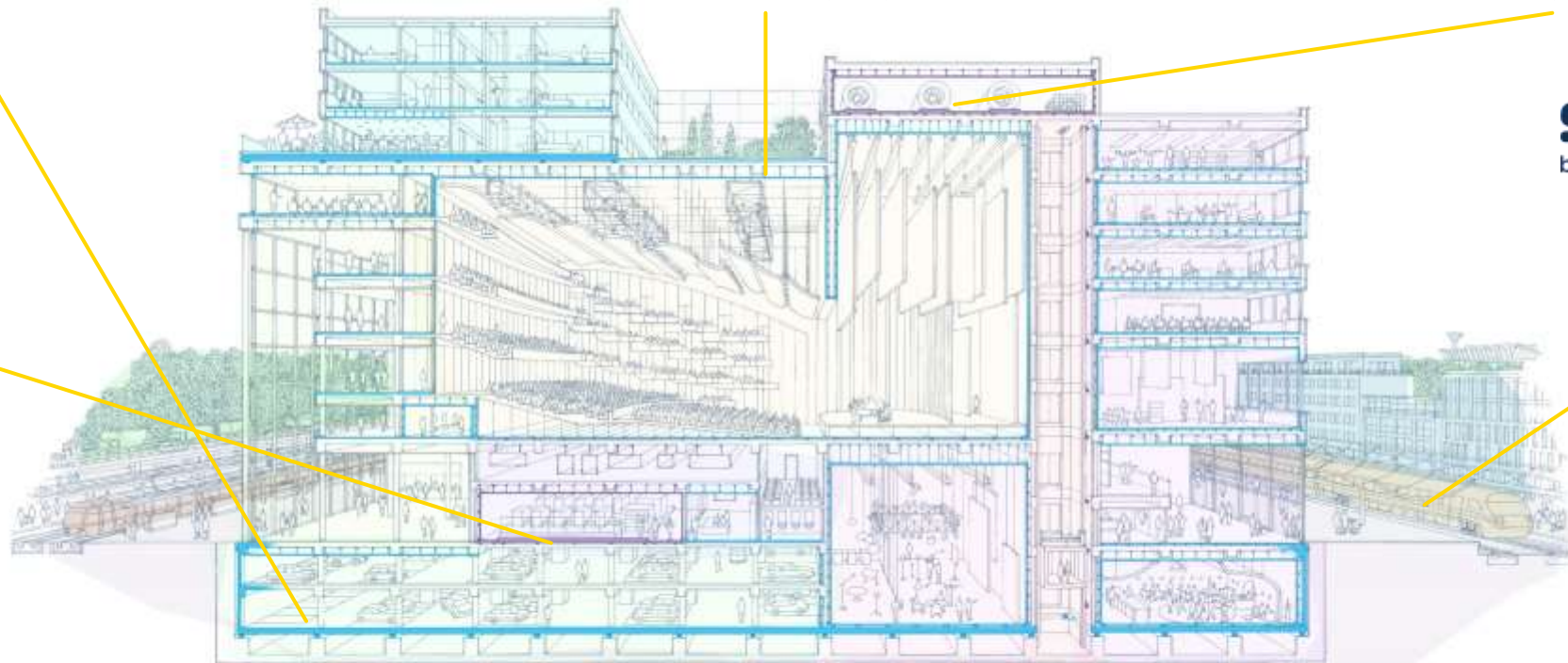
Mechanical Equipment
& Building Services

stravigym
by CDM Stravitec

Lightweight Isolated
Gym Floating Floors

stravifloor
by CDM Stravitec

High-Performance
Floating Floors



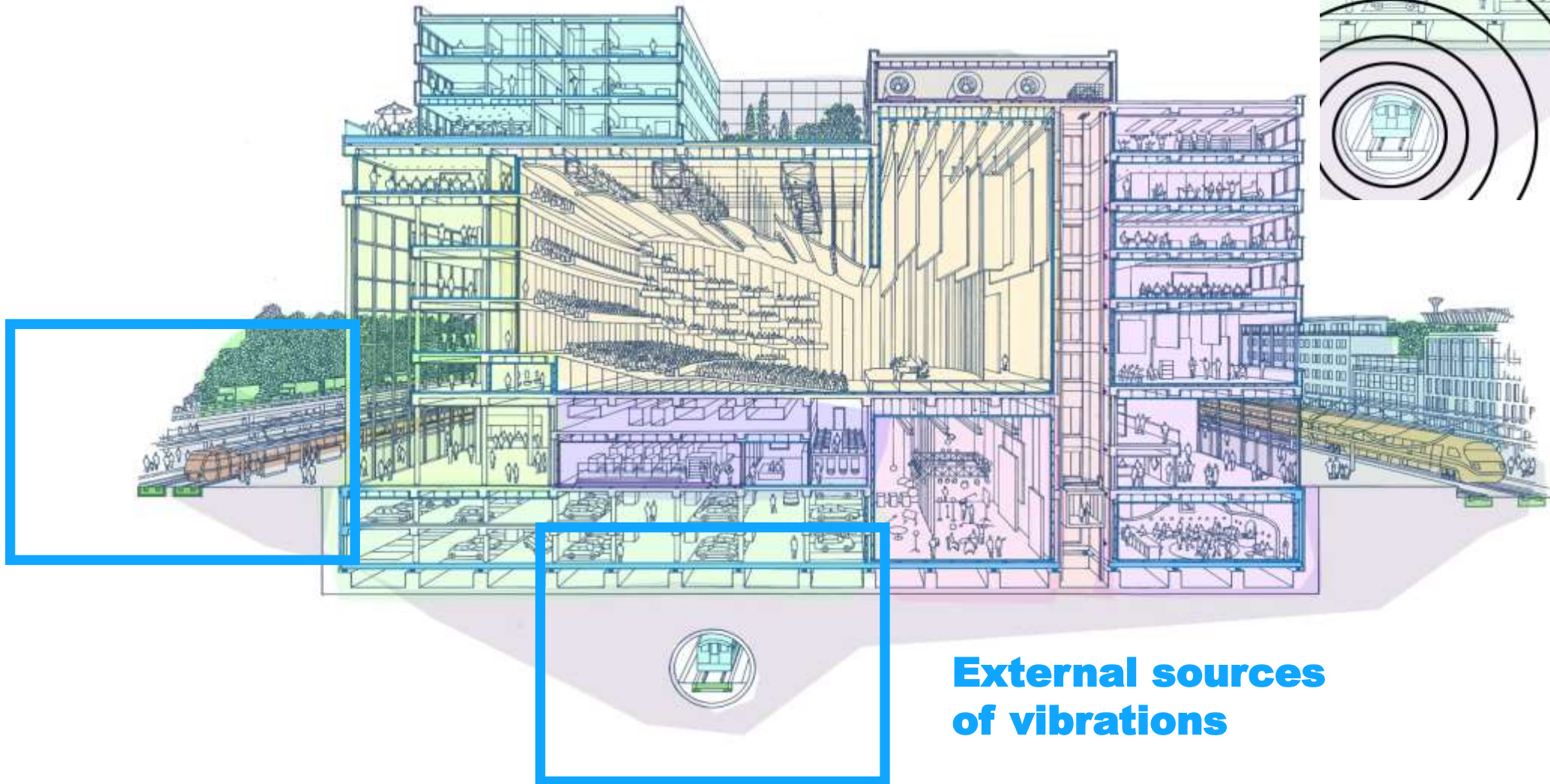
Most common isolation needs in buildings

- **Impact and rolling noise:** e.g. multifunctional buildings, apartments, hotels, hospitals, schools, offices, warehouses, supermarkets, ...
- **Vibration isolation from building service equipment's:** e.g. : internal technical rooms, building roofs, elevators, pools, ...
- **High performance spaces:**
 - leisure spaces in multifunctional buildings (e.g. bowling, bars, discotheques, ...)
 - sound sensitive spaces (e.g. recording studios, cinemas, theatres, concert halls, ...)
- **Building base isolation:** structural decoupling measures for the noise and vibrations generated by the rail ad road traffic
- **Gym & Fitness:** gyms are critical spaces in multipurpose buildings
- **Timber construction:** lightweight timber constructions transmit low frequencies noise requiring specific isolation solutions



Vibration sources

EXTERNAL

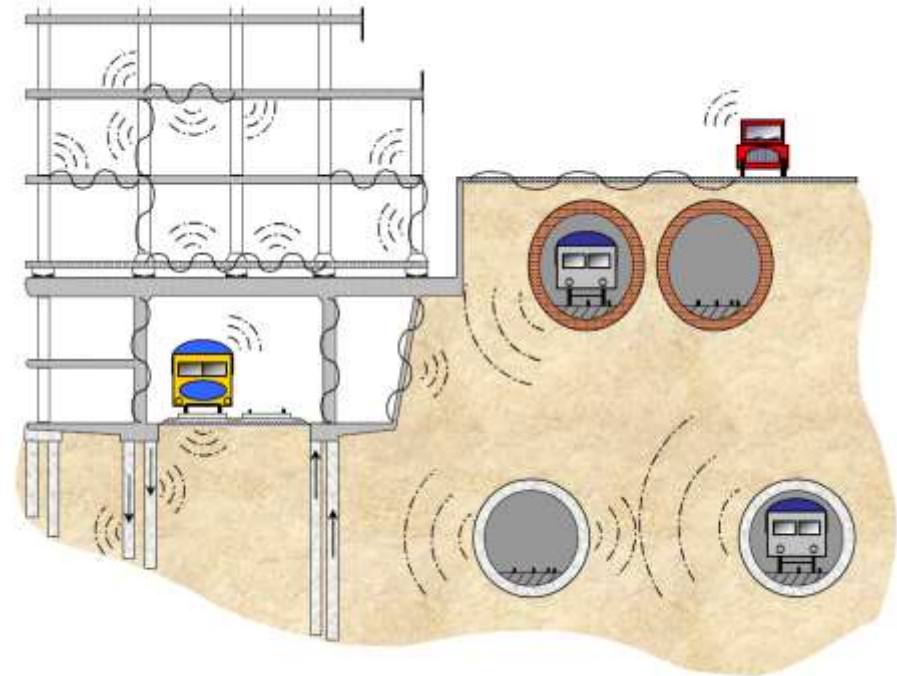


External sources of vibrations

Structural isolation systems

OBJECTIVES

- **Vibrational disturbance (up to 80Hz)**
 - Human comfort – Sensitive equipment
- **Structural noise radiation (re-radiation)**
 - Mainly human comfort (up to 250Hz)
 - Humans hear the combination of direct airborne + reradiated structure-borne noise (unless the source is located in a tunnel → only structure-borne noise)
- **Structural damage**
 - Fatigue cracks appearing in structures after a certain time
 - Often a combination of regular vibrational excitation and weather conditions (long term & complex)

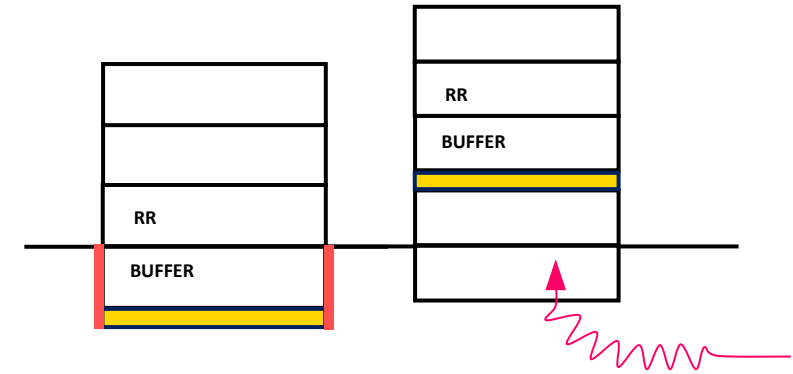
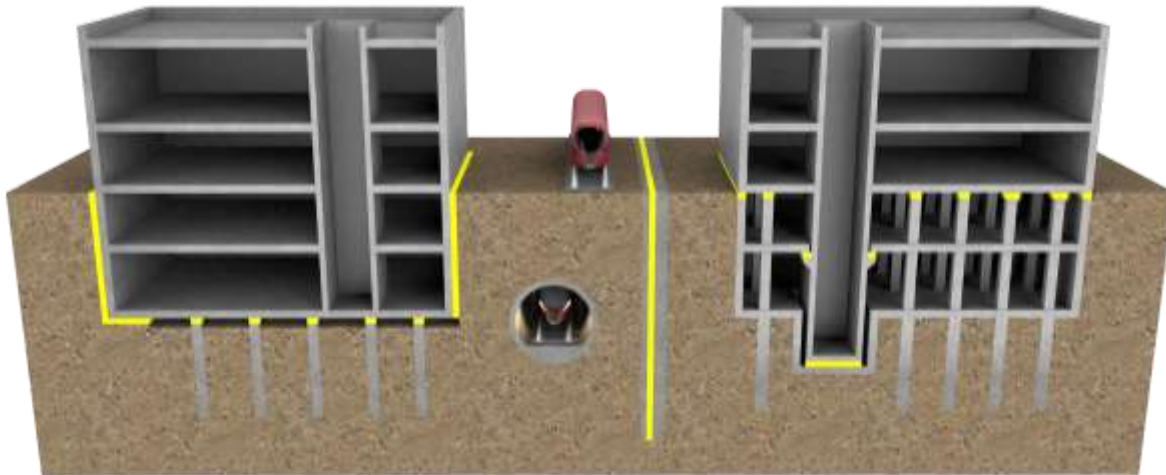


Structural isolation systems

DESIGN BUILDING CONSIDERATIONS

Location of the vibration cut:

- Structural stability → best to cut as low as possible
- Cut in lower level → more expensive (price in €/kN)
- Buffer level if possible to have got higher performance



Design Load:

- DL & LL must be known, non-factored
- Acoustical Design Load (ADL) = $DL + LL/3 < \text{Max Static Load}$
- SLS (non-factored load combinations of DL, LL, WL, according to EC1) $< \text{Max Total Load}$

Stability checks:

- factored & ultimate state combinations
- (wind, seismic loads, impact forces...)

Structural isolation systems



Stravibase Fix
Structural elastic fixation system
for any type of construction



Stravibase Raft
Resilient continuous supporting
bearing system



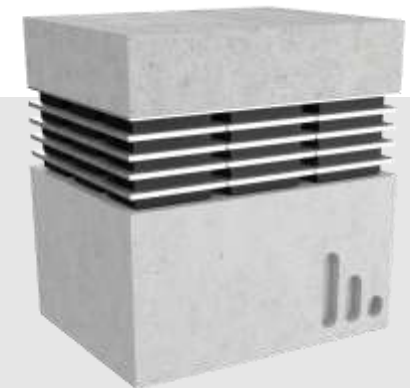
Stravibase SEB
Elastomeric bearing for
the structural isolation of buildings



Stravibase Spring
Spring bearings for
structural isolation of buildings



Stravibase SpringBox
Pre-compressed spring bearings
for structural building isolation



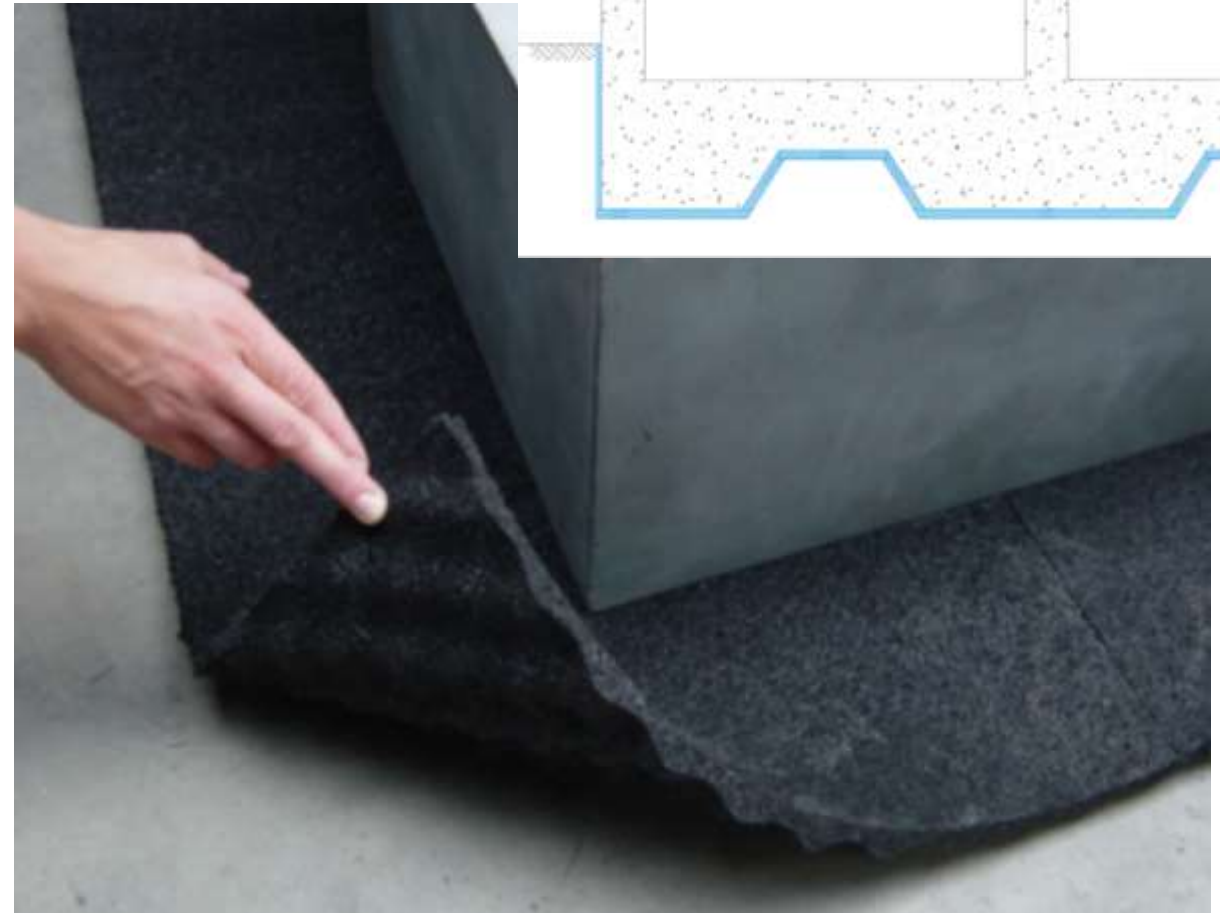
Stravibase VHS
Very high stress bearings
for structural building isolation

Structural isolation systems

STRAVIBASE RAFT

Continuous resilient support for raft foundations

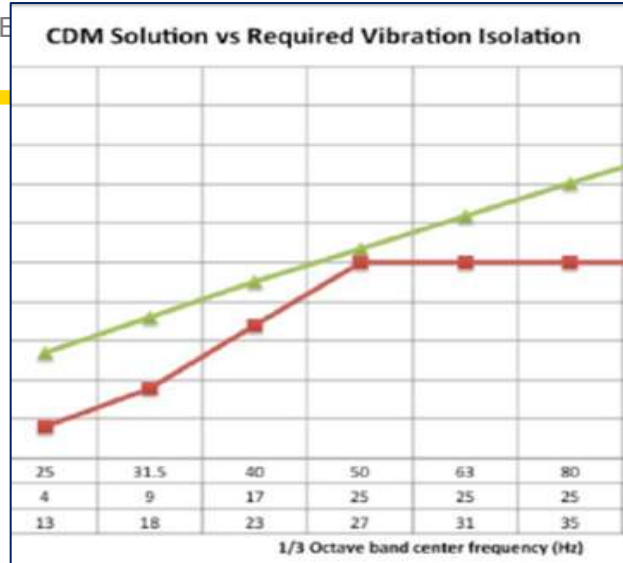
- Wide range of thicknesses for different isolation performances, meets natural frequencies as low as 10Hz
- Adaptable stiffness according to the loads to be taken
- High resistance to impact during installation and pouring + high resistance to alkaline water (wet concrete)
- Low creep behavior
- Easy and quick installation



Structural isolation systems



STRAVIBASE



PS 314 – Queens, NY, USA

New school close to a metro line isolated in a Resilient continuous supporting bearing system on the raft foundation (60mm thickness)

- Stravibase Raft - 12 Hz

Structural isolation systems

STRAVIBASE VHS



High stress elastomer bearings for structural isolation of buildings and structures

- Designed for natural frequencies 8 - 15Hz
- Easily replaceable
- Footprint minimization
- Lifespan greater than 50 years
- High lateral stiffness
- Easily adapted to meet different loads
- Flexible solution





Doornroosje (NL)

To increase the comfort of the users with respect to noise and vibrations generated by the nearby train traffic, it was decided to put the entire Doornroosje music center on a building base isolation system with a decoupling frequency of approximately 10Hz.

Structural isolation systems

STRAVIBASE SPRING

Simple spring bearings for structural isolation of buildings and structures

- Can be designed for natural frequencies of 2,5Hz to 5Hz
- Cost effective
- Easy to install
- Lifespan greater than 50 years
- High lateral stiffness
- Easily adapted to meet different loads and performance requirements
- Deflections up to 20 - 50 mm during construction

*References:
Nanterre, Paris, France
Highbury Crescent, London, UK
Hotel Yazz, Prague, Czech Republic*



Structural isolation systems



Apartments building Nogent (FR)

New building close to a track line build-up in single spring bearings (below level 1), to guarantee indoor noise levels that allow users the proper acoustic comfort

- Stravibase Spring 3,5 Hz

Structural isolation systems

STRAVIBASE SPRINGBOX

Pre-compressed spring bearings for structural isolation of buildings and structures

- Designed for natural frequencies 2,5Hz - 5Hz
- Easily replaceable
- Limits deflection of the building during construction
- Lifespan greater than 50 years
- High lateral stiffness
- Easily adapted to meet different loads
- Full boxes are cost effective

References:

- *Hotel La Citadelle, Montpellier, France*
- *New Orleans building, Rotterdam, The Netherlands*





University of Amsterdam (NL)

The redevelopment of the Roeterseiland campus includes a diamond polishing factory and several faculties of the University of Amsterdam. To minimize noise and vibration transmission and reduce additional deflection during construction the steel structure was isolated using pre-compressed spring bearings



Ebury Square (UK)

A high end residential buildings at Chelsea one of which is built directly on top of the cut-and-cover tunnel of the Circle and District lines in between Sloane Square and Victoria. The vibration levels on site are very noticeable and to limit the structure-borne noise levels both buildings were isolated on pre-compressed spring boxes.

- 341 pre-compressed steel boxes / 3,2 Hz



Nova Clínica Girona (ES)

New building close to a track line build-up in pre-compressed spring boxes (below level 1), to guarantee indoor noise levels that allow users the proper acoustic comfort and the necessary protection for hospital activities (people and equipment)

- 450.000 kN load
- 7.804 springs (596 pre-compressed steel boxes)

Structural isolation systems

DESIGN BUILDING CONSIDERATIONS

- Structure flexibility
- Load redistribution
- Replaceability
- Fire protection
- Lateral forces
- Uplifting forces
- Stability - core decoupling
- Long term behaviour
- Failsafe required

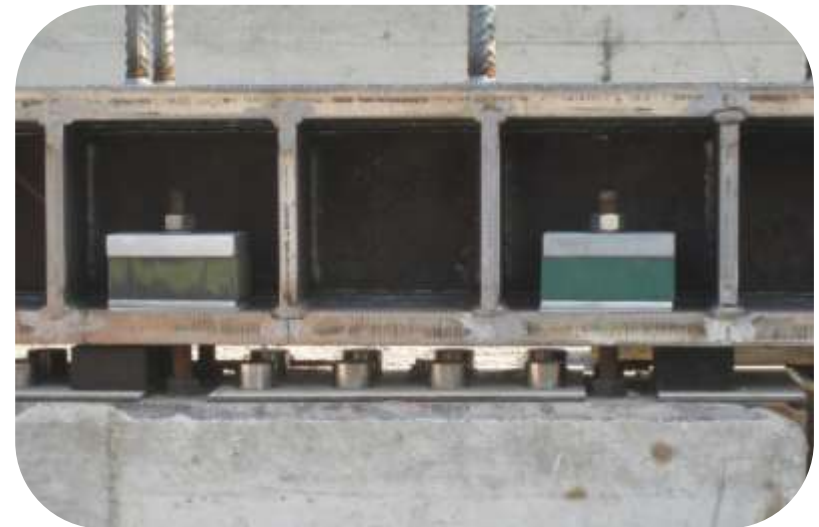


Structural isolation systems

DESIGN BUILDING CONSIDERATIONS



- 1 Uplift security
- 2 Fail-Safe space
- 3 Shear key
- 4 Jack-up space

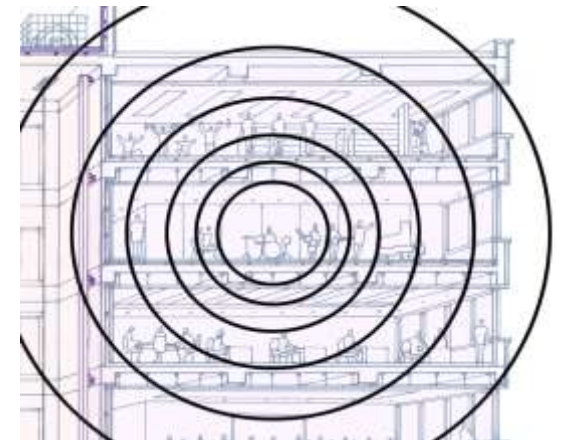
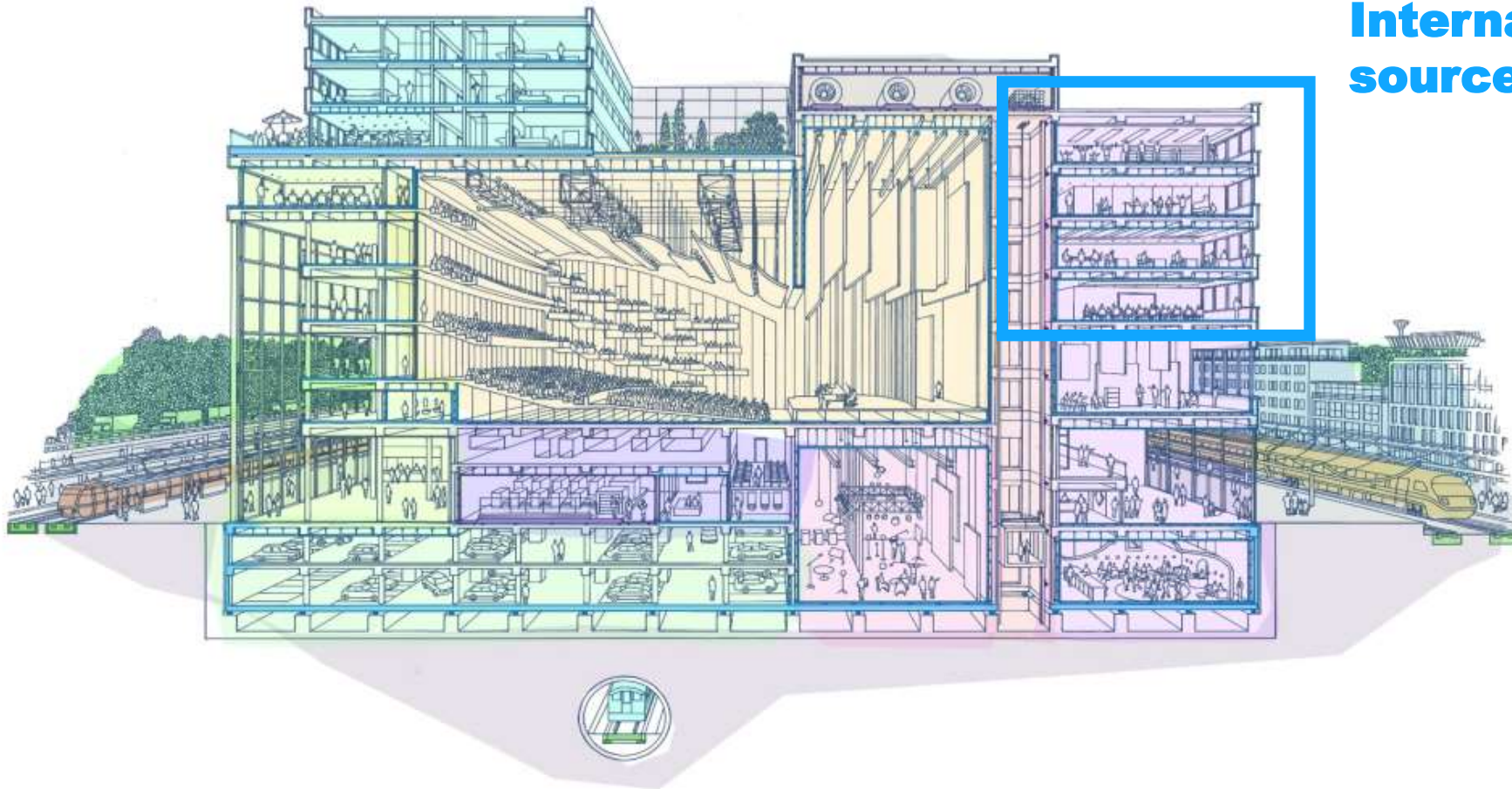


Noise sources

INTERNAL



Internal noise sources



Floating floors isolation

WHERE?



1) “ACTIVE” isolation (at the source)

- HVAC / technical floors in offices and other machine floors
- inner sports floors, bowling rooms
- cinema rooms, theaters, concert halls, cultural centers
- studio's
- large residential buildings, flats
- parking floors

2) “PASSIVE” isolation (at the receiver)

- box-in-box setups against (rail) traffic noise & vibrations
- control and office rooms in heavy factories

Floating floors isolation

SETUP

TOP FLOOR

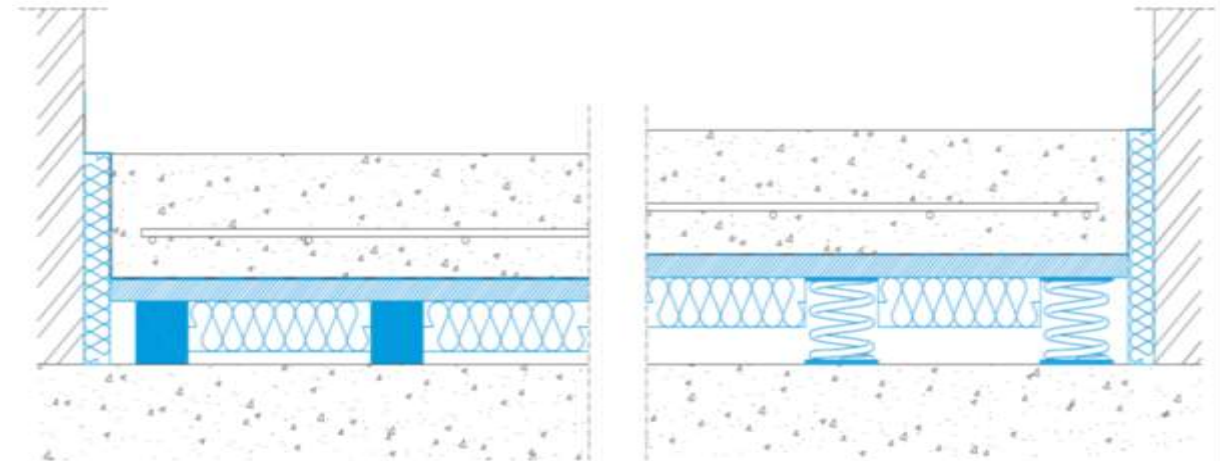
- light & dry (wood)
- heavy & wet (concrete)

ISOLATOR

- resilient mat
- discrete elastomer bearings / springs

BASE FLOOR

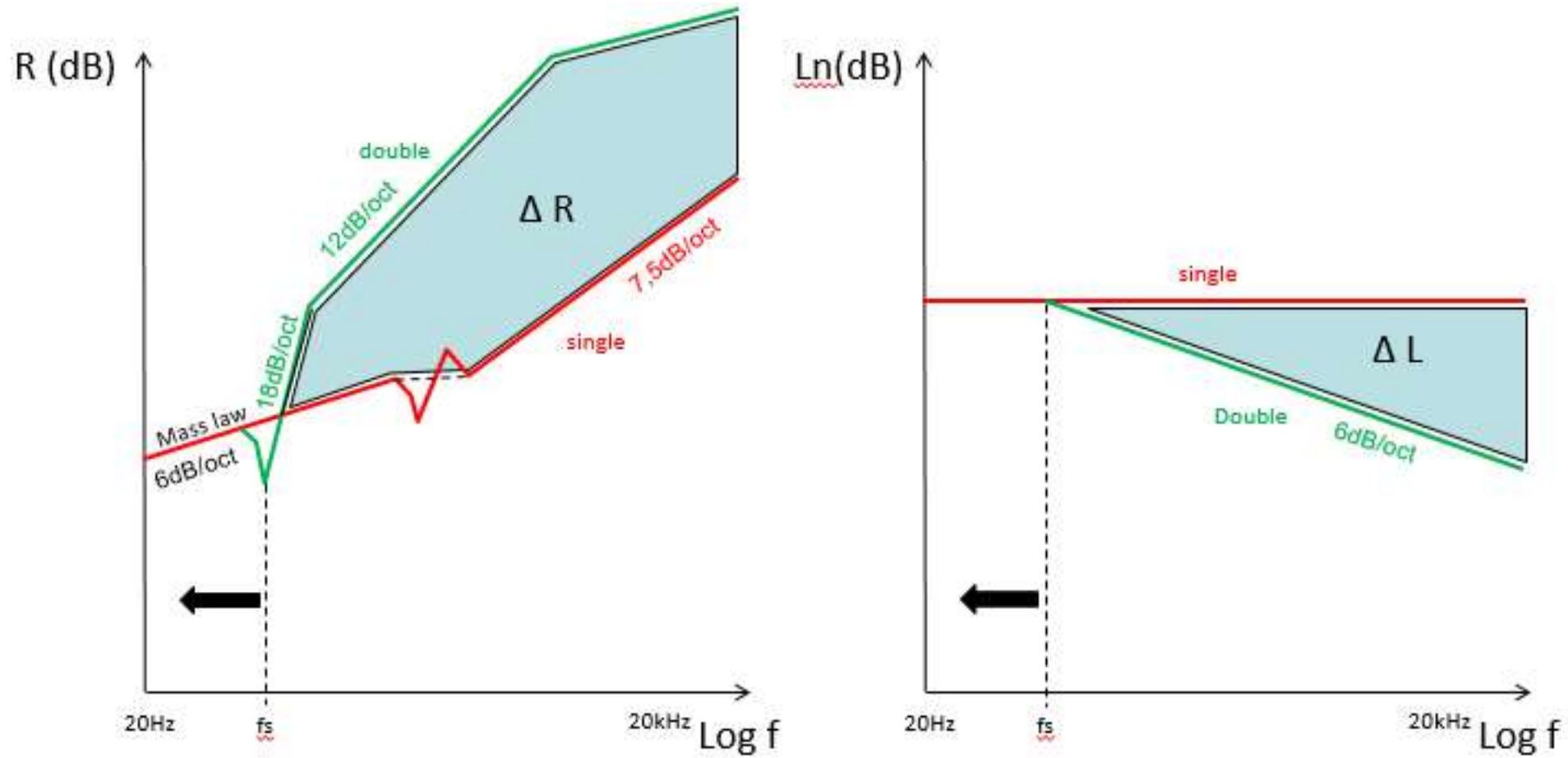
- light & dry (wood / steel)
- heavy & wet (concrete)



- ❖ different combinations possible
- ❖ “mass-spring-mass”

Floating floors isolation

PERFORMANCE

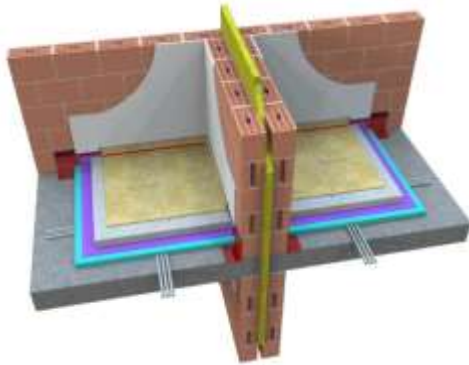


Floating floors isolation

SOLUTIONS

Full surface solutions:

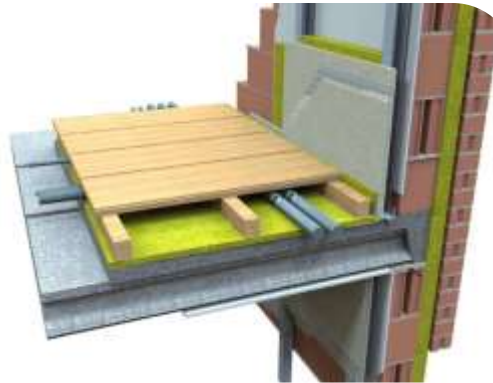
- Elastic layer is continuous under floating floor = every m^2 of elastic layer is loaded with a m^2 of floating floor mass



- Natural frequencies above 20 Hz
- Simple and fast
- Low risk of errors

Linear supports:

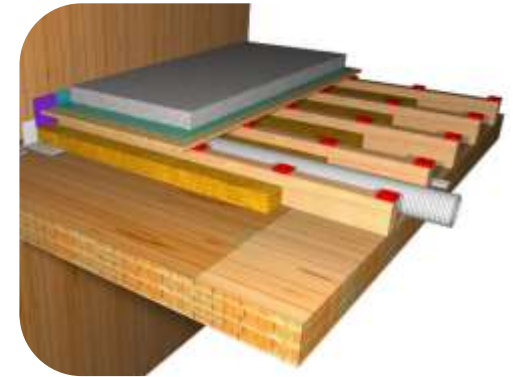
- Upper floor mass is “assembled” to line loads that are carried by the elastic material



- Natural frequencies below 20 Hz
- Easy installation

Discrete solutions:

- Upper floor mass is “assembled” to point loads that are put on elastic pads



- Lowest natural frequencies (4 -15 Hz)
- Best performances
- Careful installation required
- Applicable for most critical situations



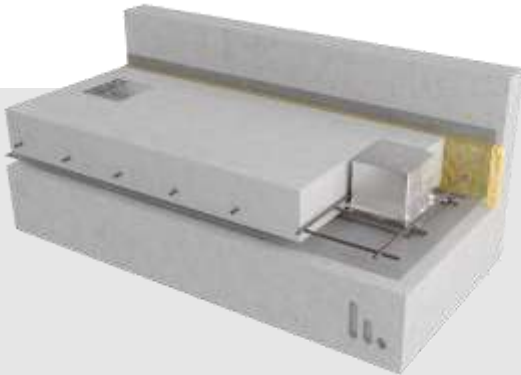
Stravifloor Batten
Resilient floor batten solution
with anchoring system



Stravifloor Channel
Isolated steel batten floor system
with enhanced stiffness



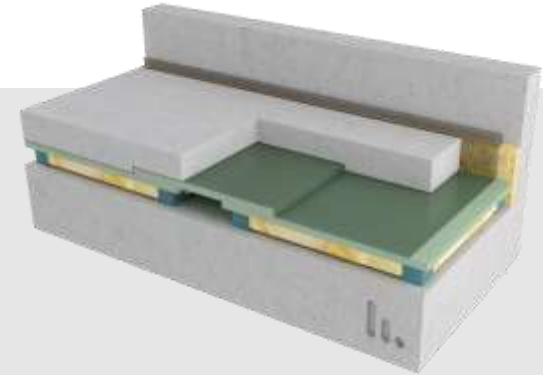
Stravifloor Deck
Low-profile deck floor system
with high bending stiffness



Stravifloor Jackup
Jack-up system using reinforced boxes &
replaceable isolators



Stravifloor Mat
Roll-out isolation solutions
For minimal system thickness



Stravifloor Prefab
Pre-manufactured modular
floating floor solution

Floating floors isolation

STRAVIFLOOR MAT



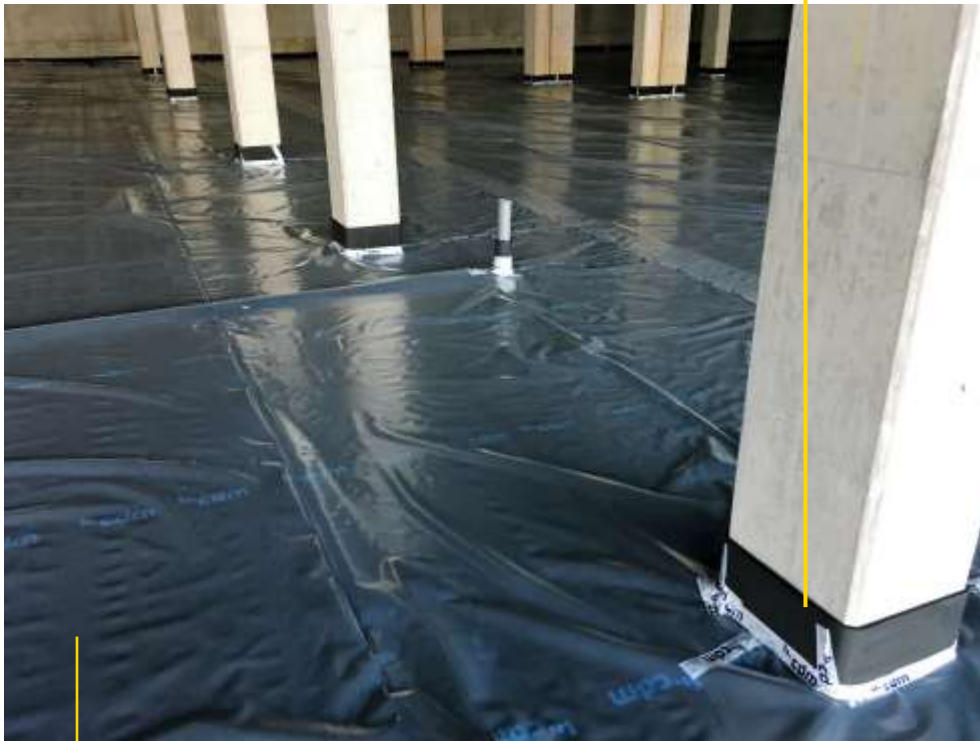
- Stravifloor Mat comes in many material types and thicknesses
- Some of the standard materials used in the residential and hotel marketplace:
 - **Roll-F3_e** – 3mm regenerated crumb rubber;
 - **Roll-F4.5_e** – 4.5mm regenerated crumb rubber;
 - **Roll-W8_a** – 8mm thick profiled resin-bonded rubber mat usually used for isolating screeds
 - **Roll-W15_a** – 15mm thick profiled resin-bonded rubber mat usually used for isolating screeds where high isolation performance is needed

Stravifloor Mat	Floating floor thickness	$L_{nw}(C_{1,r})$	$\Delta L_w(C_{1d})$ [dB]	$R_w(C;C_{1r})$
Roll-W15 _a	100mm	45(0)	31(-11)	70(-2;-7)
Roll-W8 _a	100mm	50(0)	27(-12)	69(-2;-7)
Roll-F4,5 _e	60mm	54(1)	24(-12)	-
Roll-F3 _e	70mm	60(-2)	18(-9)	-

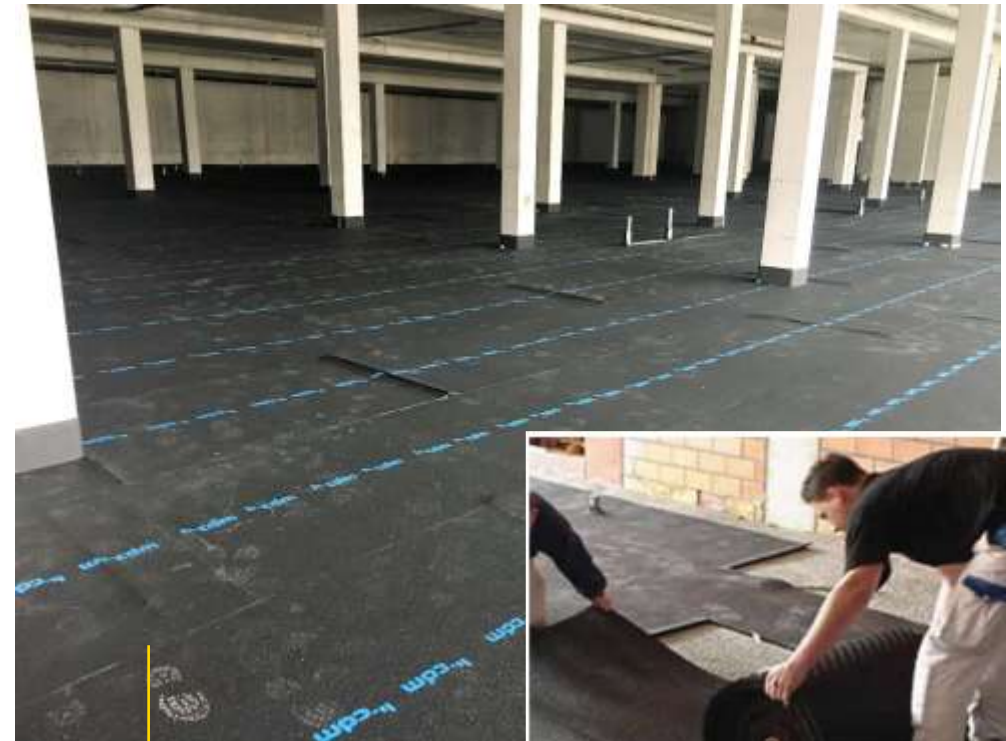
Floating floors isolation

STRAVIFLOOR MAT

Carefull installation of perimeter strip around all columns, pipes, ...



Fully covered by PE-foil

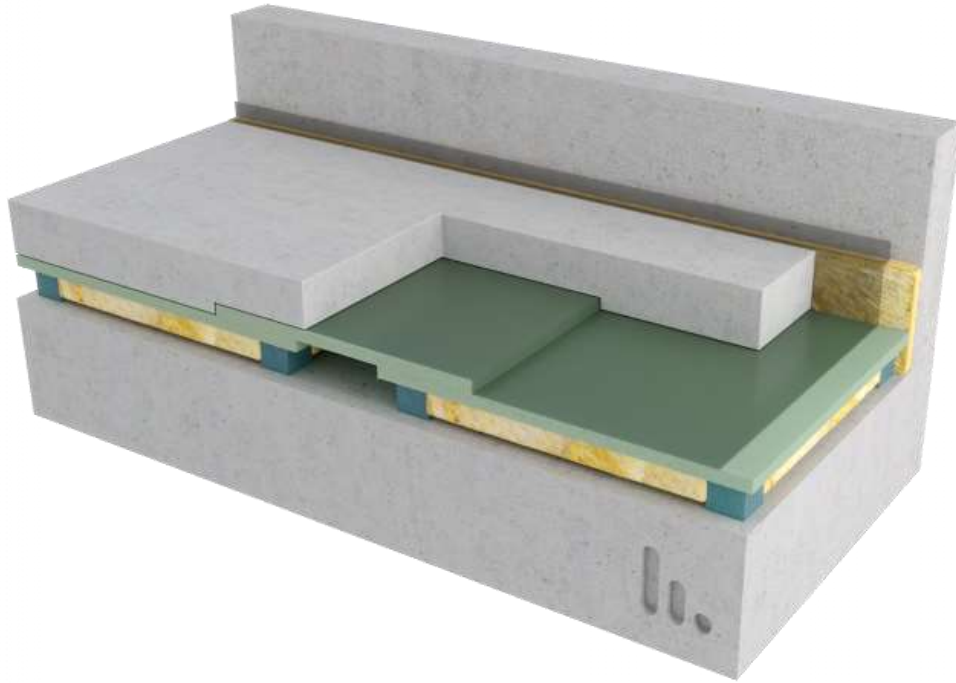


Installation with minimal gaps



Floating floors isolation

STRAVIFLOOR PREFAB

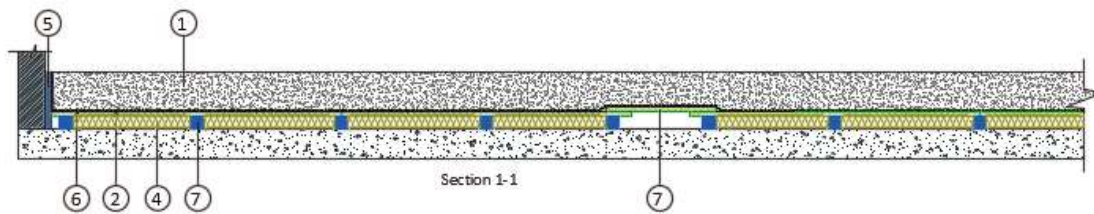
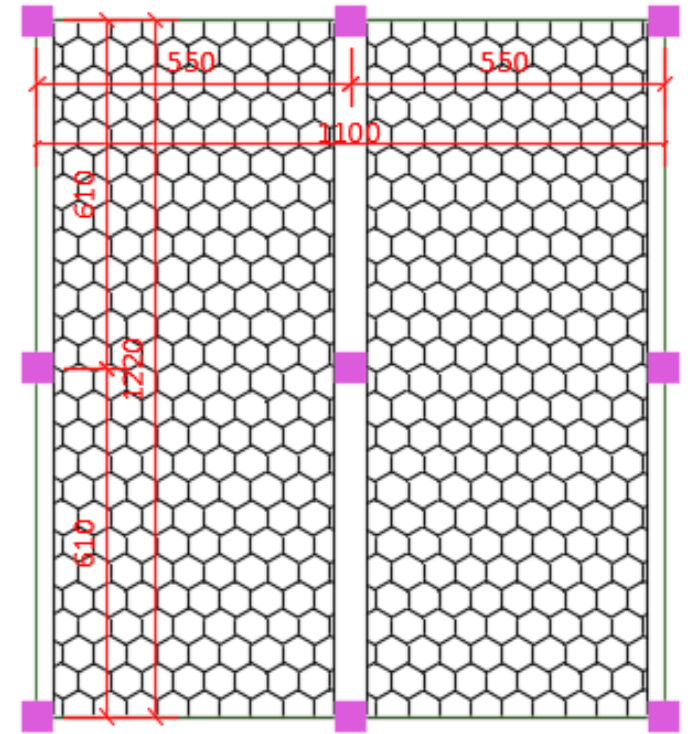
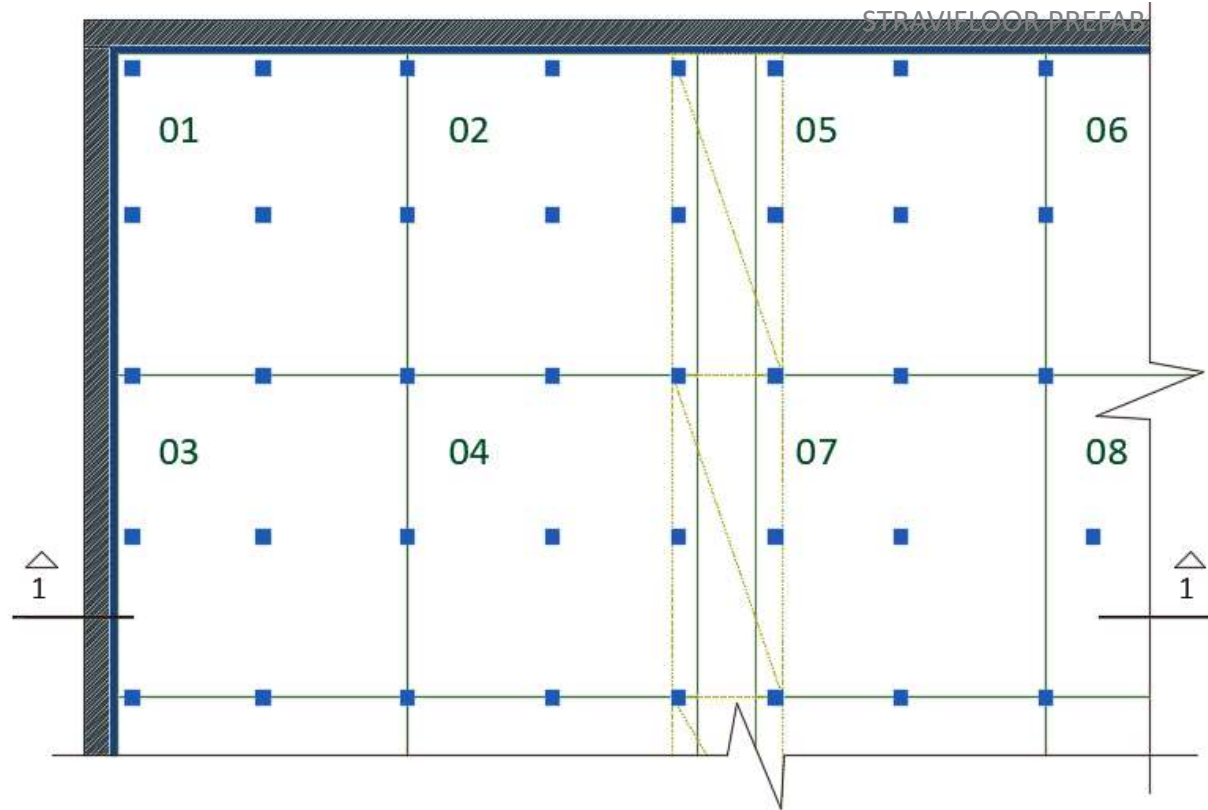


- For dry and wet floating floor constructions
- Elastomer bearings or springs
- Positioning of resilient elements conform load – extra point loads or line loads are no problem
- Sound absorption material fixed in the air void
- Installation drawings clearly show the location of the panels and the system is installed like a simple jigsaw puzzle
- Quick and easy to install

Features:

- High improvement of impact noise – even in low frequency ranges
- Very adaptable installation height
- Allows to install services in the void
- High performances:
 - $R_w > 75$ dB
 - $\Delta L_{nw} > 40$ dB

Floating floors isolation



Floating floors isolation

STRAVIFLOOR PREFAB

Car park and access tunnel



Installation from sides towards tolerance zone



Conical pads to create enough load bearing surface

Floating floors isolation

STRAVIFLOOR CHANNEL

- Available in different steel channel types
- Different grades and types of bearings depending to the loads and performance
- Features:
 - Pads can be changed to meet project specific natural frequency and damping requirements
 - Can be used for wet and dry floating floors
 - Can support a variety of formwork such as timber, metal decking or cement particle board
 - Can be supplied with project specific installation drawing



Floating floors isolation

STRAVIFLOOR CHANNEL

Box-in-box in concert hall and rehearsal room



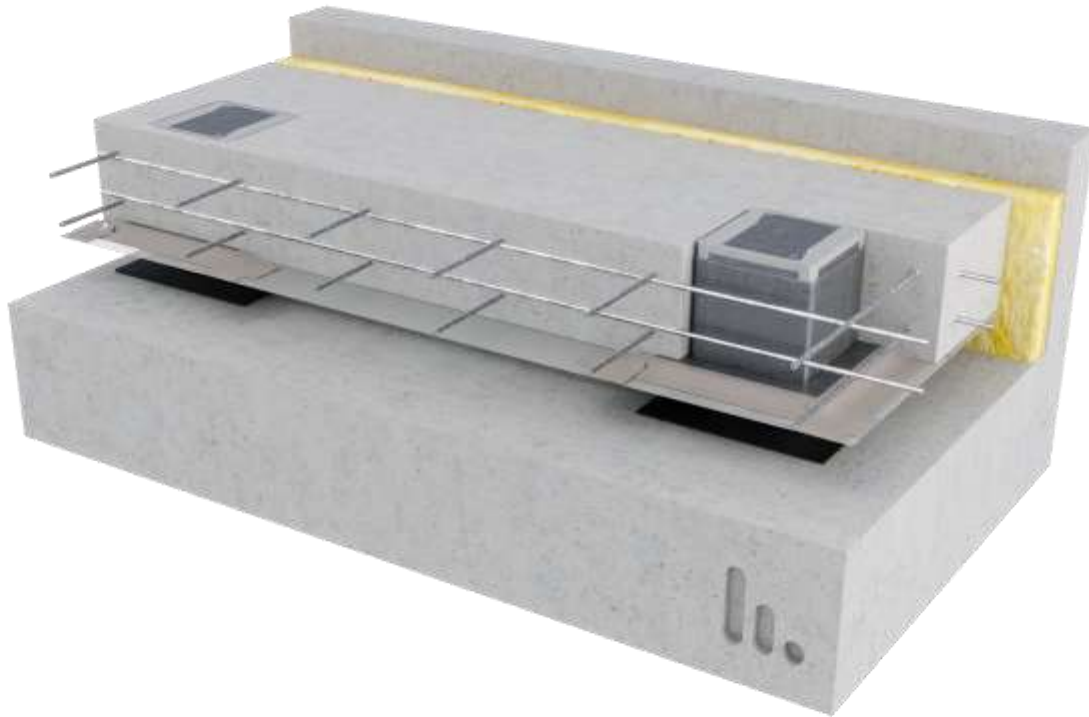
Resilient Channels



Lost formwork for floating slab
concreting

Floating floors isolation

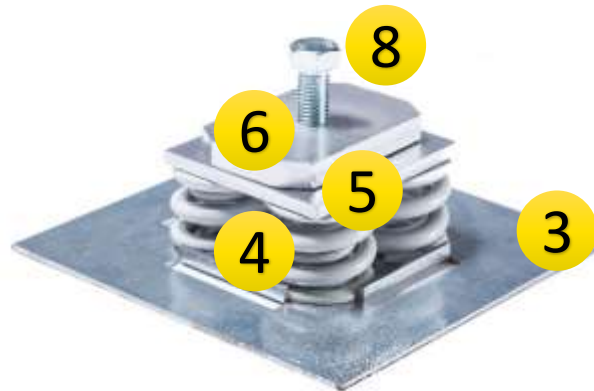
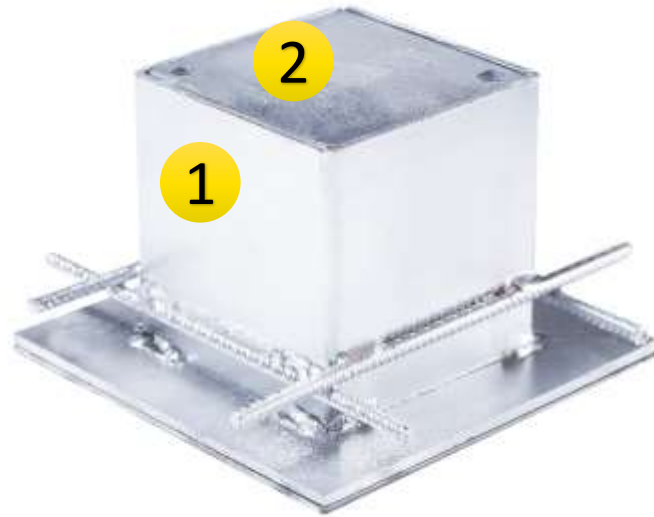
STRAVIFLOOR JACKUP-R



- Can be provided with elastomer bearings ($f_n < 10\text{Hz}$), or spring mounts ($f_n = 4.5\text{Hz}$ at design load)
- Isolators can be adapted per box to cope with different loads (surface/line/point) / fr
- Standard box heights of 100mm, 150mm and 200mm
- Jack-up heights from 20mm to 300mm possible
- Springs or elastomers are easily accessible after installation (replacement / inspection)
- All adjustments can be made without lowering the floor slab
- Excellent for contact noise isolation

Floating floors isolation

STRAVIFLOOR JACKUP-R



- 1 Jackup box
- 2 Cover plate
- 3 Bottom plate
- 4 Isolator = elastomer or spring
- 5 Spring plate or bearing cap
- 6 Adjustment plate
- 7 Bolt
- 8 Bolt

Floating floors isolation

STRAVIFLOOR JACKUP-R

Data center spring bearings with micro-seismic protection



Installation of perimeter isolation and lateral buffers



PE foil on structural slab + taped around boxes

Floating floors isolation

STRAVIFLOOR JACKUP-R

Data center spring bearings with micro-seismic protection



Reinforcement grid (double layer)
installed



Floating floor jacked up

Floating floors isolation

STRAVIFLOOR DECK



- For concrete, steel and wooden (WFC / CLT) base floors
- Elastomer or spring bearings
- Can be changed to meet project specifications (natural frequency, damping requirements, L_{nw} & R_w)
- High bending stiffness specifically for restricted build-up height / limited extra weight applications
- Very thin concrete floating slabs without extra reinforcement (min 45mm) since formwork and reinforcement are one

Floating floors isolation

STRAVIFLOOR DECK

BBC w1 studios technical boxes



Carefull shimming of each pad (by using CDM-71 pads)

Installation of metal angle profile to pour concrete



Installation of mineral wool to avoid standing waves in void

Floating floors isolation

STRAVI-DB DATA BASE

The screenshot displays the Stravi-DB website interface. On the left, there is a sidebar with a 'Welcome to Stravi-dB' message, a search bar, and filter options for 'SOLUTIONS' (Stravifloor Channel, Stravifloor Deck, Stravifloor Jackup-R, Stravifloor Mat, Stravifloor Mount) and 'FLOOR BUILD-UP' (Concrete, Wooden joists). The main content area shows two search results. The first result is for '2 layers of Stravifloor Mat-W17a with 90 mm (3-9/16") concrete'. It includes a cross-section diagram and an 'Acoustical results' table. The second result is for 'Lightweight Stravifloor Mount with 30 mm (1-3/16") bearings', also with a cross-section diagram and an 'Acoustical results' table. Both tables compare 'Base floor' and 'Solution' performance across metrics like $D_{n,w}(dB)$, RC , $R_w(1,125)$, STC , and $Max(12)$. A 'Notes' section at the bottom of the first table explains the measurement standards used.

2 layers of Stravifloor Mat-W17a with 90 mm (3-9/16") concrete

	Acoustical results				
	$D_{n,w}(dB)$	RC	$R_w(1,125)$	STC	$Max(12)$
Base floor	80 (-11)	28	/	/	31 (-12)
Solution	47 (1)	64	/	/	

Lightweight Stravifloor Mount with 30 mm (1-3/16") bearings

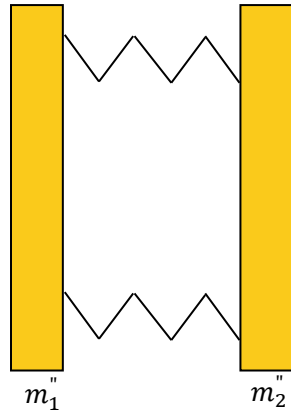
	Acoustical results				
	$D_{n,w}(dB)$	RC	$R_w(1,125)$	STC	$Max(12)$
Base floor	78 (-10)	27	54 (-2, -5)	54	35 (2)
Solution	43 (2)	62	67 (-4, -11)	69	

Notes: $D_{n,w}$ and R_w measured in accordance with ISO 10140-2:2010 and single figure ratings determined in accordance with ISO 717-2:1996. RC single figure rating determined in accordance with ASTM E997:1999 by CDM Stockler, based on ISO measurements.

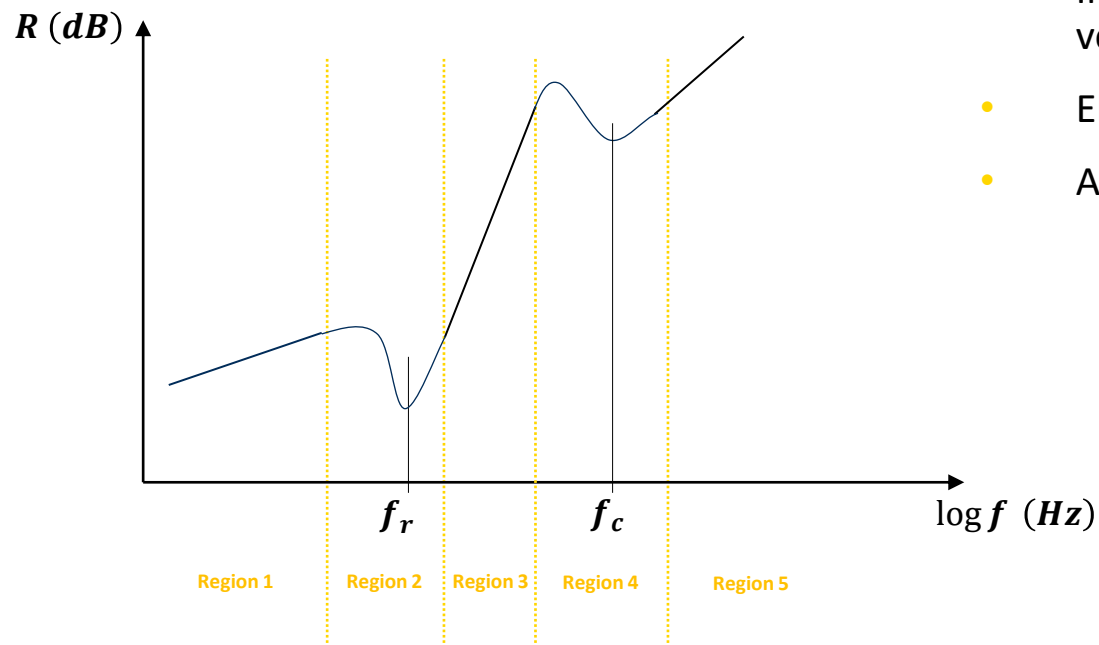
Sound Transmission Loss (TL) measured in accordance with ASTM E997-09 and STC single figure

Decoupled walls

PRINCIPLES



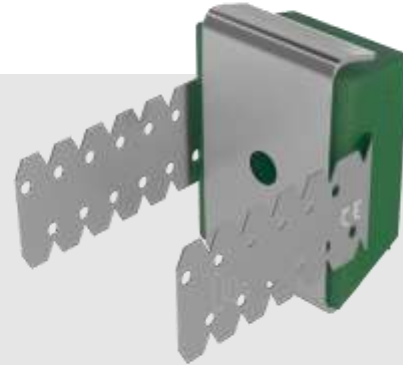
- Maximize the masses
- Maximize the air void
- Minimize connection stiffness
- Minimize contact surface of connectors to limit ΔR
- Use non-identical elements to spread coincidence effects
- Insert a porous absorption material into the air void to avoid standing waves in void. Cover at least 80% and make sure the porous material is not compressed
- Eliminate all possible rigid contacts (perimeter, pipes, columns)
- Avoid leakage





Stravilink QRC

Isolated ceiling system to isolate a standard ceiling channel



Stravilink QR

Resilient acoustic stud wall fixing to isolate dry wall constructions



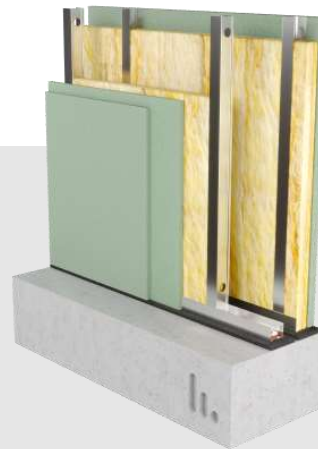
Stravilink QRW

Isolated wall system designed to isolate a standard wall channel



Stravilink RHD

Resilient head detail for the isolation of dry and wet walls



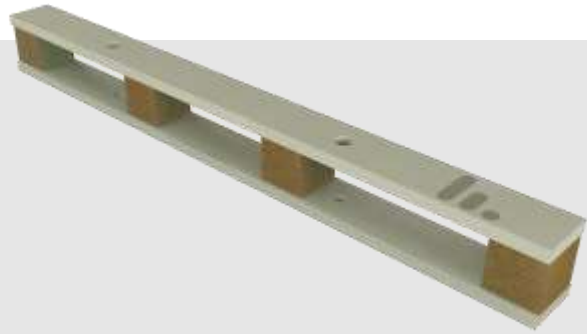
Stravilink WallFix

Stud partition base isolation system to isolate dry walls



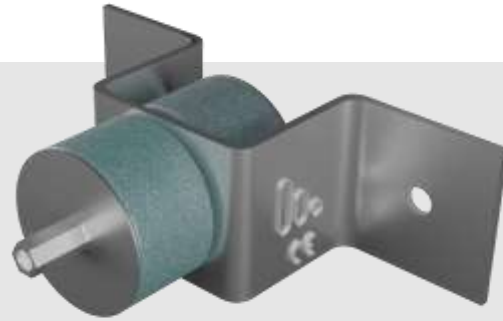
Stravilink WallStrip

Load bearing resilient strip to minimize flanking transmissions



Stravilink WallBatten

Resilient wall batten to isolate dry wall constructions



Stravilink WH

Resilient wall tie allowing walls to be mechanically tied together

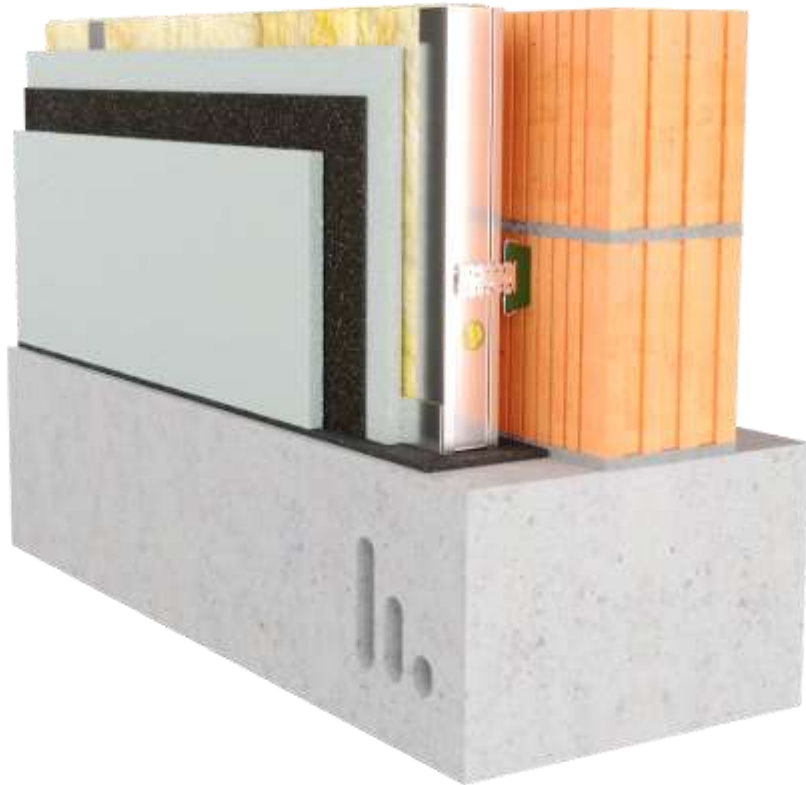


Stravilink WH3

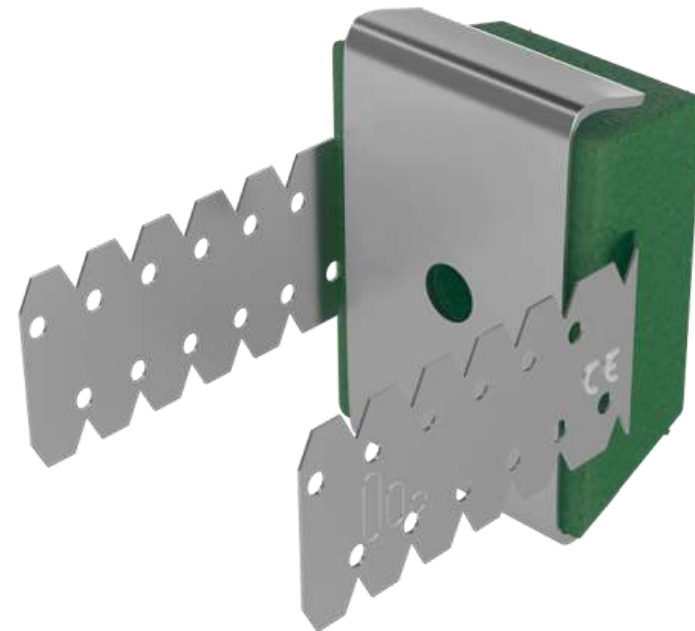
Resilient wall brace to isolate a wall from an adjacent support

Decoupled walls

STRAVILINK QR



- Quick & easy to install with / without independent frame
- For voids of 50 to 80mm
- Very low contact surface
- With built-in security against over-tension
- $R_w = 15$ to 25 dB for direct noise component



Decoupled walls

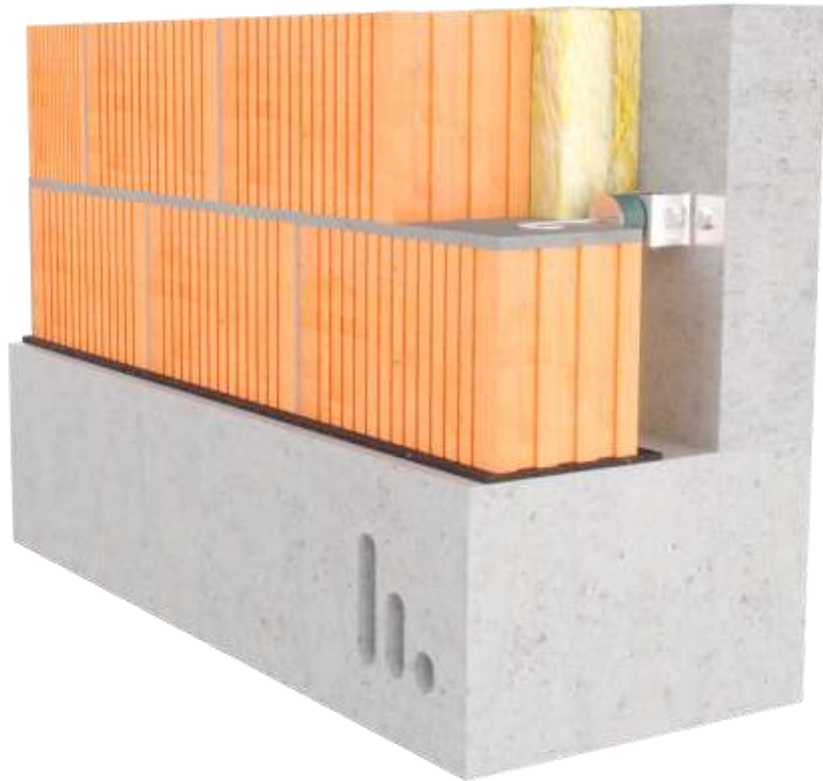
STRAVILINK WALLBATTEN

- Quick & easy to install without independent frame
- 2 standard thickness: 56mm and 96mm
- Very low contact surface
- $R_w = 15$ to 30dB for direct noise component

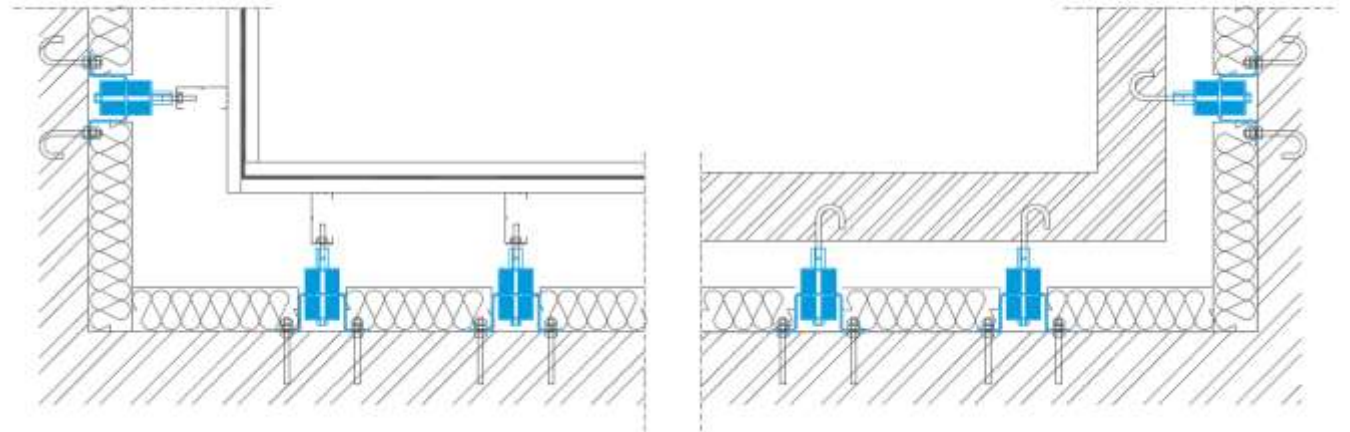


Decoupled walls

STRAVILINK WH



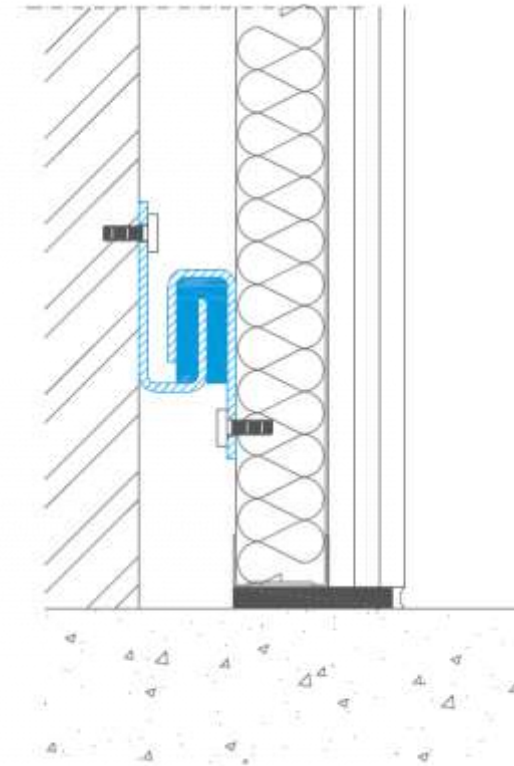
- Only for independent wall frames (to increase wall stability)
- Secondary wall can be dry or wet
- Adaptable void width, depending on the length of the M6 threaded rod / hook



Decoupled walls

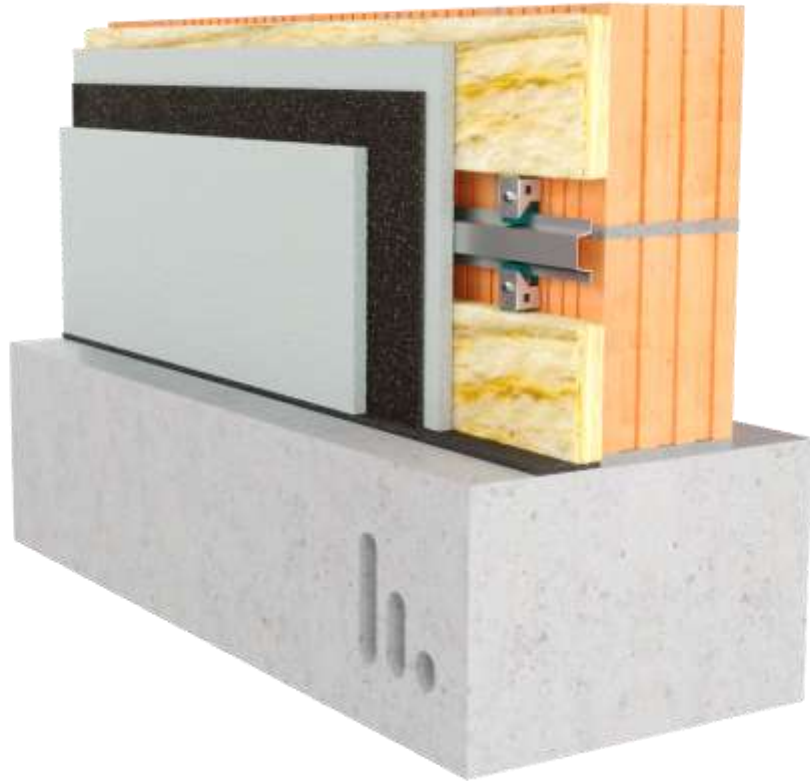
STRAVILINK WH3

- Only for independent wall frames (to increase wall stability)
- For fixed voids of 40mm

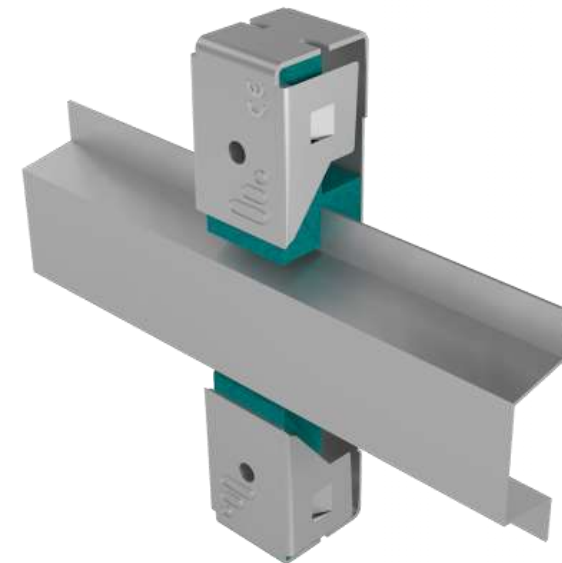


Decoupled walls

STRAVILINK QRW



- Without independent wall frame
- Primary wall can be dry or wet (secondary wall is always dry)
- Fixed void width of 30mm
- With built-in security against over-tension
- To be used with hat channel only

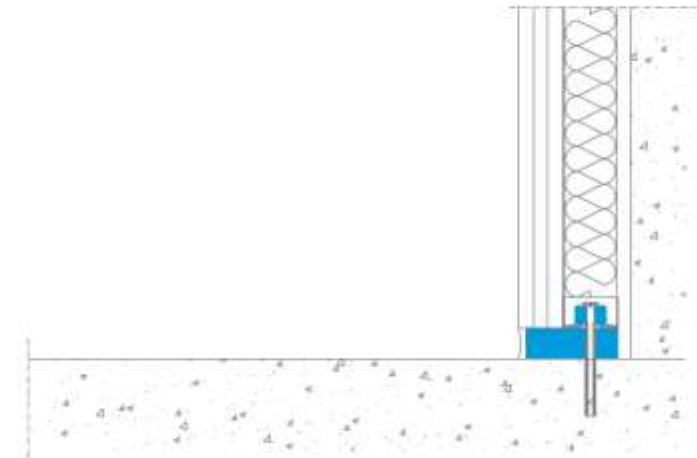


Decoupled walls

STRAVILINK WALL FIX



- Independent wall frame
- Adaptable void width
- Fixations to floor / side walls / ceilings (lateral and upper strips can be softer)
- Combinable with Stravilink QR, WH, WH3 in case of very high walls (for stability reasons)





Stravilink CC40 & CC60

Elastomeric acoustic suspension hangers for suspended ceilings



Stravilink PHR

Spring isolation hangers for suspended ceilings



Stravilink PHS

Elastomeric isolation hangers for suspended ceilings



Stravilink PHS-S

Elastomer acoustic suspension hangers for suspended ceilings



Stravilink PRJ

Spring isolation joist hangers for suspended ceilings



Stravilink PSJ

Elastomeric isolation joist hangers for suspended ceilings

Suspended ceilings

STRAVILINK CC



- 2 load standards: 150N and 350N
- 2 widths: 45mm (“CC40”) and 60mm (“CC60”)
- For direct fixation (extra pad needed) or with increased air gap
- No secondary profiles required
- Typically 2 per m²
- Natural frequency between 12 and 18Hz



Suspended ceilings

STRAVILINK PHS / PHR



- 4 load standards for pads (8 to 10Hz):
 - 150N / 500N / 1000N / 1500N
- 5 load standards for springs (4 to 5Hz):
 - 80N / 250N / 500N / 1000N / 2000N
- For heavy structures / typically when secondary profiles are used (reduced number of contacts)

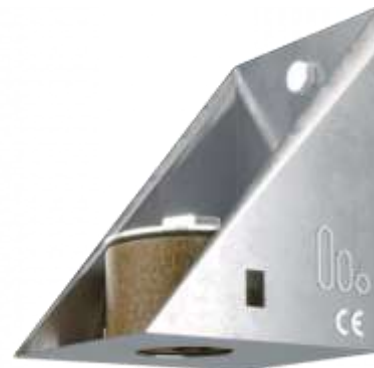


Suspended ceilings

STRAVILINK PHJ / PRJ



- 2 load standards for pads (12 to 18Hz):
 - Stravilink PSJ-150: 10-20 kg per hanger
 - Stravilink PSJ-350: 20-45 kg per hanger
- 3 load standards for springs (4 to 5Hz):
 - Stravilink PRJ-80: 5-10 kg per hanger
 - Stravilink PRJ-250: 10-35 kg per hanger
 - Stravilink PRJ-500: 25-60 kg per hanger
- For lateral fixation to joists in order to win space
- No secondary profiles required
- Ideal for renovations
-



Suspended ceilings

STRAVILINK QRC

- Fixed void width of 30mm
- With built-in security against over-tension
- To be used with hat channel only



Suspended ceilings

PERIMETER STRIP



Can be applied around floating floors, suspended ceilings and isolating party walls

Eliminates the risk of flanking transmission at the floor/wall/ceiling perimeter by completely isolating the hard surfaces

Long term performance

Standard width: 50mm, 100mm, 200mm

Width of the perimeter strip can be adapted to the project

Hotspots applications inside a building

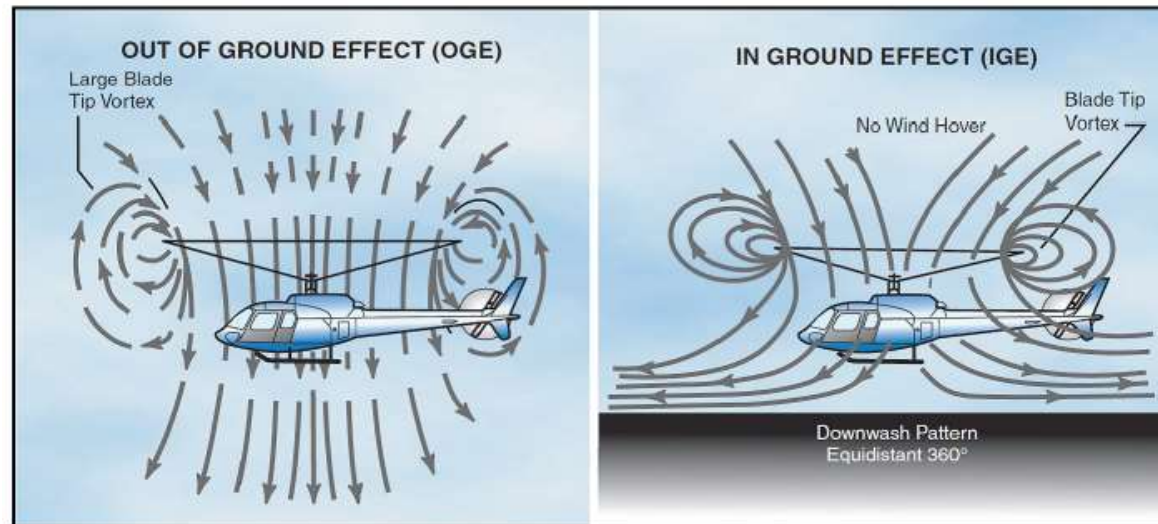


- Roof helipads – how to isolate?
- Rooftop pools – tested technology
- Sports and fitness floors – smart solutions
- Rolling noise - elevators
- FBT “frozen bearing technology”

Rooftop helipads

PRINCIPLES

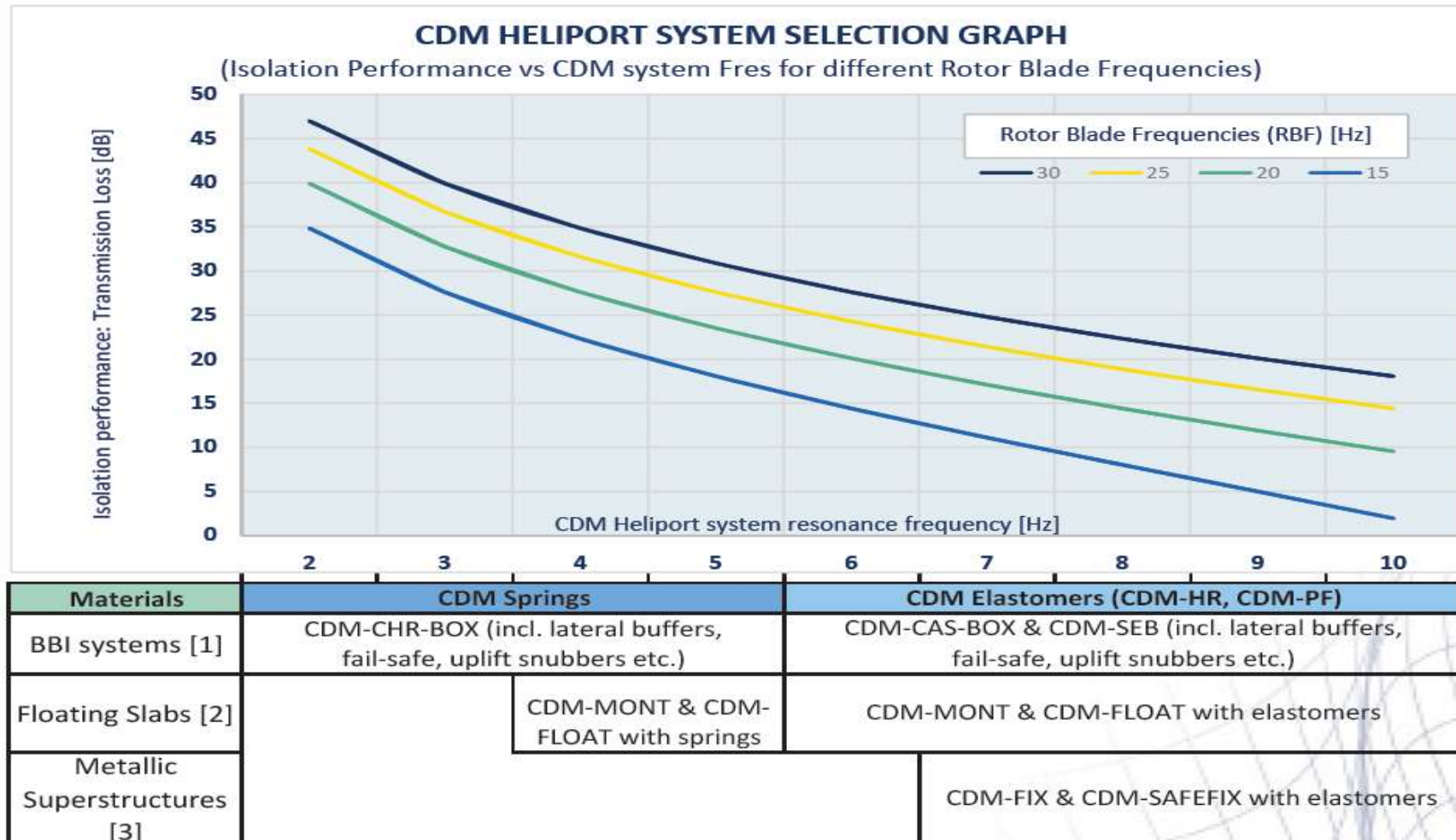
- In rooftop heliports during take-off and landing helicopters generate noise and downward pressure waves which are transmitted to the structure



- The vibration excitation is defined by the number of blades (n) and the frequency of the rotor (Ω).
- Additionally there are several harmonics ($2n\Omega$, ...) creating significant noise from the engine and exhaust sources.

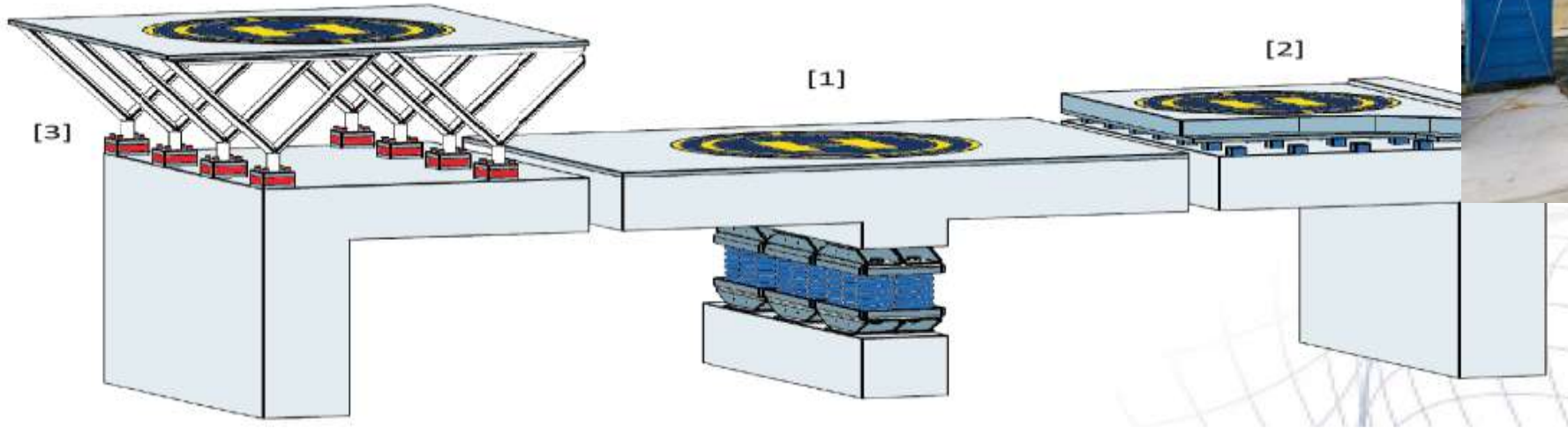
Rooftop helipads

ISOLATION SOLUTIONS



Rooftop helipads

CASE STUDIES



Maksoud Hotel - BR



Orléans Hospital - FR

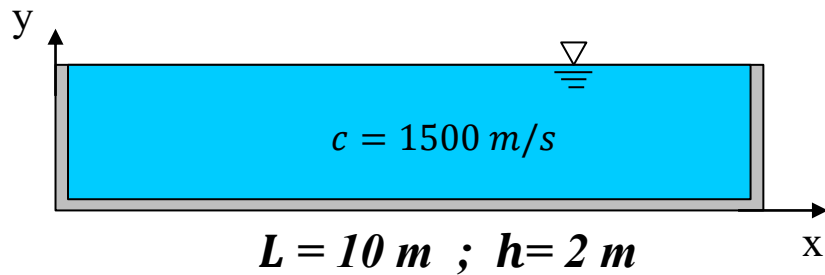


County hospital- HU



Rooftop pools

SLOSHING AND ACOUSTIC MODES



Modes	Sloshing resonance frequencies [Hz]	Acoustic resonance frequencies [Hz]
1	0.21	187.5
2	0.36	201.9
3	0.47	240.1
4	0.56	292.9
5	0.62	353.9
6	0.68	419.5

- The vibration coming from the sloshing water doesn't have enough energy to excite the structure
- The main radiated noise source is coming from the acoustic waves at medium to high frequencies
- Most pools should be designed to have good isolation above 100Hz although due to the structure vibration modes it is usually get peaks at 25 Hz

Rooftop pools

ISOLATION SOLUTIONS

Continuous Support Structure

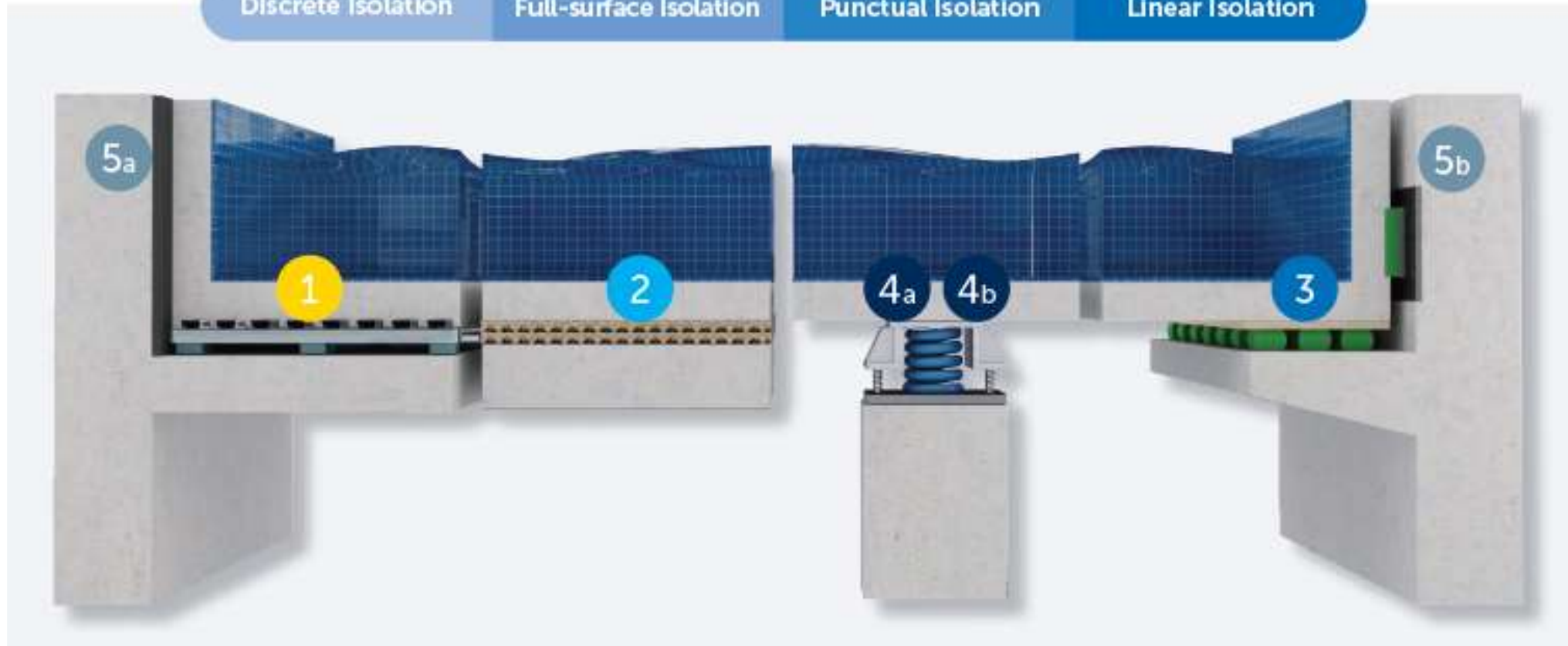
Discrete Support Structure

Discrete Isolation

Full-surface Isolation

Punctual Isolation

Linear Isolation



Rooftop pools

ISOLATION SOLUTIONS

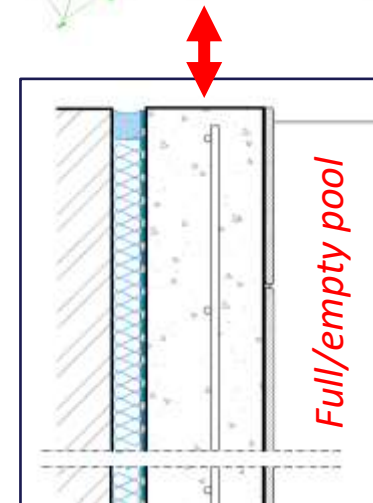
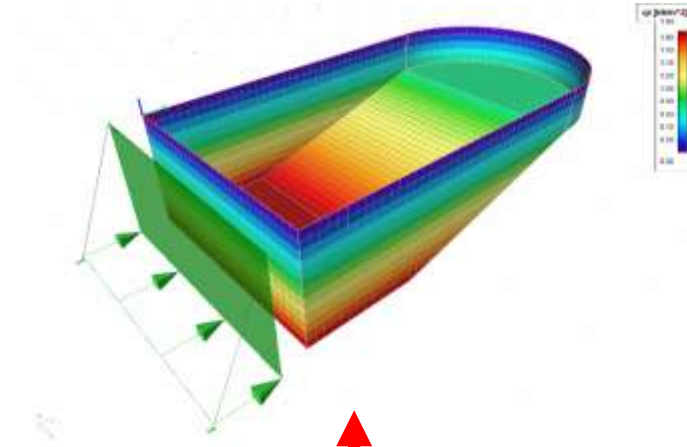


Rooftop pools

DESIGN CONSIDERATIONS

The isolation system must be designed:

- Imposed Loads
- Controlled deflections
- Functionality
- Compatibility



Sports and fitness floors

OVERVIEW

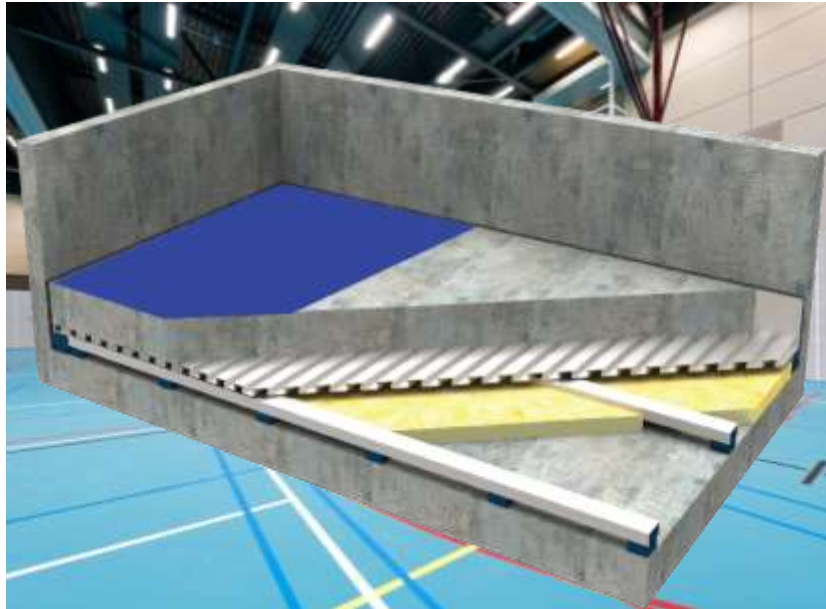
- Gyms and fitness facilities has increased dramatically often integrated into office, residential buildings, hotels, in order to make them as accessible as possible.
- Different types of activities as jumping (kangoo), ball sports, weights and running machines → all represent different types of excitation which require different approaches for a correct performance floating floor
- Unfortunately, ignorance is still too common, leaving gyms with no treatment and in big trouble if built within a sensitive environment.

The long list of enquiries to improve low-performing sports floors and the lack of specific standards and guidelines → CDM undertakes a depth R&D

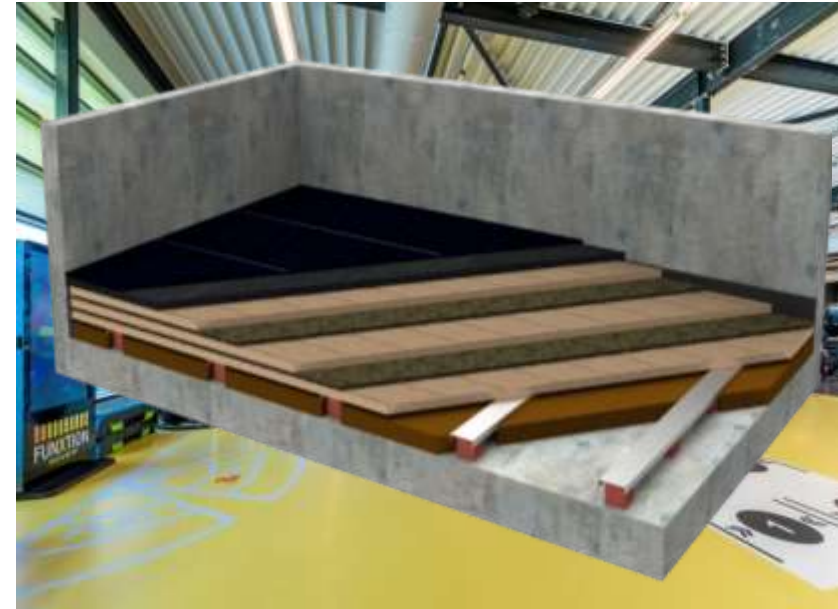


Sports and fitness floors

SOLUTIONS CONCEPT



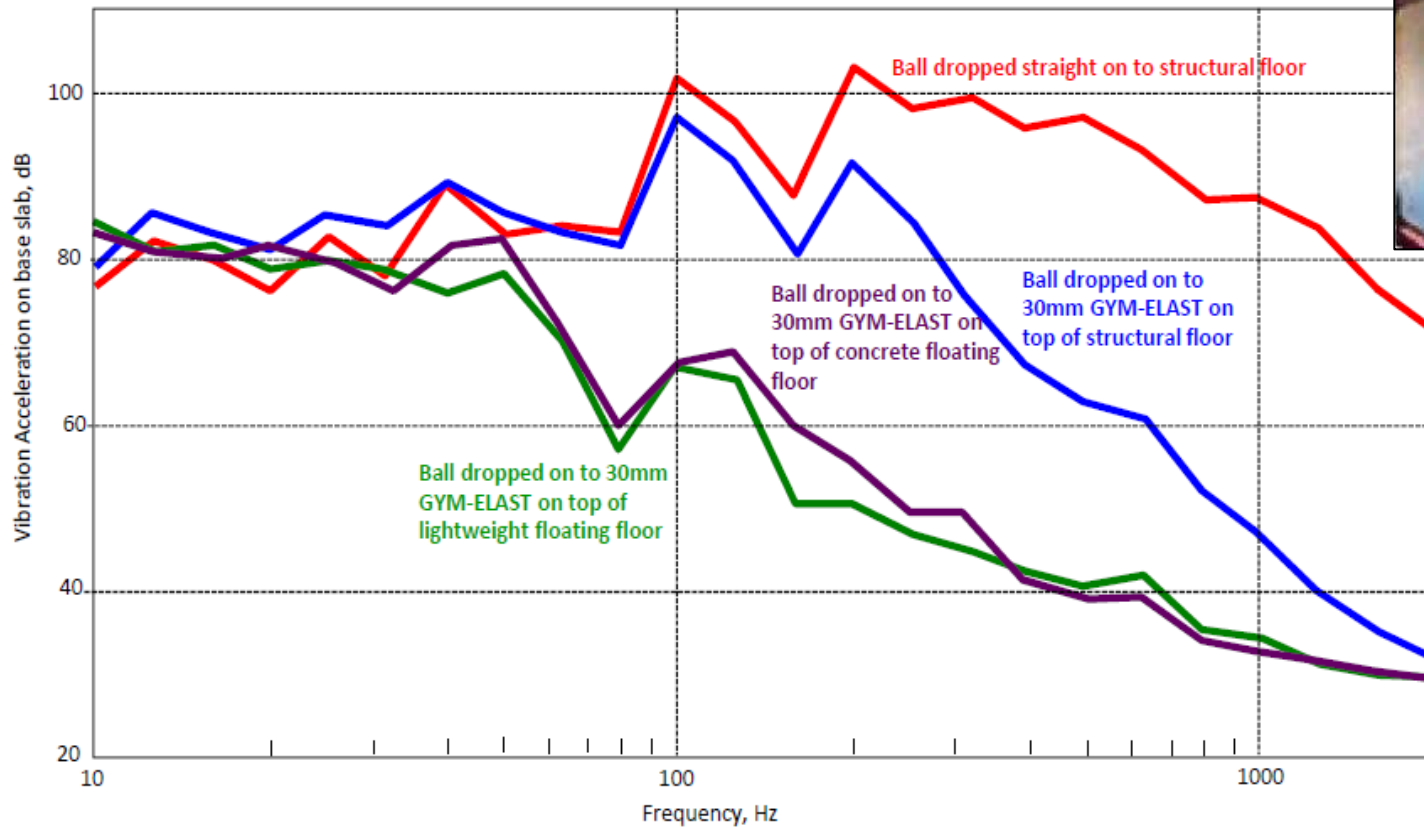
FF 'wet' systems
predominantly new build



FF 'dry' systems
predominantly refurb

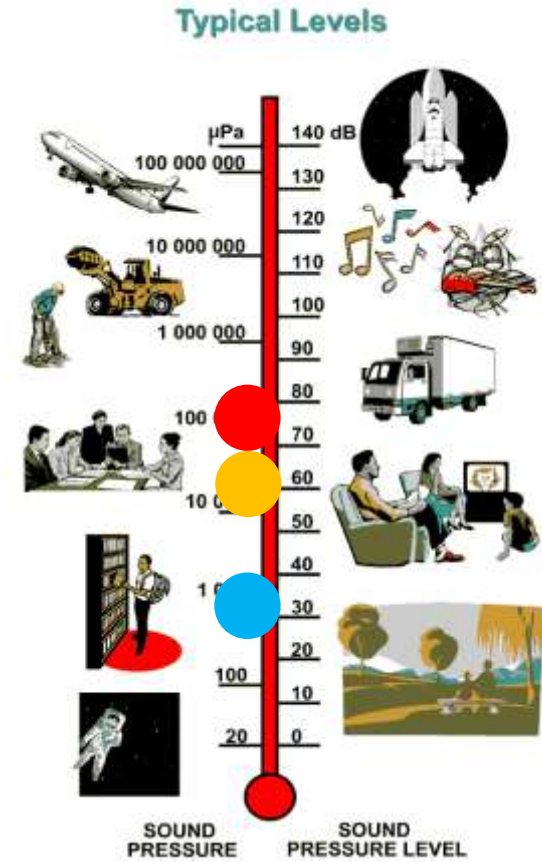
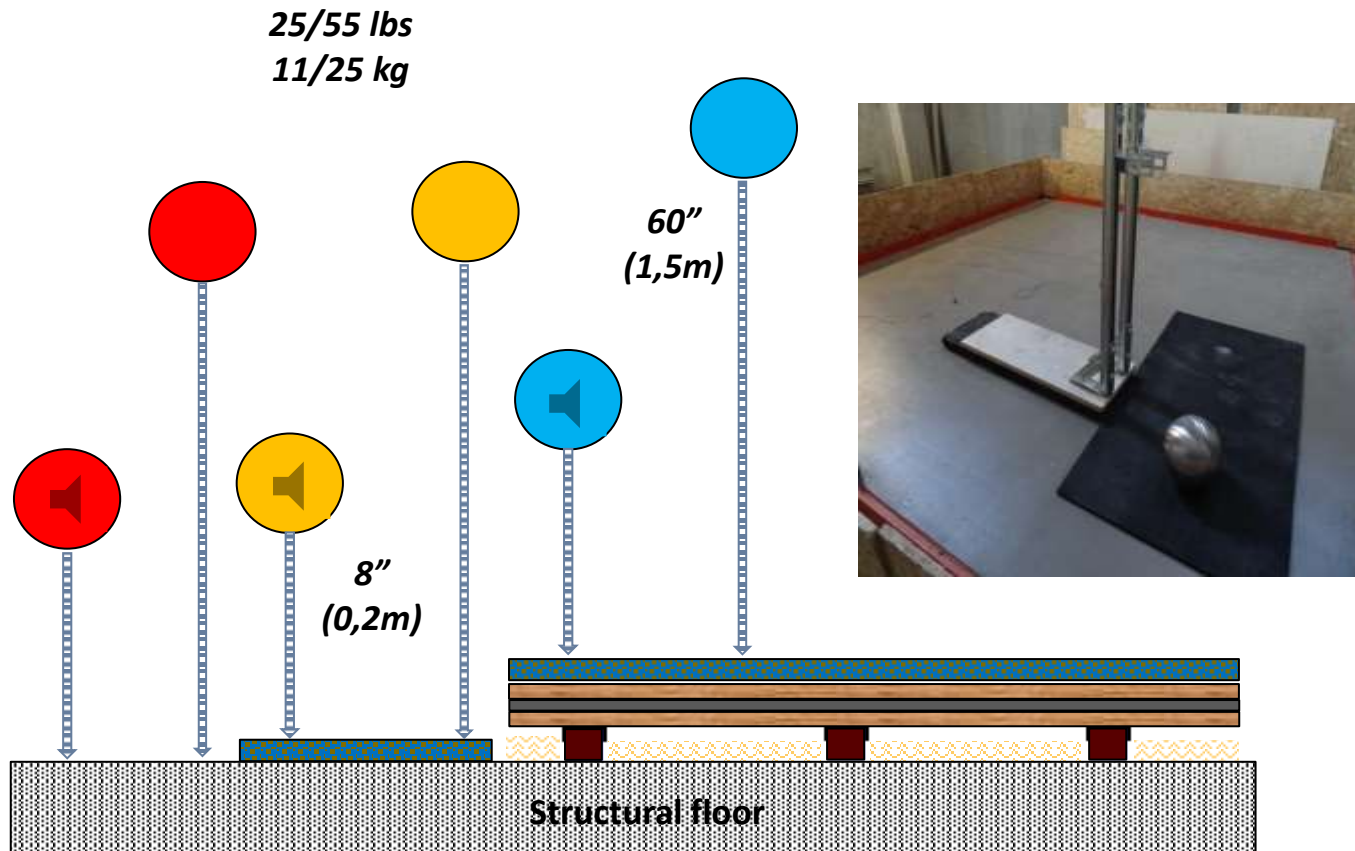
Sports and fitness floors

PERFORMANCE



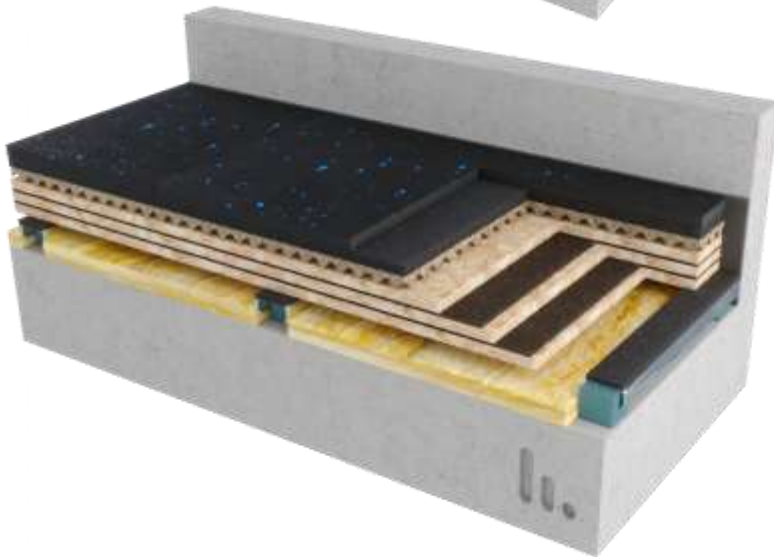
Sports and fitness floors

STRAVIGYM – PERFORMANCE



Sports and fitness floors

STRAVIGYM

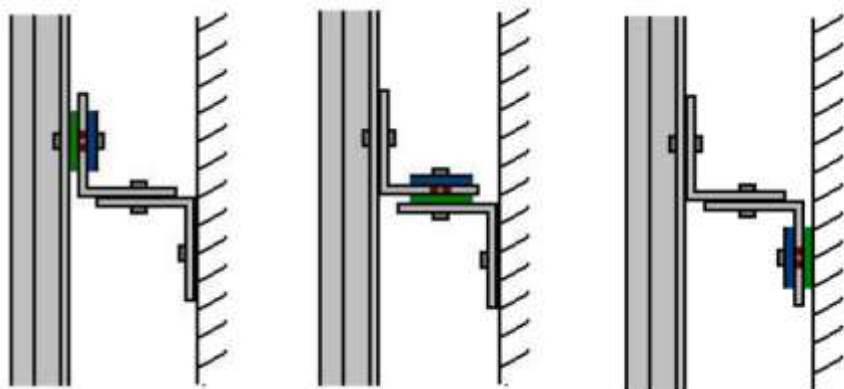


- Continuous support floating floor or discrete support floating floor
- Lightweight
- High performances with dry floating floors possible
- Installation depths ranging from 100 mm to 160 mm
- Quick and easy installation
- Compatible with all floor covering types, specially roll-out and seamless PUR systems
- Cost-effective high-performance solution
- If required can easily be dismantled and reinstalled at another venue

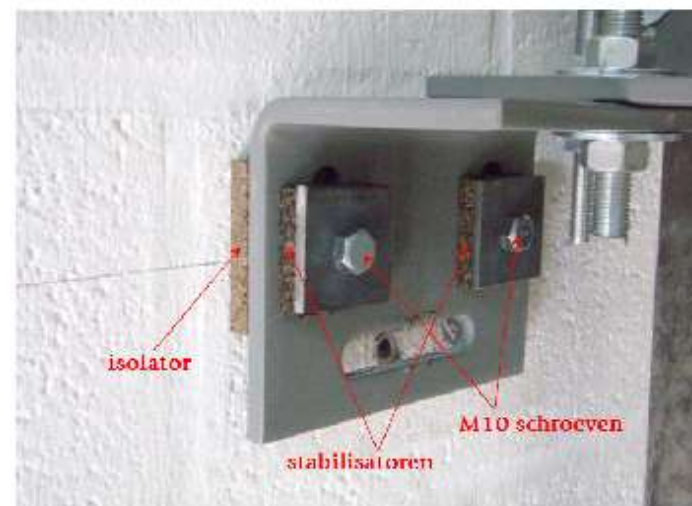
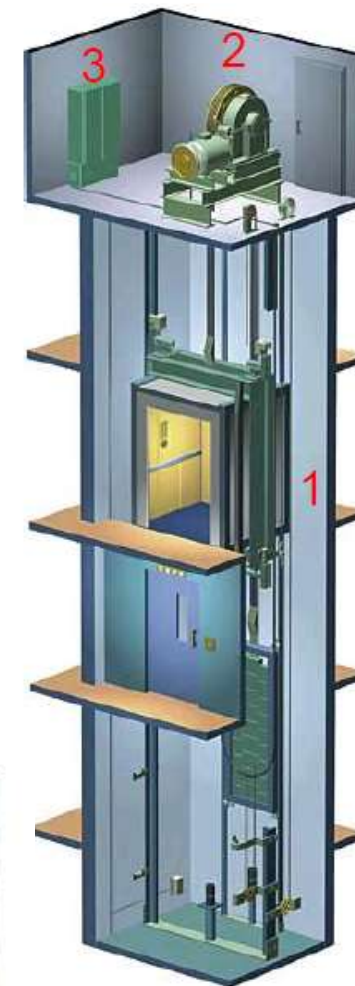
Elevators isolation

STRAVIMECH ELEVATOR FIX

- Guide rail decoupling



- Rolling noise of cabin / counterweight (1)
- Lift motor (2)
- Electrical closet (3)



Frozen bearing technology

FBT

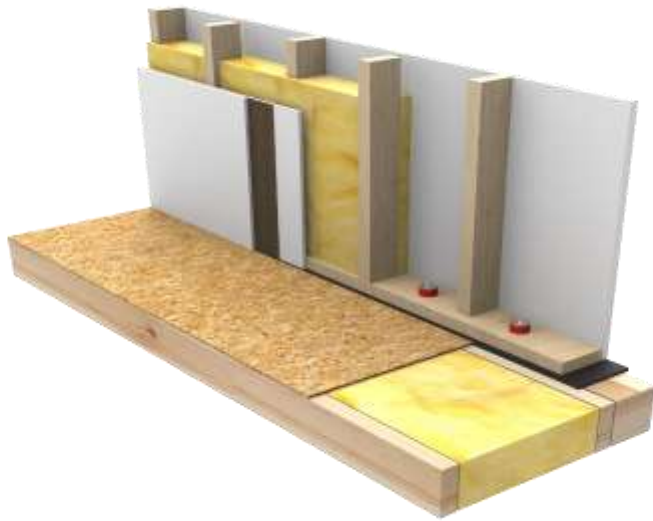
- CDM patented technology developed in 2009
- The bearing is compressed in factory until the defined thickness
- and is “conserved” in pre-compression state by freezing at -79°C ,
- The bearing is transported to the construction site in a coolbox
- is introduced into the “vibration cut”, where it will gradually take over the loads as its temperature reaches the ambient temperature.



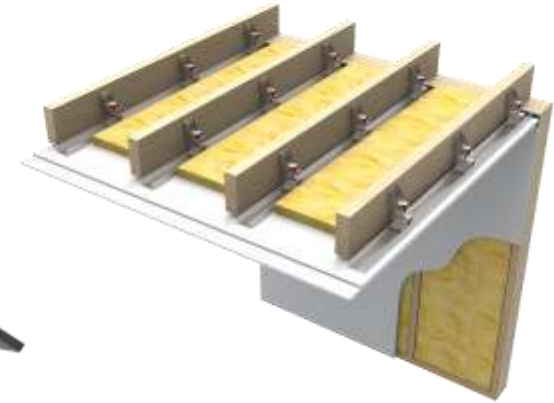
Timber construction

CLT /WCT

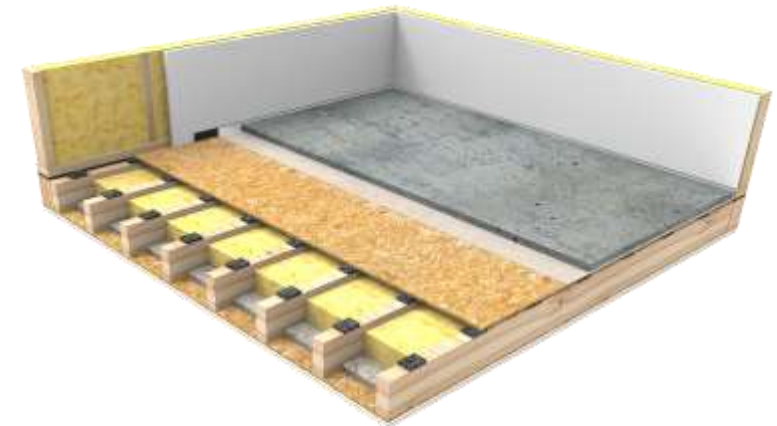
Wall decoupling system



Resilient suspended ceiling



Floor isolation system



21/10/2021

Thank You

cdm  **stravitec**

Making your world a quieter place