

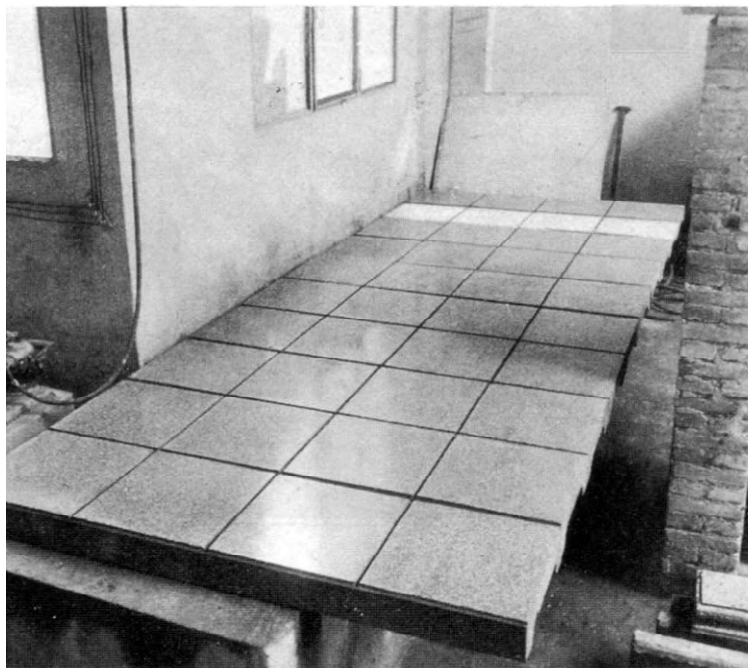
# Technical details of concrete precast elements and singular concrete elements

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## CONCRETE PRECAST ELEMENTS

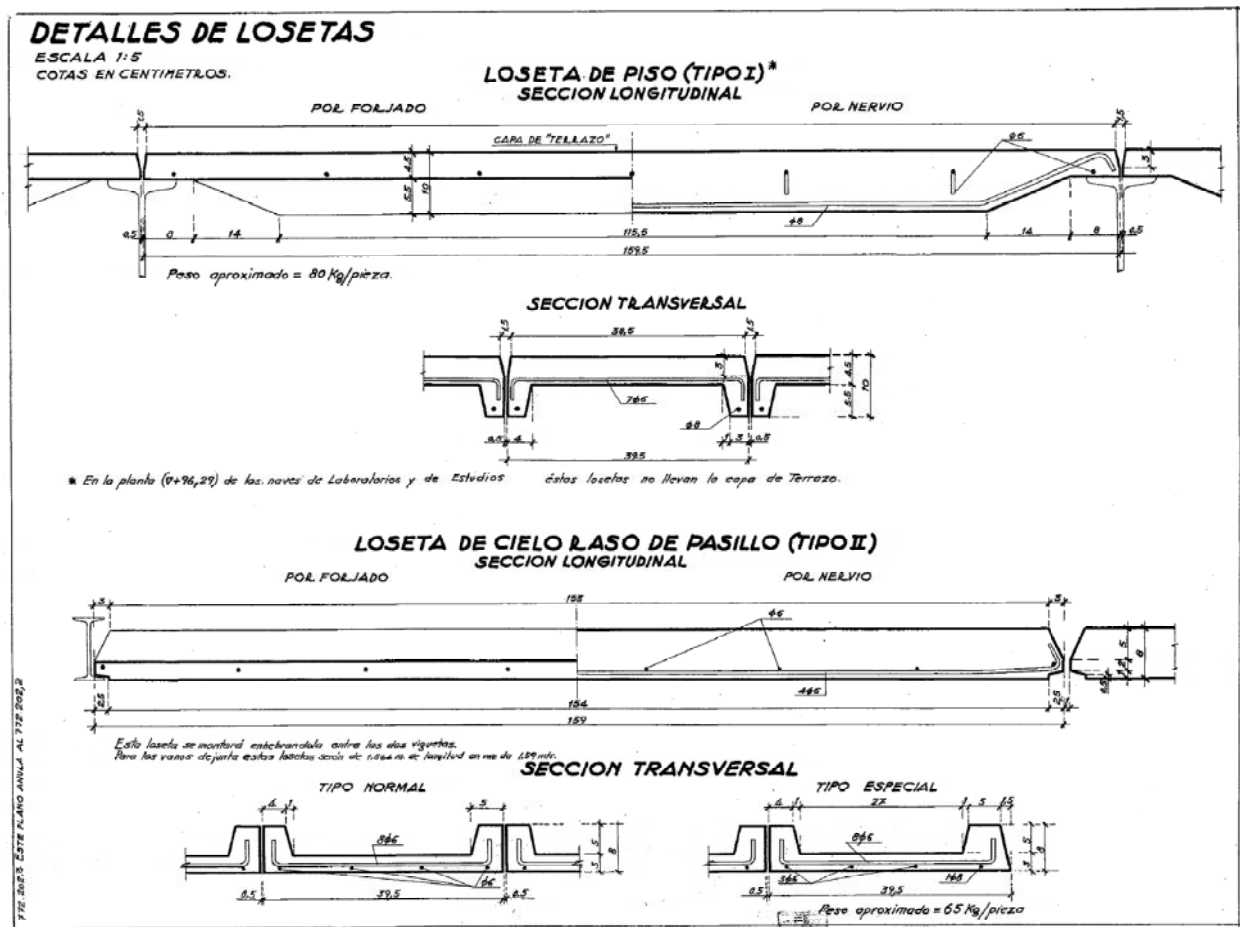
### Flooring pieces

Floors, supported on metal beams, were made of precast concrete in structural pieces of 1.60x0.40m (5000 units) and finished in polished terrazzo.



Precast concrete structural floors

The previous studies were directed to solve the problem of making a type of slab such that the structure and the floor finish were formed by a single piece.



### Constructive details

The design of the distance between the metallic beams, perpendicular to the façade, was 1.60 meters. A piece of real dimensions 1.59 X 0.39 meters, supported on the upper wing of the joists and divided by 3 false joints of 1 X 1 cm, was adopted. This element constituted a floor of artificial stone slabs of 40 X 40 cm and, at the same time, a resistant piece.

The production process was divided into the following phases: 1. Dosage of concrete and artificial stone finish; 2. Vibration molding on a table; 3. Concrete curing; 4. Polishing of finishes; 5. Storage

Concreting was carried out on a metal mold, on two vibrating tables of 6000 r. p. m. and 2 HP.

First, the flooring layer was poured and immediately after the concrete, proceeding to the placement of reinforcing bars at the appropriate time.

A total of 5000 pieces were made by a team of 12 workers at a rate of about 50 pieces a day.

## Window frames

Window frames, using the same 1.60 unit and made of precast concrete (400 units in total), leave a gap between them, later concreted, in order to be part of the resistant structure of the building.



**Precast concrete window frames**

Sill, jambs and lintel were moulded in the same piece, thus constituting a rigid frame. This frame has a small resistant function. The structural function is carried out by the false lintels and other vertical supports.

The moulds for these frames were constructed of reinforced concrete and were formed by a central block fixed to the ground and four removable lateral pieces. Over the central block, the reinforcements, composed by 8 bars of 2 mm diameter with stirrups of 6 mm diameter and some cross-sectional supplements to the bars added in order to increase the rigidity, were assembled. Four hooks fastened to it completed the reinforcements and allowed the formwork stripping.

The mortar, in a 1 to 2 proportion of white coloured cement, was vibrated across the reinforcements and its surface finished with a trowel. After 24 hours the lateral pieces were removed, and after 48 hours the formwork stripping was carried out with the help of a pulley and a rigid metallic frame so that the forces were perpendicular to the frame. The window frames were then immersed in the curing pool and then removed for their inspection, review and storage. All these operations were carried out by three operators with a production rate of four window frames per day, having thus produced a total of 400 pieces.

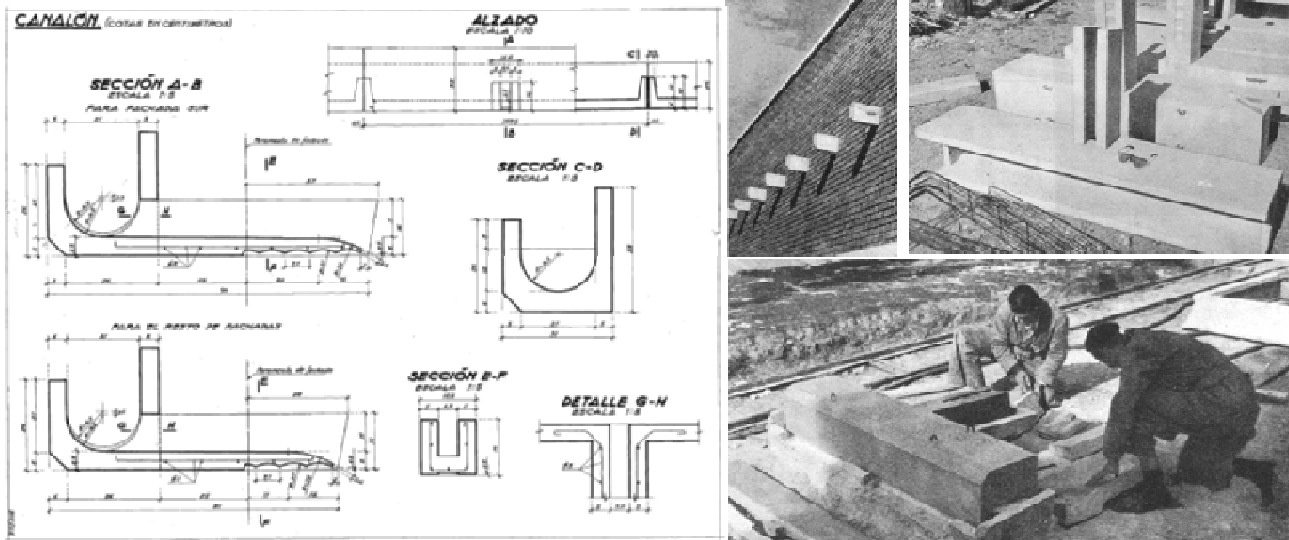
The reinforced concrete pillars between windows were moulded using as formwork the two window frames and a corrugated metal sheet; when removing this sheet, the concrete was left with a finish that, when painted, would constitute an ornamental motif between the windows.





## Gargoyles

A similar concept is followed in precast concrete gargoyles of the building (425 units).

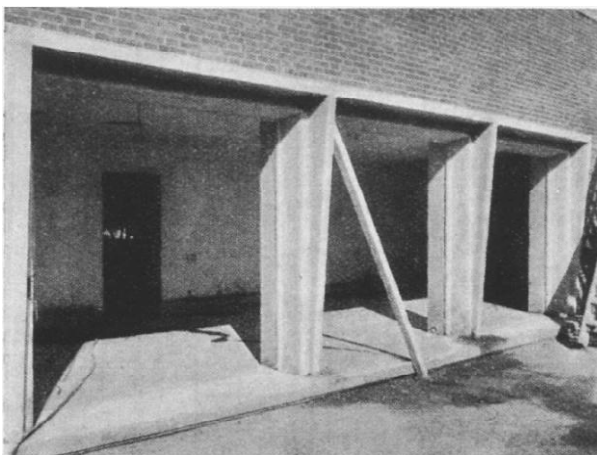


**Precast concrete gargoyles**

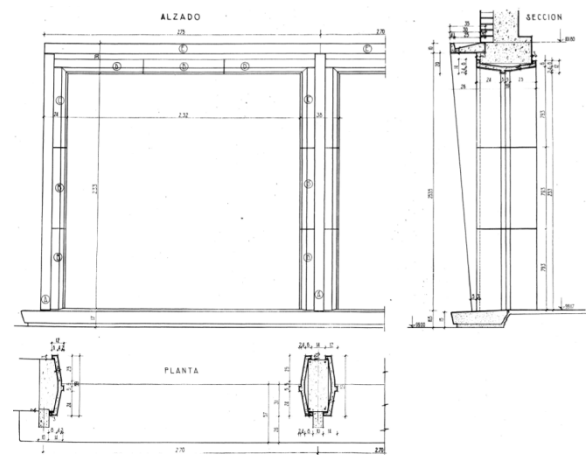
These pieces are formed by the union of the gutter and the gargoyle. The concreting of these pieces was carried out in the same way as that of the window frames: vibrating the mass through the reinforcements and removing the frame in two phases (removing the walls at 24 hours and completely stripping the piece at 48 hours).

The molds for these pieces were also constructed of reinforced concrete and were composed of one piece fixed to the ground in the same alignment as the window frame molds, and eight demountable pieces. The pieces, following the same manufacturing process as the windows, passed after the complete stripping to the curing, revision, review and storage.

All the mentioned operations were carried out by three workers with a production rate of four gargoyles per day and a total of 425 pieces.



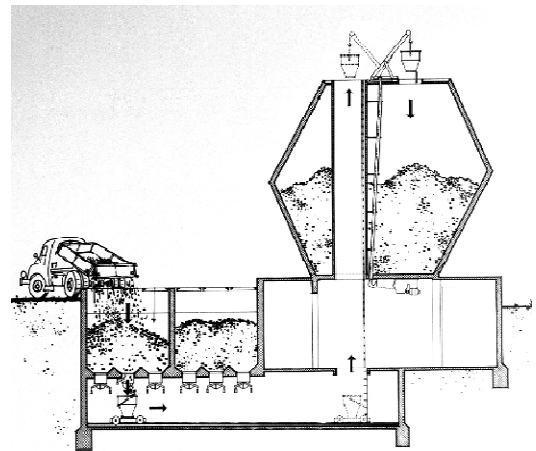
**Other similar elements in precast concrete. Door frames**



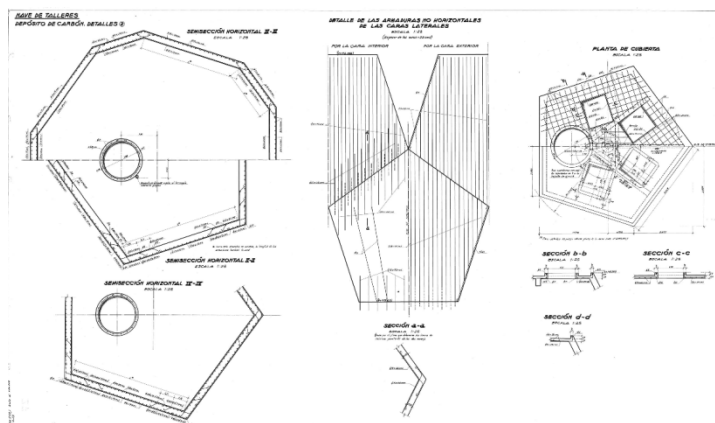
## SINGULAR ELEMENTS IN CONCRETE

### Coal tank and chimney

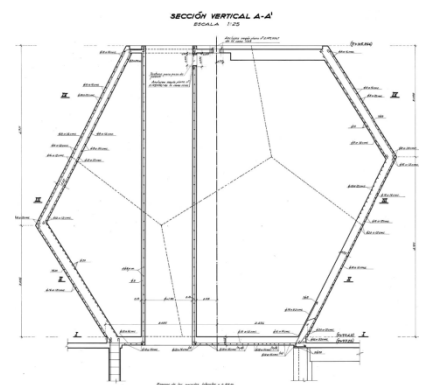
Other singular element in concrete is the coal tank, with a undoubted plastic value, located in the access to the building. In order to store the annual heating needs of coal, a silo of 280 m<sup>3</sup> has been planned. Technically, a dodecahedron-shaped piece, with a radius of 4.70 m for the circumscribed sphere, is a structurally functional shape, without leaving unloaded areas as it would occur with a cubic or cylindrical shape, for example.



Coal tank and chimney

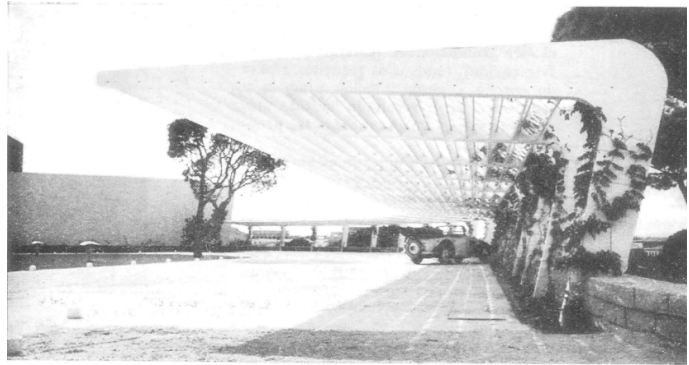
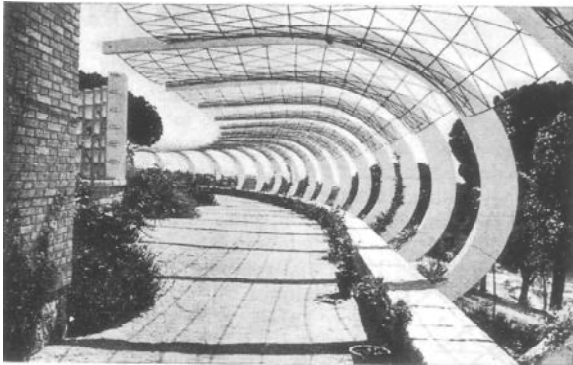


Constructive details

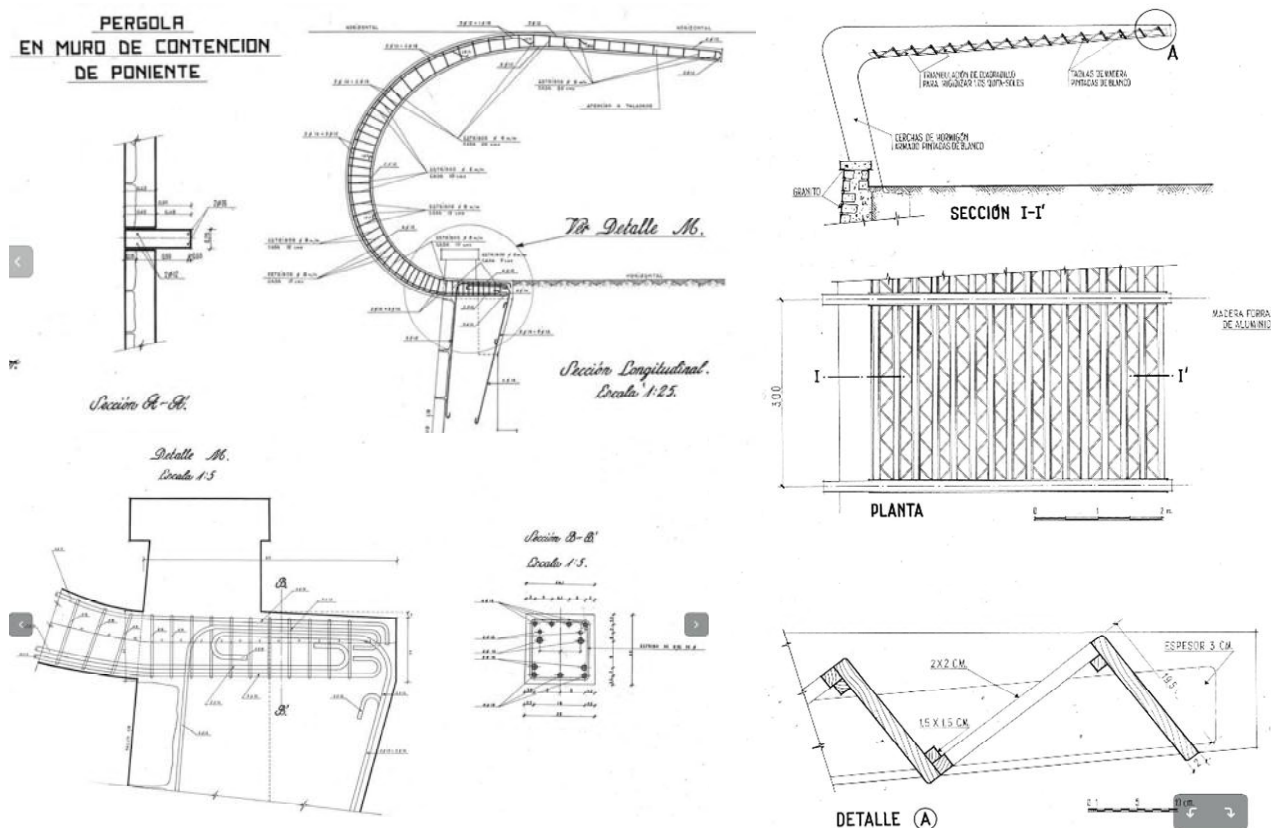


## Pergolas

The lemniscata-shaped pergola to the west and the seven-shaped one of the car parking fulfill the mission of framing and solving the volumes of buildings, mainly from distant points of view.



Lemniscata-shaped and seven-shaped pergolas

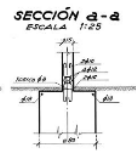
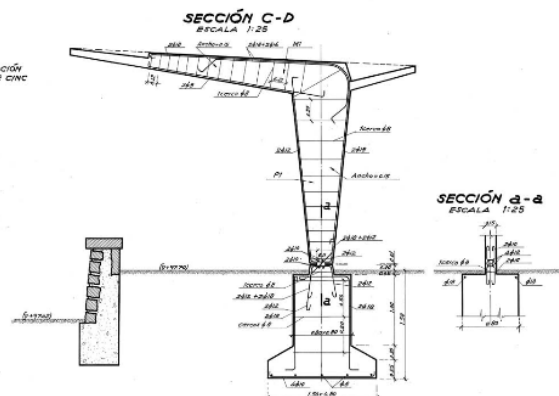
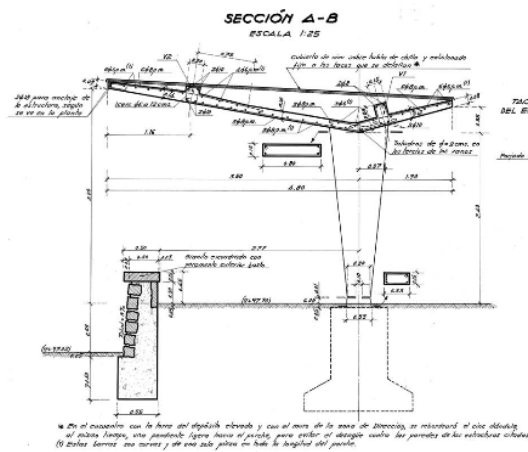
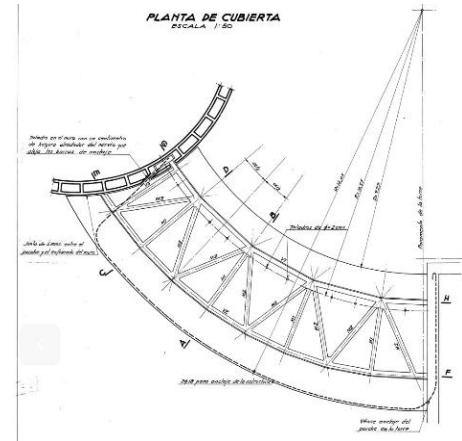


Constructive details

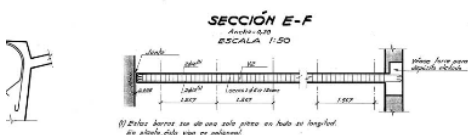
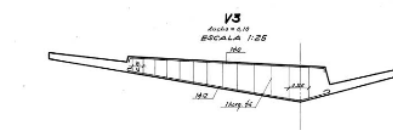
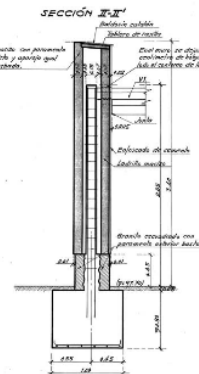
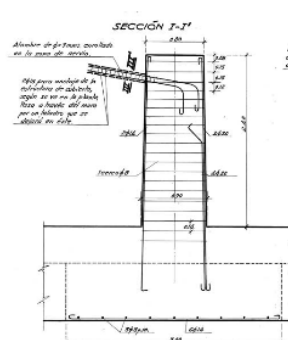
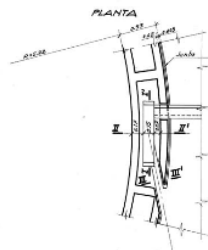
In the garden area, the passage between the direction and the workers' area has been made with a pergola that closes the pool patio.



Access to the pool patio



DETALLE DEL P2 Y DE LAS BARRAS DE ANCLAJE DE LA ESTRUCTURA



Constructive details

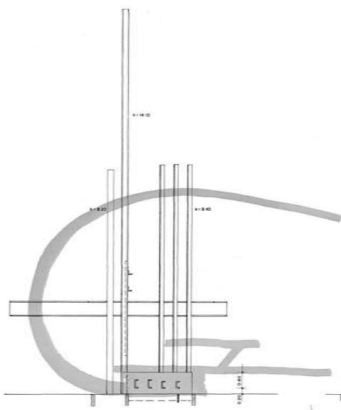


## Singular structures

Other singular structures in concrete are found in the dining room and the main hall of the building with slabs of wide span, as well as the chapel on the outside in the shape of an elephant.



Wide span structures



Elephant trunk shaped concrete slab