

# Case Study

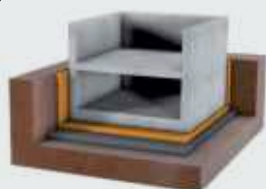
## Central & Park Panorama Towers Arnulfpark – Munich (DE)



» New residential development close to a busy rapid transit (light railway) line

» Implementation of an elastic building mount in heavy groundwater

» Proof of required effectiveness from in-situ measurements inside completed building



# Elastic Mounting of Buildings



Panorama Tower – economic and efficient vibration and sound insulation

## Project description

**Panorama Towers – a new residential development close to a busy rapid transit line**

The Arnulfpark development, a mix of residential and commercial properties, was constructed on the site of Munich's former container rail depot. In 2009, work began on the Central & Park project in the southern part of the Arnulfpark. This collection of buildings unites the two outer residential towers with the commercial development that lies between them.

The area is bordered to the south by the rail approaches to Munich central station, while an extremely busy stretch of Munich's rapid transit network has trains passing alongside about every 90 seconds. "We had to protect the residential properties from the effects of the rail traffic. However, the high water table in the area presented us with a major technical challenge. At nine metres below the surface, the base plate is permanently under four and a half metres of groundwater," explained Rainer Zindler, project manager at Getzner's Munich office, on the critical aspects of the contract. The vibration-insulating solution had to be able to cope with this particular situation.

## Getzner's solution

**Full surface building mount using permanently water-resistant materials**

The base plates of each 44 m high apartment block were placed on a Sylodyn® surface covering the entire area. To achieve optimum levels of vibration insulation, the side walls were elastically isolated from the surrounding environment – from the lower edge of the base plate to the top of the soil. Both Sylomer® and Sylodyn® were used, depending on the installation depth.

### Technical and economic arguments

"Getzner put forward an impressive array of cost-effective vibration and sound insulation measures geared precisely to the specific requirements of the project. Their solution was based on homogenous and weather-resistant materials and showed an attractive price-performance ratio," explained Ahmad Kamali from the IB Schmid engineering consultancy when asked about the main reasons for awarding Getzner the contract.

## Execution

Getzner vibration expertise was involved in the project right from the planning phase. To achieve optimum building isolation, the specific conditions on the ground had to be addressed right from the offset. Key factors included the required natural frequency of 16 Hz, the actual loads and the water table lying 4.5 metres below the surface. The vibration specialists at Getzner selected Sylomer® and Sylodyn® as the appropriate bearing materials and presented the client with fully-developed installation plans while still in the pre-project phase.

Alongside planning and delivery, Getzner was also awarded the contract to install and supervise the vibration solution. Getzner was able to call upon the services of the company constructing the building shell, R. Leitner, to complete the installation; ultimate responsibility for delivery and installation, however, remained with Getzner. In effect, Getzner was far more than just the developer and manufacturer of the vibration reduction materials. The company was also involved at all stages of the project, from consultation and calculation through to installation and final assessment. The warranty obligation and quality control duties lay with Getzner.



Professional building protection using Sylomer® and Sylodyn®



Site plan: Arnulfpark with Panorama Towers

## Feedback

### External inspection confirms effectiveness of vibration solution

After the closure of the project, the engineering company Möhler + Partner Ingenieure AG conducted a series of measurements on the largely completed property. The sound insulation specialists analysed effectiveness before concluding that the specified values were consistently met. Despite the influence of groundwater, the insulation delivered exceptional results. All the stipulated requirements were met and the fore-cast calculations proved to be totally accurate. "The scientific investigations into the foundations were conducted on the above ground levels used for residential occupancy. They showed a drastic reduction in vibrations and secondary airborne noise," summarised Hans Högg, noise insulation specialist at Möhler + Partner.

The result: despite the challenging site conditions, the professional building protection system using Sylomer® and Sylodyn® delivers excellent residential standards.

### The views of Möhler + Partner, consulting engineers

"The building complex is not only bordered by railway lines, some of it also stands in groundwater. Despite this challenging situation, the engineers at Getzner have developed a practical solution whose success has been demonstrated by our comparative test results. We were impressed by both the material and the outstanding technical performance."

Hans Högg  
Möhler + Partner Ingenieure AG  
Munich

### The views of Ahmad Kamali, IB Schmid consulting engineers

"A direct comparison between mounted and non-mounted structures is especially revealing in this project, as both are exposed to the same environmental influences. The test results illustrate strikingly how dramatically an elastic mounting can reduce the vibration effects on a building."

Ahmad Kamali  
IB Schmid  
Ges. für Projektsteuerung und Bauüberwachung m.b.H.

The isolated base plates are permanently submerged in 4.5 metres of groundwater





The main rapid transit line runs immediately next to the Panorama Towers

## Facts and figures at a glance

### Elastic mounting of the Central & Park Panorama Towers in the Arnulfpark development

Building complex:	Two 12-storey residential buildings (44 m high)
Location:	Central & Park, Arnulfpark, Munich
Vibration insulation:	Getzner Werkstoffe GmbH
Solution:	Full surface building mount with Sylodyn®; Isolation of the south, west and east-facing side walls using Sylodyn®, between depths of -9 m and -4.5 m and Sylomer® between -4.5 m and the top of the soil
Use of material:	2,210 m <sup>2</sup> Ground area, 1,675 m <sup>2</sup> side mats
Getzner's involvement:	June 2009 to December 2010
Client:	Arnulfpark Wohnbau GmbH & Co. KG
Investor:	alpha invest Projekt GmbH
Building mount installer:	R. Leitner GmbH & Co. Bauunternehmung KG

### Getzner Werkstoffe GmbH

Foundation:	1969 (as a subsidiary of Getzner, Mutter & Cie)
Chief Executive Officer:	Ing. Jürgen Rainalter
Employees:	340
2015 turnover:	EUR 77.9 million
Business areas:	Railway, construction, industry
Headquarter:	Bürs (AT)
Locations:	Berlin (DE), Munich (DE), Stuttgart (DE), Lyon (FR), Amman (JO), Tokyo (JP), Pune (IN), Beijing (CN), Kunshan (CN), Charlotte (US)
Ratio of exports:	85 %

### References (Extract)

- The Touraine - luxury residential complex, New York (US)
- The Rushmore Building, New York (US)
- "Four Suns" luxury residential complex, Moscow (RU)
- Welfenhöfe, Munich (DE)
- Drachen-Center, Basel (CH)
- Teatro Nacional de Catalunya, Barcelona (ES)
- BMW World, Munich (DE)
- National Training Centre, Tokyo (JP)
- Oslo Opera, Oslo (NO)
- Bolshoi Theatre, Moscow (RU)
- Skyline Vienna, Vienna (AT)

