Building pit C.O.R. Düsseldorf
Compensation Grouting
Düsseldorf, Germany

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**Contract Value (net):**
130,000 Euro

**Construction Period:**
05/2012 - 06/2012

**Client:**
COR Düsseldorf GmbH & Co. KG
An der Oelmühle
D-47638 Straelen

Accompanying phenomena at building sites such as noise, dirt or subsidence cracks are very unwelcome to local residents around inner-city construction projects.

Clients are therefore insisting more and more on flanking measures such as, for example, compensation grouting. The method is used for building conservation: It actively counters subsidence caused by construction, especially the associated leaning, and reduces associated potential damage. Subsidence arising from actual foundation engineering services (e.g. anchors under buildings, subsidence arising from warping in the pit lining, etc.) can be minimized using this method and in most cases completely rectified. An additional advantage is that the works can be performed from shafts and building pits located away from the buildings to be protected.
In the middle of Düsseldorf city centre a modern, 6-storey office building is built. For the construction of this building, Implenia Spezialtiefbau GmbH created a turnkey, approx. 2,000 m² and 11.5 m deep building pit.

In order to reduce, or respectively rectify, anticipated subsidence arising from the production of a temporary anchor layer underneath a neighbouring building, compensation injections were conducted during this construction project.

For this purpose - prior to commencement of the subsidence-relevant anchor works - a two-layered "shield" made out of sleeve pipes was installed between the neighbour’s foundations and the anchor layer to be produced. The adjacent subsoil is made good by means of injections in the upper shield layer. This leads to a reduction and smoothing of subsequent subsidence impacts on the structure to be conserved. Injections in the lower shield layer reduce the structural subsidence to a fractional amount. By means of elevation grouting performed with utmost precision, even this can be mostly completely eliminated and the subsoil's original state of tension can be restored.

The subsidence and leaning in the building are permanently recorded and analysed by means of an automatic, high-precision measuring system, so that any counter-measures can be scheduled and executed in a timely and targeted manner. Through the use of highly developed, CAD-based, three-dimensional measurement display with built-in planning tools, reaction time has been drastically reduced.
The forecast subsidence arising from the production of the anchor layer, or from warping of the pit lining, was considerably reduced in the case described here. Structurally damaging leaning was also consistently kept below 3% of the permitted value.

**Quantities / services:**

Technical processing, planning and dimensioning

400 m compensation grouting drill holes (30 pieces, L = 10-15 m)

10 m³ grouting

Contact injection from the upper shield layer (5 injection days)

Elevation grouting from the lower shield layer (10 injection days)

Digital measuring system consisting of 14 water level gauge measured points to monitor the building structure and control the injection during execution.