

TITLE: Construcción y cimentación de un parking de dos plantas en Barcelona
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ABSTRACT

The main objective of this work consists on choosing and defining two floor parking constructive stages, and about the design analysis of the parking retaining and foundation elements, considering the following requirements:

- The study and analysis of the design of a retaining wall anchored system.
- The study and analysis of the design of a piling foundation structure.

It has required to calculate the retaining and foundation structures resistant characteristics, which has been done using the initial data, consisting on the applied loads and a previous geotechnical study, and also by choosing the hypothesis and the calculation methods adequate to every calculation phase, and checking those with the established corresponding standards.

The work has been divided in five mainly parts:

1. **State of the art.** It includes the summary of the information about the geology and geotechnics of the Barcelona city and the most common building problems associated to these geological materials.
2. **Starting initial data.** In this stage it is explained the future parking situation, which is situated in the geological area known as Llano de Barcelona, and the geology of this point.
3. **Development in stages of the constructive process.** In this stage, and previously to the constructive stages choosing, it is developed a new geological model, called symplified model, whose objectives are to keep the analysis on the safe side, and to minimize the tensional state calculations applied over the structures in every constructive stage. There have been developed four constructive stages:
 - First stage: retaining walls. In this stage it is considered the preparation of the surface previously to the retaining wall construction and also includes the retaining wall construction, with the purpose that retaining walls dimensions are as small as possible so that the parking area is maximized and the material costs are minimized.
 - Second stage: parking excavation. The four excavation phases of the area among the retaining walls are presented.
 - Third stage: piling foundation. Once the excavation is done, the piles and the heading piles structures must be built.
 - Fourth stage: supports and floors construction. Finally, it is analyzed and chosen the process to construct the floors, to cut the anchors and also to rise the parking supports.
4. **Dimension of retaining walls and foundation structures.** With the maximum loads obtained of the stress laws for every constructive stage phases, the pile loads, the geological material type and its strength, the structures strength, and with the calculating hypothesis and correspondant standards, the structures have been defined. It has also been considered the maximization of the parking area and the minimization of performance material costs and construction time.
5. **Conclusions.** In this section there are included the conclusions obtained in every stage about load states, constructive stages and structure dimension, and some ending recommendations.

It is assumed the proposed methodology and many of the obtained results may be used in other similar construction sites in the urban context of Barcelona city.