

## Piano House & Carpathia Office House, Warsaw, Poland

Modern new buildings protected against vibrations from adjacent underground

Prestigious land plots in central Warsaw are in high demand, but their location also makes them accordingly expensive. Additional problems for the otherwise ideal locations are created by vibrations caused by underground trains. However, vibration isolation products from BSW enabled two high quality building complexes with vibration protection to be completed between 2012 and 2014.

### Piano House

With 68 rooms ranging in size from 30 to 250 m<sup>2</sup> over five storeys, Piano House is an imposing sight. It is not only the size, but also the selected construction materials of granite, quartz and onyx that give the building its impressive appearance. The luxury apartments offer the highest level of comfort, but this comfort is at risk from the local underground line of the Warsaw Metro. This is because the subterranean railway lines cause disrupting vibrations which have an adverse effect on people and on the building structure. To prevent these negative effects, Polish construction company IDS-Bud s.a. installed **Regupol®** elastomers for the vibration isolation of the vertical and horizontal building bearings.

### Carpathia

Piano House directly faces Carpathia Office House across an intersection. The state-of-the-art complex was built in the last few years. From a total rental area of 3,700 m<sup>2</sup>, office premises from 150 m<sup>2</sup> can be rented. The main features of the new building are the high quality interior and the easy access to public transport, including the underground. However, the building structure is located only about three metres away from the train tracks which would have created similar adverse effects as on Piano House. The fact that the underground line was under construction during the planning phase of the building presented a particular challenge. The planning committee generally uses measurements to decide which product solutions for vibration isolation have to be used. In this specific case, data-based computer models were generated and then vibration simulations were carried out to record the expected resulting vibrations. These were then used as a basis to propose the technically fit-for-purpose **Regupol®** products.



### Planning, concept and installation

The immediate proximity of the building foundations to the tunnel of the underground line and the resulting adverse effects made a vibration isolation solution imperative. For this reason, the planners decided to commission BSW to design a vibration isolation solution. This solution specified the installation of an isolation layer directly on the concrete foundation, underneath the rising building parts. This prevents vibrations from being transferred through the building structure and being perceived as actual vibrations or as secondary sound. Therefore the **Regupol® HT** and **Regupol® PL** products were used as vibration isolation on Piano House by the Polish construction firm IDS-Bud s.a. Vertical isolation was also achieved with the 50 mm thick **Regupol®** material.

Carpathia Office House likewise was isolated with the even more improved product range from BSW. The **Regupol® vibration 480**, **Regupol® vibration 550** and **Regupol® vibration 450** products formed the basis of the approx. 1600 m<sup>2</sup> foundation isolation. The Metro line is now operational and construction work on the buildings has been completed. It is recognised that vibrations and noise emissions do have negative impacts on the surrounding buildings, whereas Piano House and Carpathia Office House have been protected successfully. As planned, occupants do not notice the moving trains. All legal requirements for vibration protection were also observed and met during installation.

### Information at a glance

|                       |                                                 |
|-----------------------|-------------------------------------------------|
| Building:             | Piano House & Carpathia Office House,<br>Warsaw |
| Planning:             | BSW Berleburger Schaumstoffwerk GmbH            |
| Construction company: | IDS-Bud s.a.                                    |

