



Engineering Structures for Life



BUILDINGS - COMMERCIAL

El Corte Inglés Shopping Centre

ABOUT

The new building for the El Corte Inglés commercial chain in Vila Nova de Gaia has six underground floors and eight high floors. The construction area is 11.900 m² with a total area of 110.000 m². During its construction were employed 62.300 m³ volume of concrete, 12.300 tonnes of reinforcing steel, 7.200 m of concrete piles and the excavation volume was 280.000 m³.

Structural solution

The building's structure is a system of slabs, pillars and reinforced concrete walls. The slabs are flat plates with 0.32 m of thickness, supported by an orthogonal mesh of pillars separated by 8.0 m without column heads. In some zones, where it was necessary to change the pillars mesh, resulting in greater spans, alternative solutions were used. That was the case of the loading docks covering. A ribbed Post-tensioned slab was constructed for the 16.0 m span and supported by a metallic welded beam with a 25.0 m span.

The building layout geometry has its maximum plant dimensions reaching 110 m in the underground floors and doesn't have definitive expansion joints. These facts obligate a particular attention regarding the building global study under temperature variation and shrinkage, in order to evaluate the effect in the slab and pillars. As a consequence, it was decided to employ temporary construction joints with shrinkage unilateral movement and to use a concrete with a reduced water/cement ratio to minimise the shrinkage effect.

The access ramps between the 5 underground parking floors develop peripherally along the floors. For this reason, in a great extension, the transmission of the forces applied on the retaining wall due to land pressures, after the temporary anchorages are deactivated, will be transmitted indirectly to the floor slab through the ramps

FACTS

Year: 2004

Client: El Corte Inglés

Services: Detailed design, Structural Engineering, Foundations design, Geotechnical Engineering, Geological and geotechnical studies, Ground support and earth retaining structures, Hygiene, health and safety management

TEAM

António Campos e Matos
Paulo Pimenta

LOCATION

Vila Nova de Gaia, Portugal

or struts and walls that support them. A study with three-dimensional models was carried through to characterise the diverse situations for the walls and strut design.

Geotechnical solution

A 23.5 m depth excavation was necessary to execute the underground floors and the building foundations. For such construction, a peripheral support wall was carried out using reinforced piles with jet-grouting columns in between and various levels of temporary anchors. The anchors' retaining function was replaced at a definitive phase by the floor slabs. Therefore, the wall was materialised by a set of 1.0 m diameter piles separated by 1.30 m amongst each other and filled in between with jet grouting columns. The anchors were spaced with 2.60 m between each other and the different levels of reinforced concrete beams were installed as the excavation advanced. The pretension applied varies between 450 kN and 750 kN. The choice for such constructive technique resulted, fundamentally, because of its reliability in heterogeneous lands, with frequent occurrence of rock materials and high water levels.

MORE IMAGES

