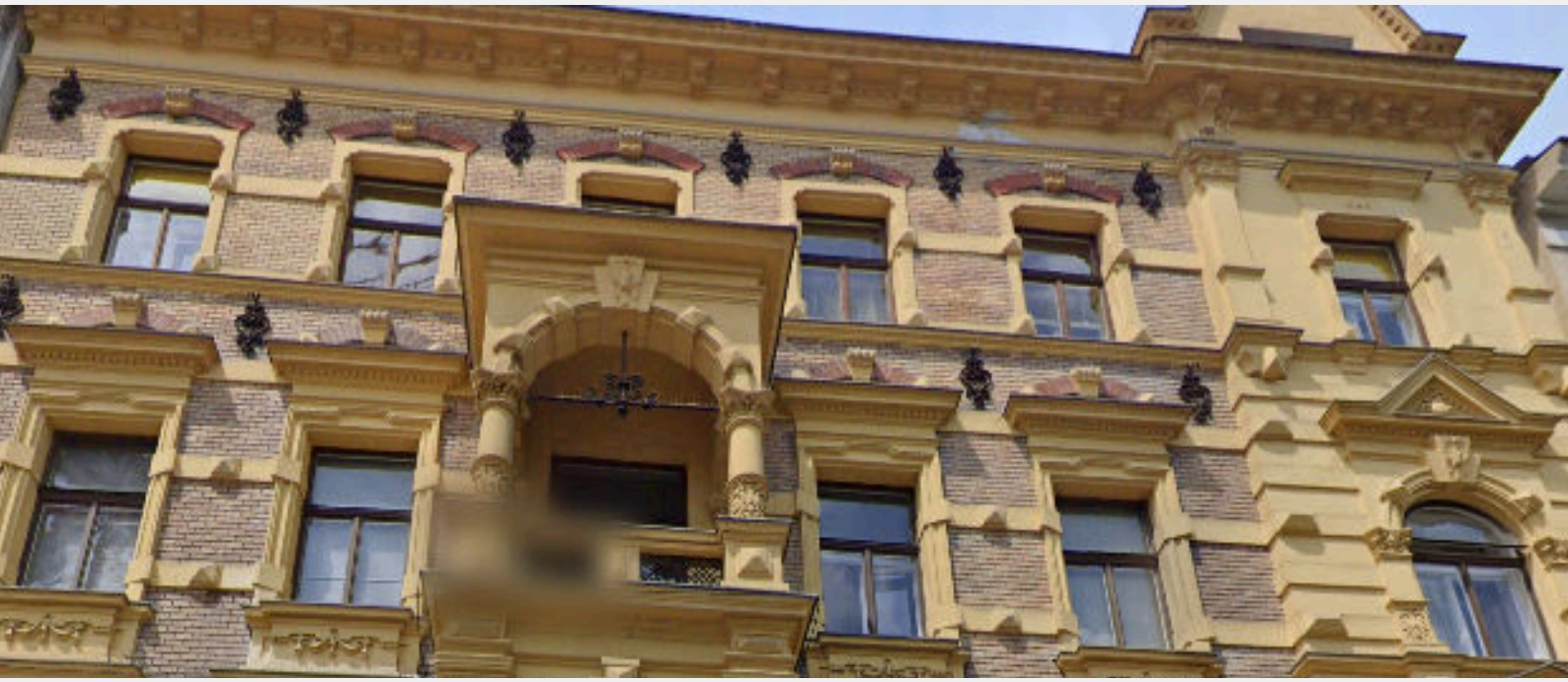
SUESSCO SENSORS

CRACK MONITORING

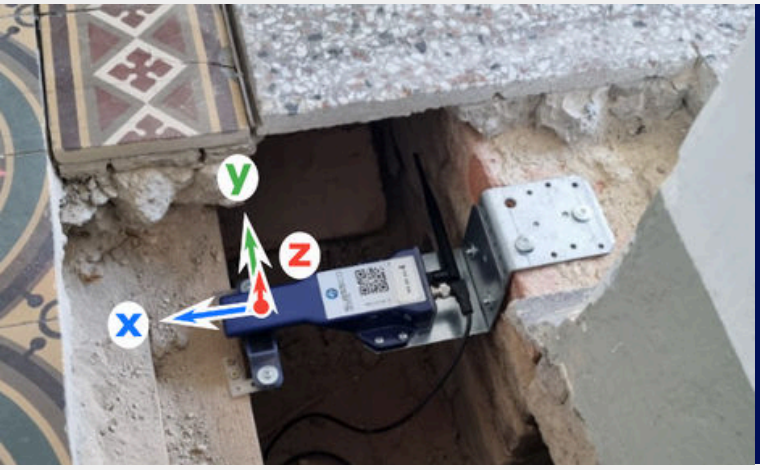
Case Study - Residential building



Initial situation

Years of construction work on a new subway line in the heart of a European metropolis have caused damage to a historic multi-story residential building. Tunnel excavation and the lowering of the groundwater level have led to subsidence in the subsoil, causing the building to tilt and cracks to form. These cracks, extending over multiple stories, are particularly evident at the junction between the old structure and a newer extension.

The property owner now faces the challenge of ensuring the building's safety for residents while collecting legally admissible evidence to determine the cause of the subsidence and successfully pursue potential claims for damages.



Requirements

The monitoring system must continuously and accurately record changes in the building to detect potential risks at an early stage and prevent further damage. Particular focus is placed on visible cracks in the stairwell and the metal structure of the elevator shaft, which are critical for ensuring the elevator's safe operation.

The sensor data must be permanently available online to allow for continuous assessment of the overall situation.

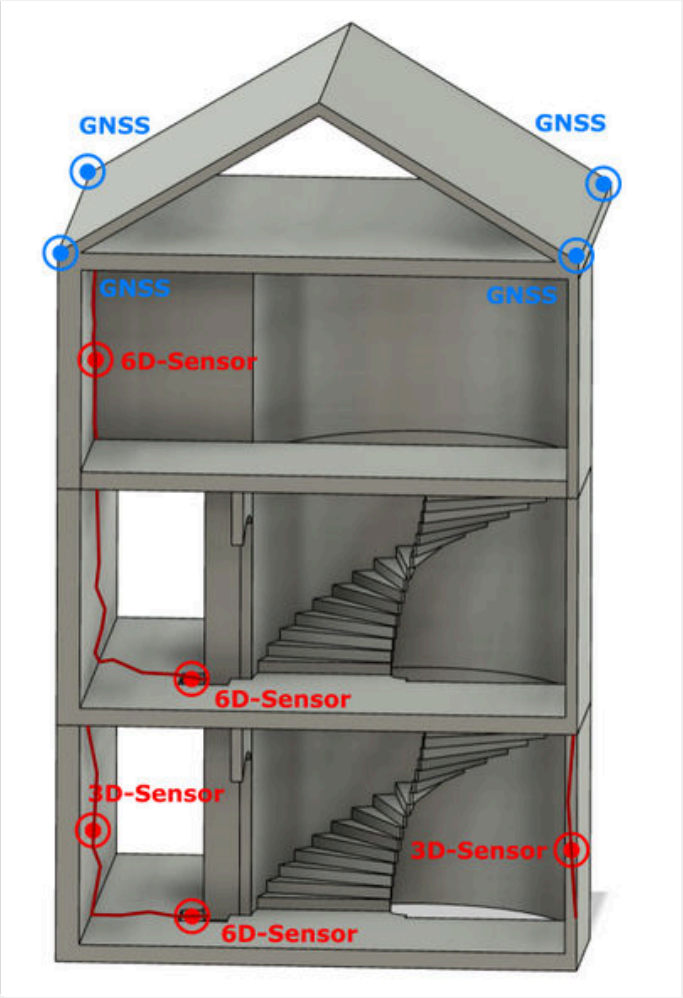
Crack monitoring case study residential building

SUESSCO SOLUTION

Based on detailed analyses, the responsible structural engineering office defined the optimal positions for the sensors. Two SuessCo 3D-Sensors were installed in the public stairwell to monitor wall movements and crack development with micrometer precision. Three SuessCo 6D-Sensors were mounted on the sub-floor structure and in the attic. All 3D- and 6D-Sensors come with integrated temperature sensors, to distinguish temperature induced movements from external factors. In addition, four SuessCo GNSS-sensors were mounted on the roof, enabling the measurement of both relative and absolute movements.

All measurements are continuously transmitted to the SuessCo DataHub, where they are stored, graphically processed, and made accessible online. Experts, particularly the responsible structural engineers, can access the sensor data at any time via the DataHub. This allows real-time evaluations to immediately detect changes in the building's stability and take targeted action where necessary.

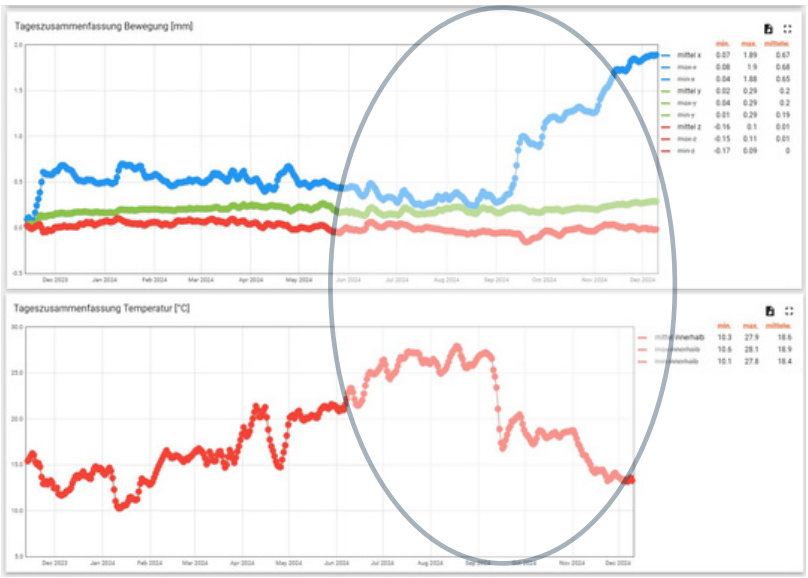
The SuessCo monitoring system is further enhanced by an alarm function, which triggers alerts when critical parameters are exceeded.



RESULT

The SuessCo sensors and IoT monitoring system provide the property owner with reliable data for root cause analysis and evidence preservation. The direct involvement of a structural engineer, with real-time access to the sensor data, enables a precise and professional assessment of the building's condition.

This ensures that necessary measures can be taken promptly to prevent irreparable damage and avoid unnecessary costs.



Blue = X-axis = crack width
In September 2024, an increase of 1.2 mm in the X-axis can be observed. Temperature indexed due to a simultaneous drop in temperature clearly visible.