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Kindergarten design with structure envelope technology

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The present dissertation was carried out in reply to an announcement issued by the town of Sirtori, a small Lombard town in the province of Lecco, which asked for the design of a three-classroom kindergarten, in the adjacent allotment of an already existing school. Moreover, the town council required the planning of a high-performance energy-efficient building, rapid construction and low running costs. Dry construction systems fulfilled such a request. This technology has been explained in the present dissertation in parallel with the design phase.

Sirtori lays on a great value landscape. Almost half of its surface houses the so-called "Parco Regionale di Montevicchia". The lot project, connected with the main square through Via Risorgimento, consists of an area of 700 square meters, whose half is occupied by "Modesto Negri" primary school. The peculiarity of the place is due to the steep inclination of the land. This causes a 18 meters drop. From an in-situ analysis it was possible to detect the presence of entrances and roadways in relation to the flow of consumers and goods. Moreover, the presence of a hill situated in the south of the just mentioned area, required a preliminary study of the shading in a part of the town carried out following a virtual model. Finally, a further climate analysis allowed to define the different strategies to assure the wealth of the potential users of the building. Large-scale urban interventions have been conceived in sight of a single school complex. This led to the redefinition of the entrances and roadways. The architectural concept developed following the well-known spiral shape. Within this structure it is easy to distinguish the core and a radial structure defining the other sections. Similarly, the plan of the building includes a more intimate and private central area, devoted to the outdoor activities, surrounded by other rooms. The concept phase has been influenced by the idea of realizing a building connected with the surrounding environment.

This was obtained through the placement of a launch ramp that fits with the lay of the land and gives access to the green roofing, ending on the opposite side with the slope.



PLANIMETRIA GENERALE



Special attention was paid on the interior design, in particular on classrooms and the hall, both thought as a space suitable for the educational development of children.



The opaque roofing characterizing the building was planned using a technology aimed at an increased efficiency, cost reduction, a rapid execution of works, implant integrability and environmental impact. The vertical structure has been realized using a lightweight double-shell structure ("Acquapanel Knauf"). The floors are made of dry foundations and lightweight panels having a thermal, fire and acoustic function. The floor is built with sandwich panels and a double seam metal roofing suitable for the installation of a photovoltaic plant. The internal façade is characterized by an aluminium full-length window fixed to the bearing wall. It consists of a steel frame and lamellar beams. As heat generation it exploits a geothermal heat pump with energy poles powered by electricity. This is partially produced by an amorphous photovoltaic plant with floor radiant panels. The production of solar hot water (SHW) has been obtained by a thermal solar plant powered by a condensing boiler.

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