POLYTECHNIC OF TORINO
FACULTY OF ARCHITECTURE
Degree in Architecture
Honors theses

Environmental project for a multifunctional building in Santiago de Chile
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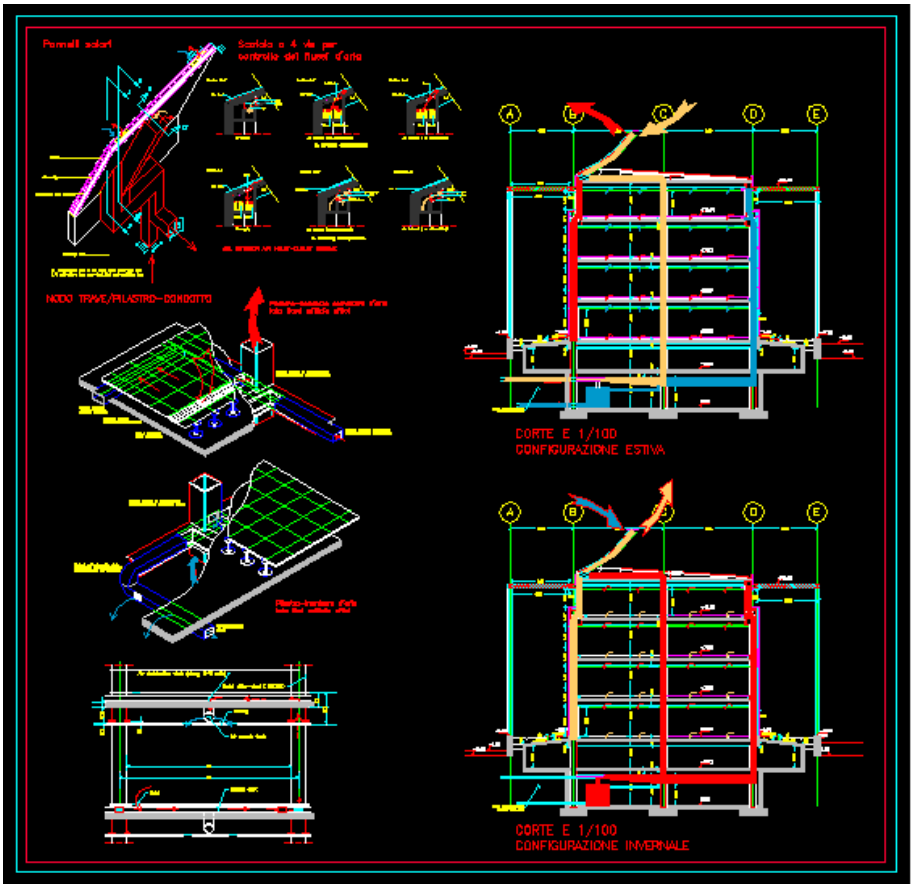
This degree thesis is part of a **real project which** was developed in 1998, **during our working experience in Chile.**

The building works have started in March 1999.
The open-minded view of architects May y Soler, heads of the studio named after them in Santiago, considers the human capital as a fundamental resource for renewing the studio image and our reliability in carrying out previous works for the studio has allowed us to become responsible for the project, both for the design and for the co-ordination of the related activities. Though one of the head architects has always been present as a supervisor, the freedom of working in a creative way has brought us to a quick learning of production and management of medium and large scale architectural projects.
Our work dealt with the design of the new headquarters of Consalud, an assurance and health assistance private company operating also outside Chile. Besides the

operative and head offices, Consalud has also required the design of other spaces such as a canteen for 300 people, a conference centre, a call centre, a leisure area with a gym, squash and tennis courts and a swimming pool.
The philosophy behind the project is mainly characterised by the precise need of the client to move out of the metropolis to a site surrounded by gardens, away from the current headquarters location in Providencia, a polluted and chaotic zone in the town centre.
To achieve this objective Consalud bought a country estate of 2.5 hectares (6.25 acres) easily reachable from the town via the ring-road.
The client required a three floor building, without lift and with an easy access to the garden, where some working activities could be carried out.
Exploiting our previous experiences, with the aim of reducing the building operational costs, we proposed to develop a project based one **bioclimatic system** for the building climate control. This project, in our opinion, achieves the following objectives:
A) to avoid recreating an artificial environment out of the city;
B) to propose a building with lower operational costs compared to one designed without any energy saving criterion and same building costs;
C) improve company marketing in the health field;
D. renew the image of May and Soler's studio with a new style for design together with the attention to technological innovation.
To cut the costs related to energy consumption we reduced the energy loads to the cooling and heating systems by using natural resources and a mechanical system for air propulsion, whose cost is negligible. As a matter of fact, local climate conditions do not allow to adopt air systems exploiting the wind which is very weak.
The first design was based on the assessment of the effects of building orientation and of the use of a shading system in terms of energy contributions related to direct exposure to solar radiation.

Site Plan



Bioclimatic Scheme of Functioning Sistem

In a second phase a climate control and natural ventilation strategy was studied: buried pipes are used for summer air cooling before air enters the conditioning ducts; during winter, the incoming air is preheated via solar collectors on the roof.
As a result of simulations, it was found that the energy needs for climate control are covered by roughly 50% for cooling in summer and by 100% for preheating in winter. An artificial climatic system supplies the remaining energy needs, not covered by the bioclimatic system. This artificial system uses the same horizontal and vertical ducts of the bioclimatic one. The tecnical solution for the final design is the ingenious choice of the architectural element girder-pillar-ceiling: the numerous air ducts are contained in the pillars which act both as structural elements and as vertical ducts, inhaling the air from and supplying it to the various floors. These pillars are connected with the layered structure composed of floating floor, concrete floor and counter-ceiling which allow air to be diffused over the whole office surface.

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