Increasing Value through
Elastic Shielding of Buildings

- Noise and vibration protection for buildings
- Higher quality living and working environments through elastic decoupling
- Increases market value of land and buildings

getzner
engineering a quiet future

1 Reliable Protection against Vibrations from External Sources

Motel One Wien-Prater, Vienna

Protecting buildings from vibrations

From opera houses in the midst of rumbling traffic to homes and offices alongside underground and tram lines, individual vibration solutions from Getzner provide buildings with a highly efficient form of decoupling and protect against disruptive shocks and vibrations. Solutions based on polyurethane materials developed by our own experts ensure peace reigns inside buildings, thereby improving the quality of life and providing a more civilised working environment.

Growing rates of urbanisation are resulting in ever more new buildings springing up on plots of land that are susceptible to vibration. The vibrations frequently emanate from nearby railway lines, roads or adjacent industrial complexes. Unless appropriate action is taken, these buildings are defenceless against the structure-borne noise generated in their immediate environments: unwanted and occasionally even unacceptably severe vibrations are the result. Secondary airborne noise levels also rise, as the vibrations excite elements such as the walls or ceilings. External factors such as these have an unfailingly adverse effect on the living and working environment inside the building.

Getzner Werkstoffe offers highly effective protection against shocks and vibrations. Our solutions boost the value of buildings and land. Successful projects, including the Central & Park Panorama Towers in Munich's Arnulfpark, serve to demonstrate that even buildings constructed immediately next to busy railway lines can meet the most stringent requirements.

Benefits of a Getzner vibration solution

- Proven protection against vibrations in buildings
- Reduction in sound radiation entering buildings from external sources (rail traffic, industrial complexes, roads)
- Higher quality of living and working environments through elastic decoupling
- Increase in market value of land and buildings
- Pioneering and lasting solution for maximum comfort

Picture left:
Central & Park Panorama Towers, Munich

2 The Challenge in Protecting against Shocks and Vibrations

A planner's task is not only to construct a building that complies with the relevant regulatory standards, but also to meet the particular requirements of the customer. The diverse range of parameters with a vibration isolation dimension have to be collated and implemented according to the defined goals and objectives. This is where Getzner comes in.

Recipient and source isolation

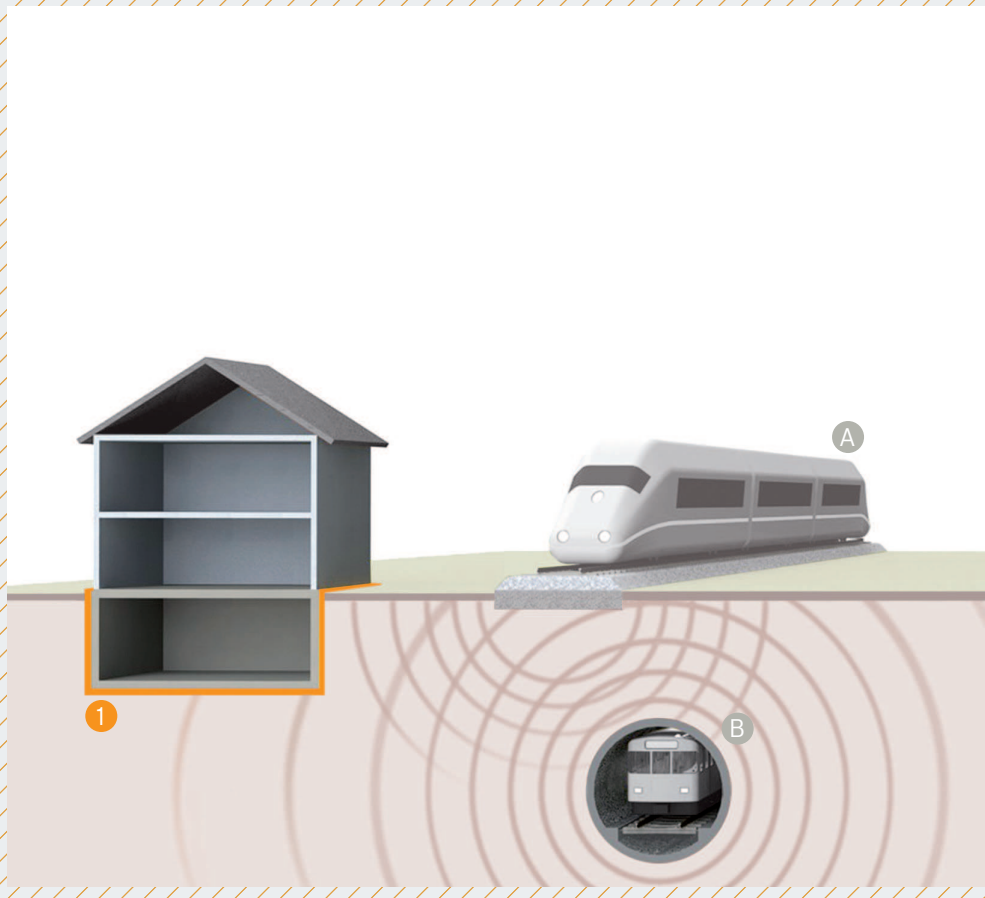
In the vibration engineering industry, a distinction is made between recipient isolation and source isolation.

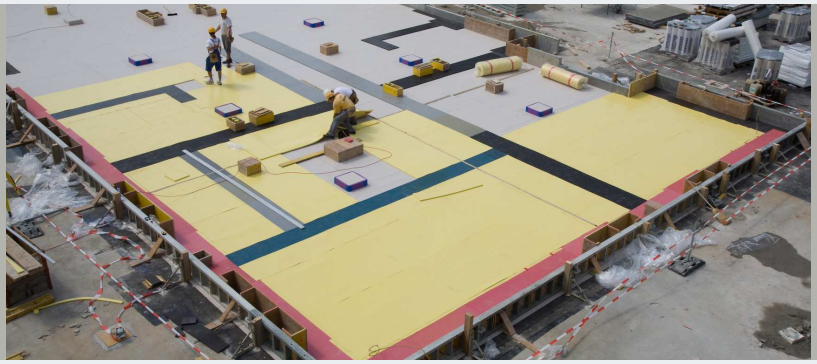
- Source isolation describes measures taken at the source of the vibration (i.e. railway lines, roads, industrial facilities). Examples include elastic measures implemented on the rail superstructure or decoupled machine foundations.

- Recipient isolation is a solution that decouples a structure from surrounding vibrations directly at the point where the impact is felt. This is where the elastic bedding of buildings is used.

Source isolation is generally the more efficient approach. However, as many projects involve sources that cannot be isolated retrospectively, Getzner offers effective yet affordable solutions for isolating the recipient against vibrations.

>> Involving experts early cuts costs. The best vibration protection is devised during the planning stage. <<





Drachen Centre Basle: Full-surface bearings for buildings

Anti-vibration measures for recipient

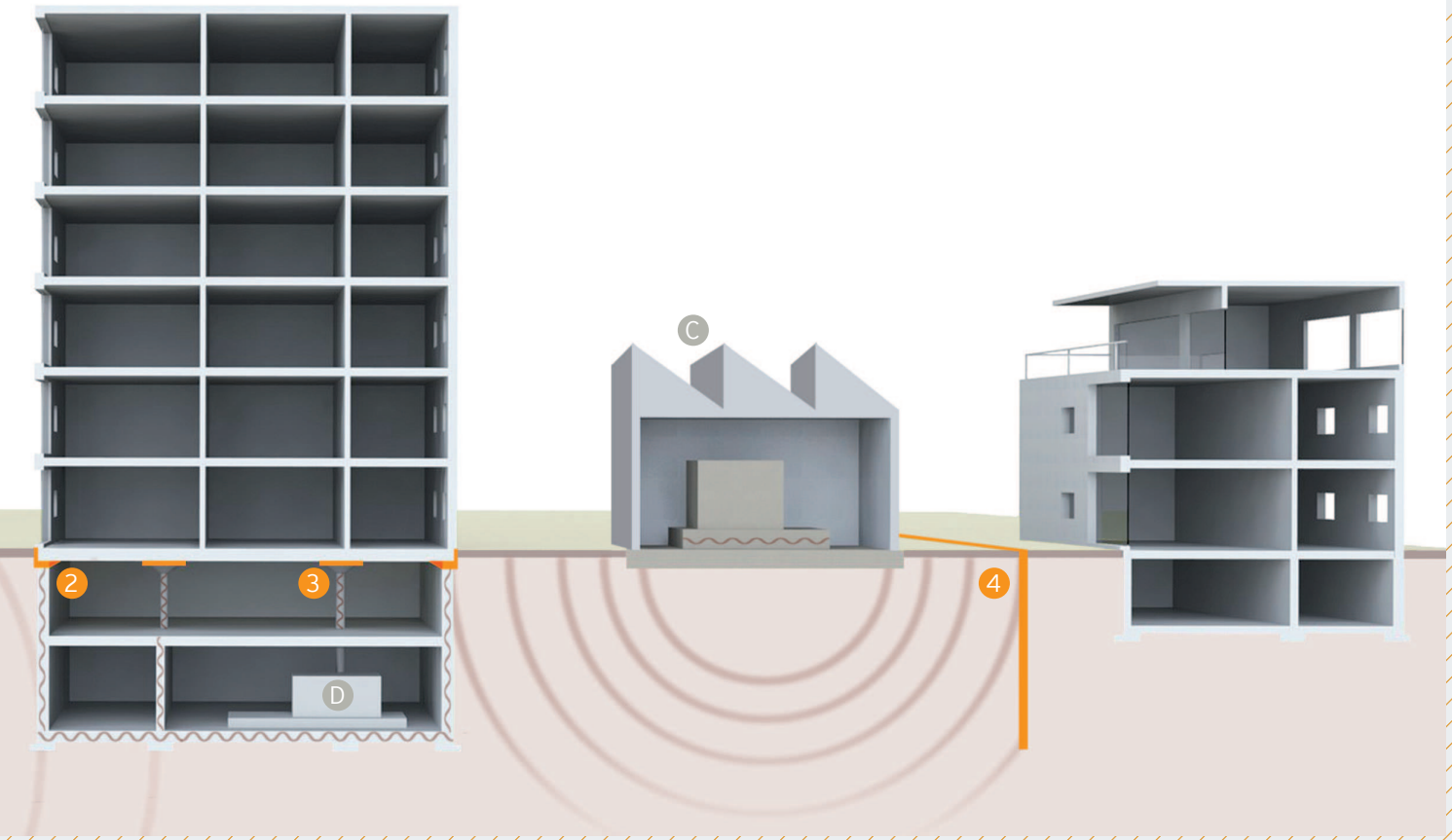
1. Full-surface bearings for buildings using side mats
2. Strip bearing of buildings or structures
3. Discrete bearing of buildings or structures
4. Slot wall between existing source and recipient

Sources

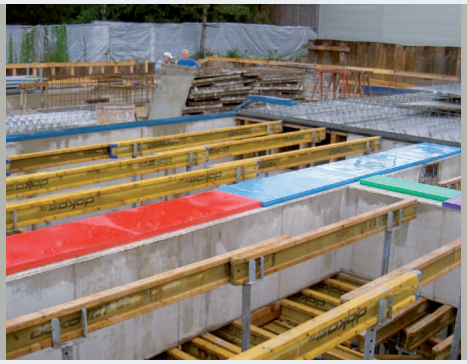
- A Rail traffic, light railways, trams, etc.
- B Underground rail traffic
- C Industrial complexes, machinery, etc.
- D Building service installations

Result

- Greater usage potential
- Greater comfort in the building
- Increases market value of buildings and land



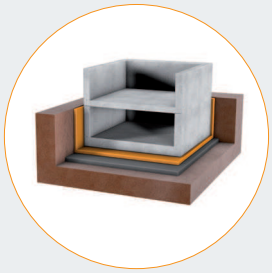
3 Measures



Appropriate measures for reducing vibrations

Getzner materials combine all the properties needed to provide effective elastic shielding of buildings.

With Sylomer® and Sylodyn®, planners have at their disposal technical elastic bearing materials that permit a variety of different designs.



Full-surface bearings for buildings

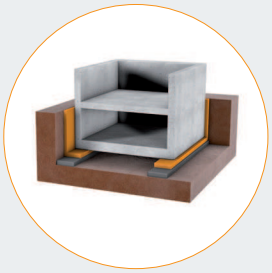
- Easy to shape and install
- Achieves lower natural frequencies
- Relatively little subsoil preparation
- No changes to the building design needed

Example: Central & Park Panorama Towers, Arnulfpark, Munich (DE):

Requirement: Protect a building constructed on a plot with pressurised groundwater from the vibrations caused by a busy light rail line

Solution:
- Anti-vibration layer between the binding layer and the building foundation
- Architectural measures to transfer loads to bearing strips or individual bearing points are not required

Result:
- Proven effectiveness, even in pressurised groundwater
- Limited structural vibrations in the foundation slabs due to the continuous support surface



Strip bearings for buildings

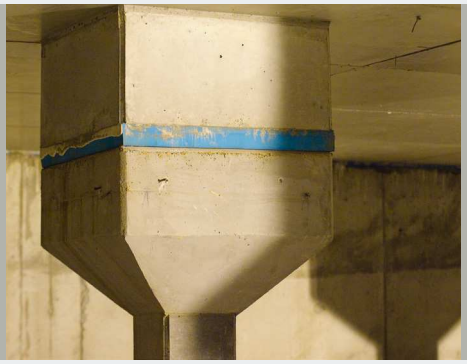
- Bearing on strip foundations
- Ability to implement vibration decoupling between the individual floors of a building
- Lower material costs
- Achieve very low natural frequencies

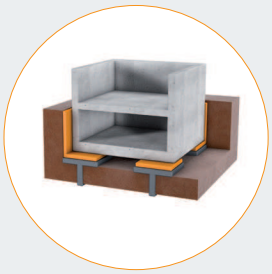
Example:
Linz Music Theatre (AT):

Requirement: Elastic shielding between the first and second basement levels

Solution:
- Decoupling through strip-shaped dividing planes on the wall elements
- Ceiling of first basement level directly mounted on elastic strips

Result:
- Cost-effective vibration protection
- Prevention of sound bridges
- Disruption-free use of decoupled premises





Point bearings for buildings

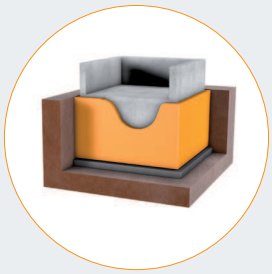
- Bearing on discrete foundations
- Elastic bearing in the case of discretely supported ceilings
- Provides vibration isolation of buildings on pile foundations
- Very low natural frequencies possible

Example:
Helsinki Music Centre (FI):

Requirement: Vibration isolation of broad-spanned ceilings on pillars

Solution:
- Discrete decoupling
- Use of HRB-HS to bear higher loads

Result:
- Building load is borne by individual discrete bearings
- Vibration isolation creates a quiet auditorium
- Cost-effective vibration protection



Side wall decoupling

- Side wall decoupling from the ground combined with full-surface, strip or discrete bearing
- Also suitable for shielding in groundwater
- Retrospective installation on existing buildings possible

Example:
The Touraine, New York (US):

Requirement: Vibration protection for a residential building in the immediate vicinity of three underground railway lines

Solution:
- Elastic shielding of the building's foundation
- Full-surface bearing for the foundation slabs and side walls right up to ground level

Result:
- Total decoupling from the vibration source
- Maximum living quality in the immediate vicinity of underground rail tunnels

Slot wall

- Vibrations are intercepted before impacting on the building
- Vibration protection implemented during renovation work

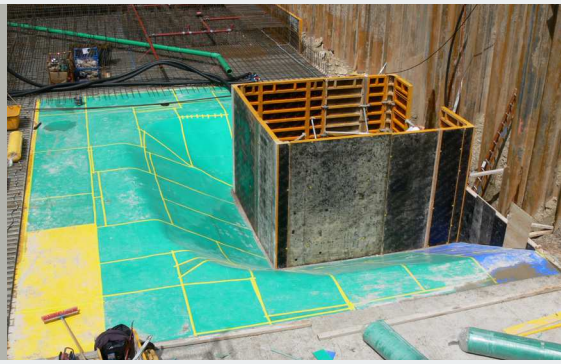
Example:
Paris Clichy Batignolles (FR):

Requirement: Vibration isolation of investment property to protect against vibrations from the adjacent railway lines

Solution:
- Installation of an elastic slot wall
- Consideration of the different soil parameters
- Special material selection due to the foundation pressure

Result:
- Vibration protection for neighbouring residential areas
- Higher property values of neighbouring plots and future constructions

4 Solutions and Materials from the Experts



Easy handling and a long service life

Sylomer® and Sylodyn®: Getzner materials are an everyday necessity in the rail, construction and industrial sectors. By drawing on this wealth of experience and never resting on our laurels, we constantly refine our materials to create ongoing improved solutions.

Sylodyn®- HRB-HS for the elastic bearing of high loads exemplifies the innovative zeal embodied by Getzner. Sylomer® and Sylodyn® combine all the properties needed to provide effective elastic shielding of buildings.

Constant and lasting isolating effect

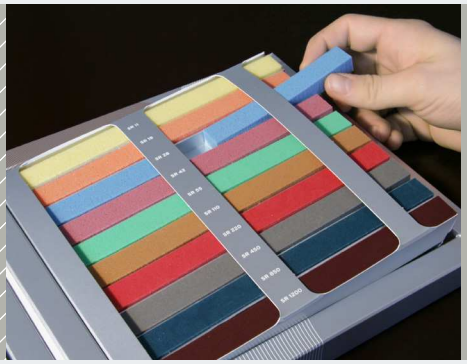
You do not need to just take our word for it that these materials provide exceptional long-term elastic properties: this has been proven in real-life case studies and through independent investigations carried out by external testing institutes. For example, from its work on the material Sylomer with railway applications, the TU München has concluded that a product lifetime of 100 years can be expacted in the field of bedding of buildings - without any deterioration in performance.

Water-resistance

Structures below groundwater level present a particular challenge to elastic materials. Polyurethane materials from Getzner are the perfect elastic decoupling solution, even for buildings in pressurised groundwater, something that has been demonstrated on reference projects.

Physical and chemical properties of Sylomer® and Sylodyn®

- High dynamic effectiveness
- Excellent long-term creep behaviour
- Low amplitude dependence
- Low frequency dependence
- Lightweight
- Flammability classification: Class E
- Chemical and oil-resistant
- High mechanical resistance (tensile strength, elongation at failure)
- Range of different materials with special stiffnesses for different load requirements



Broad range of product series

Flammability

The flammability of Sylomer® and Sylodyn® is classified according to EN 13501-1 as Class E.

Standards, approvals

The elastomers Sylomer® and Sylodyn® are universal products that deliver maximum isolating values and have proven themselves time and time again under a range of conditions in various applications. The following institutes have verified the effectiveness and suitability of Getzner materials:

- Arsenal Research, Vienna
- Fraunhofer Institute for Building Physics, Stuttgart
- Testing and Research Institute of Magistrate District 39 of the City of Vienna
- TÜV Rheinland, Institute for Environmental Protection, Cologne
- TU München, Prüfamt für Bau von Landverkehrswegen [Department of Inland Transport]
- Chinese Academy of Railway Sciences (CARS)

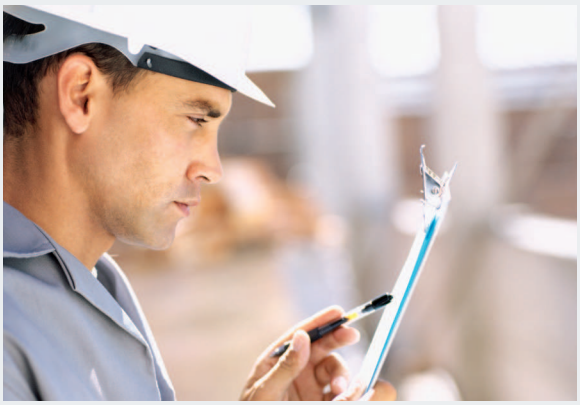
Economical product benefits

- Long service life
- Maintenance-free
- Simple integration into the construction process
- Easy to implement any type of elastic bearing

Getzner's manufacturing processes comply with certified quality management (ISO9001) and environmental management (ISO14001) systems. All physical and chemical properties of each product are presented in detailed data sheets.

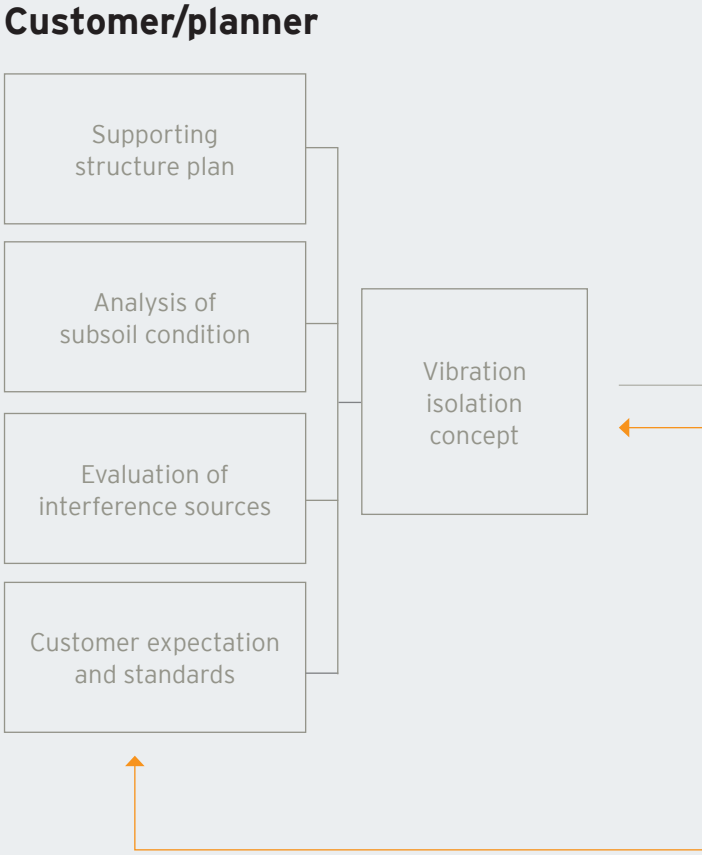
5 Specialist Services in the Field of Vibration Engineering

Getzner is happy to advise on all application matters. This includes testing and honing materials for special applications. Getzner's Bürs site is home to a range of specialist testing equipment and laboratories, which are constantly updated with the latest technology. Even universities take advantage of our high-tech infrastructure for their research needs.



>> Early consideration of the challenges posed by vibrations cuts costs. Additional expenditure on retrospective work is avoided. <<

Getzner vibration isolation solutions: a simple and cost-effective process



Professional consultancy

Efficient and prompt project management

6 Getzner Expertise

Getzner Headquarters Bürs, Austria

Developer, manufacturer and building consultant

Getzner brings added-value

- Maximum vibration protection
- Constant development of the material and product portfolio: a company infused with innovative zeal
- More than 40 years' experience in vibration engineering
- Tried and tested solutions as confirmed by countless references (see page 15)

Why Getzner?

Around 300 employees around the globe dedicated to providing effective solutions for isolating vibrations to improve living and working standards.

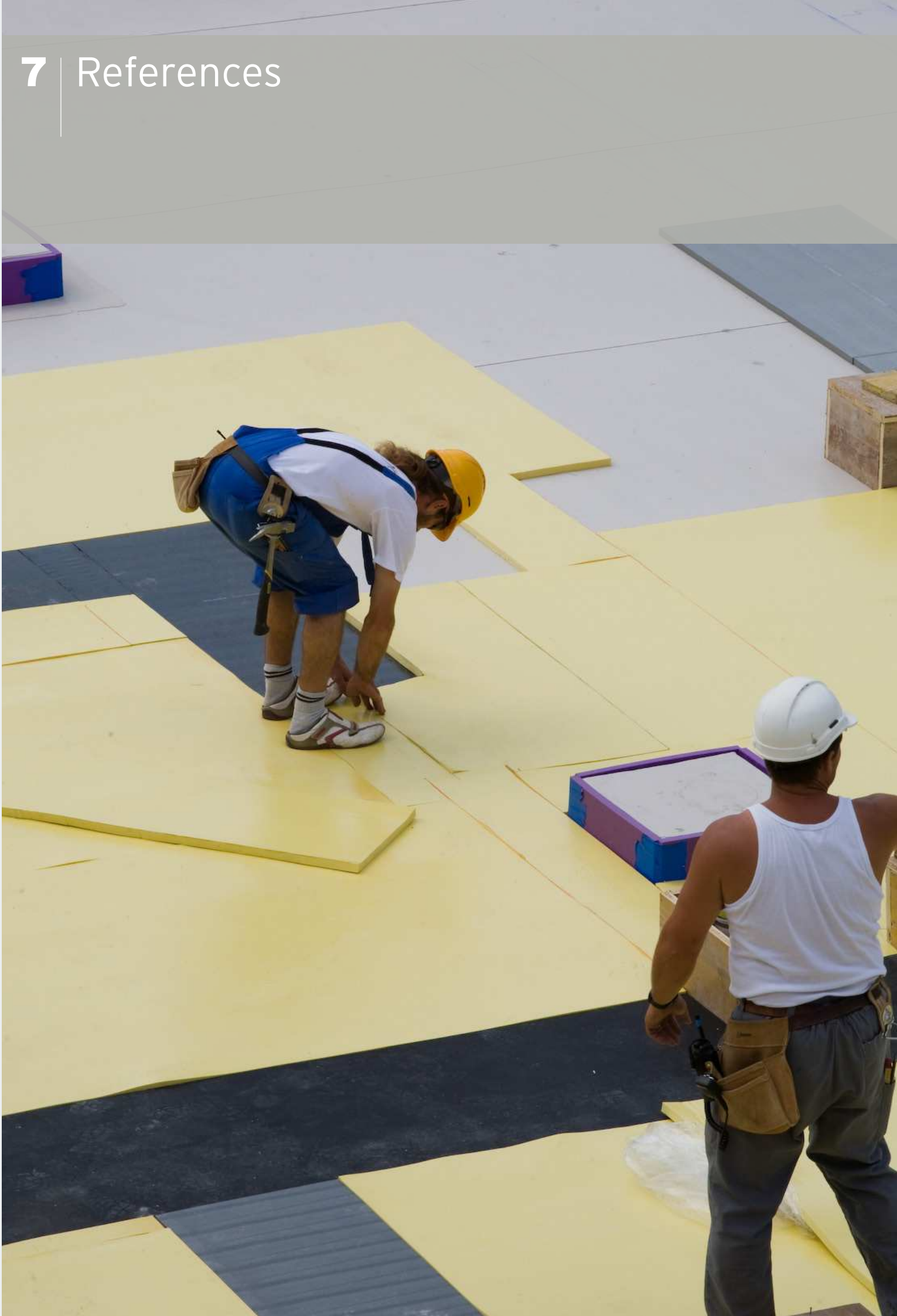
Specialised services from engineers

- Bespoke, project-specific solutions
- Professional consultation services from experienced specialists: expertise in building and civil engineering, chemical engineering, etc.
- Skilled, efficient project management
- Network of established professional planners and engineers from external agencies

Proven materials

- Clear advantage of high-tech polyurethane: impressive special properties, such as maintenance-free, constant and lasting isolating effect
- Polyurethane mats retain their properties over the long-term, even in harsh ambient conditions
- Material testing by renowned testing institutes stand testament to the quality

7 | References



Helsinki Music Center

“Four Suns” luxury residential complex, Moscow

References (extract)

- Motel One Wien-Prater, Vienna (AT)
- The Touraine luxury residential complex, New York (US)
- Central & Park Panorama Towers, Arnulfpark, Munich (DE)
- “Four Suns” luxury residential complex, Moscow (RU)
- Linz Music Theatre (AT)
- Paris Clichy Batignolles (FR)
- Welfenhöfe residential and office complex, Munich (DE)
- Chamber of Commerce Innovation Campus (HKIC), Hamburg (DE)
- The Rushmore Building residential and office complex, New York (US)
- Drachen Center, Basle (CH)
- Forum Museumsinsel Gropiusbau (Gropis Building, Museum Island), Berlin (DE)
- National Training Centre, Tokyo (JP)
- Kipfenberg water works, Denkendorf (DE)
- Friedrichstrasse hotel and office building, Berlin (DE)
- Kempten hydroelectric power plants, Kempten (DE)
- Rettenbach hydroelectric power plant, Sölden (AT)
- Skyline Vienna, Vienna (AT)
- Residential complex with underground car park, Oberschleißheim (DE)
- Hotel Melia project, Kirchberg (LU)
- Uhlandstraße hotel building, Berlin (DE)
- Hotel ibis, Munich (DE)
- Hotel am Potsdamer Platz, Berlin (DE)
- John Jay College, New York (US)
- Nursing home, Munich (DE)
- National Theatre of Catalonia, Barcelona (ES)
- BMW World, Munich (DE)
- Oslo Opera, Oslo (NO)
- Helsinki Music Center, Helsinki (FI)

The Touraine luxury residential complex, Manhattan NYC

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