

PARKING LOT OF PUERTA DEL MAR (CÁDIZ)

On January 17th, 1999, Parquigran S.L. presents bidding offers in public tender called by the city council of Cádiz for the construction and subsequent exploitation of two underground parking lots in the city. One of them located at *C/ Dr. Fleming* (old garages of *Comes*, in front of the *Puerta del Mar* Hospital) and the other one placed at *Plaza de Jesús de la Paz*.

On May 21st, 1999 Parquigran signs the awarding agreement for the construction and subsequent exploitation of the parking lot located at *C/ Dr. Fleming*, commercially known as Parking lot of *Puerta del Mar*, file number 98366. This parking has 628 spaces distributed in four floors. The opening took place on may 18th 2001.

The construction of this parking is a great constructive challenge for the Company since it is a pioneer process in Spain. The project has been carried out a few meters from the beach and the excavation has reached 14.5 meters depth. The parking is constructed over a surface area of 16,380 m² and it is divided in four underground floors. For this, it becomes the only construction of this kind carried out in Spain to date and the second in Europe.

For the construction of the parking the structure is carried out in a descending system in mine type or, in other words, built from top to bottom. The aim of this structure is to control water from the Atlantic Ocean since the water table was one meter from height 0.00.

The perimeter slurry walls of 90 cm thick reach 25 meters depth in order to build them into the rocky subsoil and in this way give the vessel configuration. For this, it has been applied thixotropic sludge using bentonite.

After this process, we proceed to the pile driving, with the double objective of executing the anchorage system for the future underpressure-foundation slab and serving the pillars to the frameworks. These are done in "in situ" vertical borehole, at 27 meters depth with 1250 mm in diameter and an internal metallic support HEB 300.

Once the pile driving is finished, it is time for excavation until height -6.00 to construct floors 0 and -1 from which the draining of land beneath them continues.

To evacuate water from the sea, it was necessary to dig a pit with height below -14.5, assembling a steel cylinder of 800 mm in diameter, which serves to accommodate 8 drainage pumps. These pumps are connected to pipe systems. The pumping system may allow water drainage of 300 liters/second.

Finally, the foundation slab, which supports an underpressure pressure of 12Tm/m², is implemented with 1.1 meters thick, without concrete joints and with a waterproofing system. When this system acts by osmosis it avoids micro cracks, proceeding thereafter to a draining chamber of 10 cm and to a trowelled concrete finish.

Then, the surface of each floor is painted with paint made on polyurethane and quartz base that facilitates the adherence of vehicles and cleaning.

PARKING ESTIMATED FIGURES:

- **Earthworks** **60000 m3**
- **Drainage** **300 Hm3 - 300 l/s**
- **Concrete used** **20000 m3**
- **Iron used** **2000 Tm**
- **Workforce** **200**
- **Project deadline** **18 months**

To carry out the works, Parquigran has spared no efforts when collaborating with the best professionals, specialists and companies with wide experience in foundations, pile driving, waterproofing and so on as well as with the latest technology in the field.

This parking lot will put an end to parking problems in the area due to the great number of vehicles nearby the beach and the *Puerta del Mar* Hospital of Cádiz.