

OITO CASAS. MULTIFAMILY HOUSING

Braga. Portugal

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Architect: João Caldas, Rita Breda, Pedro Rodrigues, Francisco Calheiros, Francisco Pereira , **Engineering:** TDP Engenharia, **Client:** Flexible Loop S.A, **Project-Completion Date:** 2015-2019, **Photographer:** ©Pedro Nuno Pacheco, ©Arménio Teixeira .

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Abstract: The article presents the project for a multifamily housing - Oito Casas – that presents a concrete bearing structure and also a set of pre-fabricated concrete brise soleil in the upper level of the main facade. The specificity of the project led us first to the modification of the allotment plan. A procedure that was then followed by the development of a spatial configuration allowed by a concrete structure and, finally, the introduction of the exposed concrete in the form of concrete brise soleils that provide a particular and changeable identity to the architectural set throughout the day, in a distinctive game of shadows.

Key Words: Concrete, patio, portuguese architecture, multifamily housing, project.

Oito Casas - Multifamily housing

The project responds to the initiative of a real estate developer to rethink and introduce a new housing model in the market, responding to the changes in familiar dynamics and ways of living.

The site is located in the peripheral area of Braga, (Portugal), and defines one of its urban borders. It is characterized for its extraordinary southern views to the religious sanctuaries of *Bom Jesus* and *Sameiro*, a steep topography and specific conditions defined by an allotment plan - seven housing units of oversized areas, characterised by a lack of usable exterior and common spaces, placed “stairway like” along the length of the plot, as an approach to the difference in height (fig. 1).



Figure 1. During construction. 2018. ©Pedro Nuno Pacheco.

Concrete: in-situ and pre-fabricated

We started by changing the allotment plan from seven to eight houses, of which seven in a single volume plus a detached house that adjusts to the street's design. The access to every unit is possible, at the west and lower level through an exterior pedestrian gallery parallel to the street, or via the single car access to the individual garages (fig. 2). The pedestrian gallery is also accessible from the street, at a higher level, via a staircase, and further up the street one finds a direct access to the detached house.

Regarding the constructive character of the project, we developed a simple and straightforward approach with concrete introduced in several different ways for optimization and cost reduction purposes. The main reason for the selection of a concrete structure over alternatives was its added value. The demanding client's brief and architecture ambitions were hence achieved: cost efficiency, elimination of expansion joint, robustness and elegance. It allowed for complete openness of the north and south facades, cantilevers and an open floor plan at the first-floor level.

The structure of the main volume is defined by a set of parallel bearing concrete walls, which stand above a partially buried concrete volume that shelters the garage and individual entrances. These parallel walls are set apart by 6,5 meters with a north to south orientation (fig. 3). Moreover, those elements introduce considerable acoustic improvement for the housing units and allow us to expand the exterior areas by creating extended cantilevers over the ground floor. In order to maximize the use of exterior space on the first-floor, the south cantilever on the main facade defines a veranda



with 2,5m that expands the living room, and it also partially covers the pedestrian pathway where children gather, play and ride bikes together, even on rainy days. To the north, the first floor of the detached house cantilevers 5m (fig. 4).

Our approach was very pragmatic, the different uses of concrete were studied in a back and forth relation with the engineers in order to achieve optimization and strict economic restraint. For instance, at the beginning of the construction the terrain revealed itself to be partially fragile. To the need of lowering the foundation footing, the team came up with a solution of digging pre-fabricated concrete sanitation rings, then fill them with cycloptic concrete over which the concrete footing were placed (fig. 5).

Regarding the concrete brise-soleil, the option for pre-fabrication allowed for a significant reduction in construction time, hence economic reduction. We have also developed a mounting system that allowed to place the seventy concrete pieces in only two days, with a gluing process on the bottom, and on top a screwing solution that came inserted on each pre-fabricated concrete piece (fig. 6).

We have also used concrete in pavements. At the lower level, the entire garage and patio of the detached house is in stroke concrete for its resistance characteristics, cost control and coherence considering material and color scheme (fig. 7).

The heritage of the patio house

One of the client's main objective was that each unit should have three bedrooms, in order to respond to the contemporary demands



Figure 2. Pedestrian Gallery, garage and unit entrances. 2019. ©Arménio Teixeira.



Figure 3. Concrete parallel walls and patio during construction. 2018. ©Pedro Nuno Pacheco.

of the real estate market of this urban area. To do so, we opted to recall an ancestral and universal archetype, the patio, a composition element, although interior, that connects and protects from the exterior space, “participates on the day and night, sun and moon, hot, cold and rain (...) a spatial symbol of intimacy.”¹ During the summer, the patio functions as an escape route for the hot hair through the stairway, and in winter, it increases the exposed facade area to sunlight, thus functioning as a sustainable and natural ventilation and lighting system (fig. 8).

Each unit has an entrance at the ground level via the pedestrian gallery, an inner street or “place where one practices a ludic appropriation of the city.”² Entering, one finds an office, laundry and individual double garage. The detached house, although having



an entrance at this level, has its main entrance directly from the street at the first-floor level. The first floor is composed by the social program of the dwellings with a kitchen and dining room facing a partially covered patio to the north, and a living room connected to the southern veranda overlooking the views of the valley. The most private program of the house - the bedrooms - is reserved for the upper floor, from which we highlight the main bedroom suite, facing south, with a complete glass facade both on the bedroom and bathroom, with several concrete brise soleils that operate as shading devices (fig. 9).



Figure 4. Cantilevers. 2019. ©Arménio Teixeira.



Figure 5. Pre-fabricated concrete rings for footing and first unit walls. 2018. ©Murmuro.

Conclusion

The project intended to take advantage of the maximum available construction area, adjusting to the sloped topography, ensuring that each unit has an independent entrance, both for pedestrians and cars, while providing several exterior spaces, also common, that enrich interior living dynamics. Concrete comes up both as a structural option and also as a passive thermal solution - the use of concrete shading devices in the upper level simultaneously manage sunlight and privacy. A “brise-soleil in which depth becomes an important dimension, acquiring greater formal protagonism (fig. 10).”³ The vertical brise soleils, inspired on Le Corbusier, introduce a rhythm in “a facade where the game of shadows exacerbates its spatial richness.”⁴

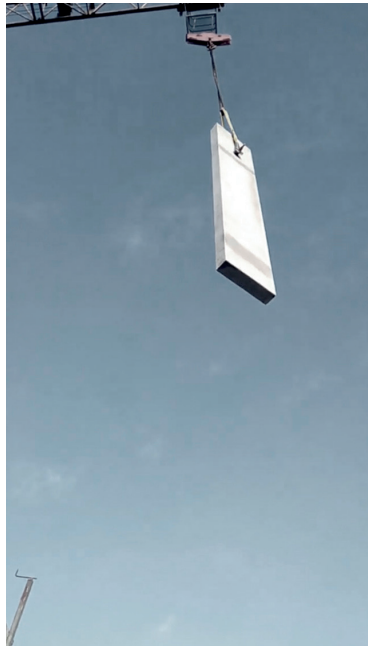
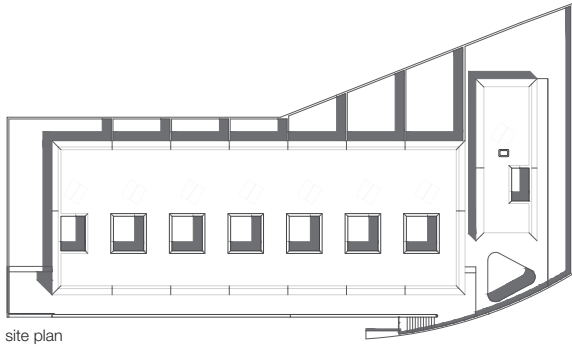
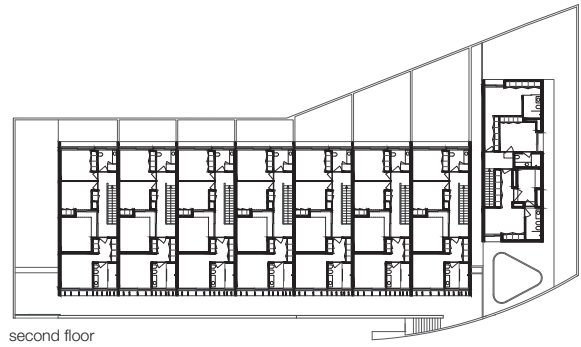


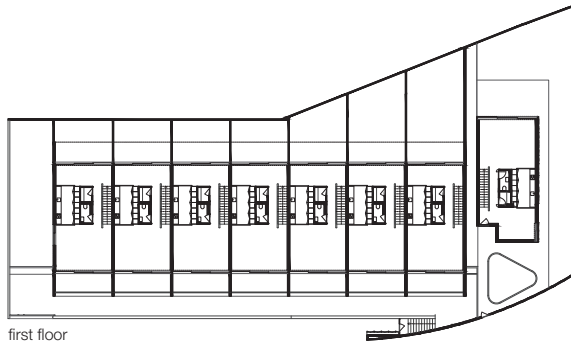
Figure 6. Pre-fabricated concrete brise-soleil during assemblage. 2018. ©Murmuro.



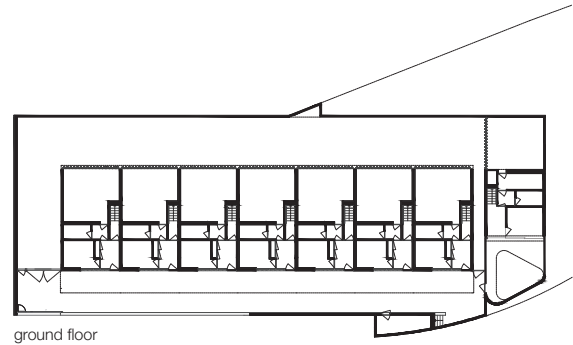
site plan



second floor



first floor



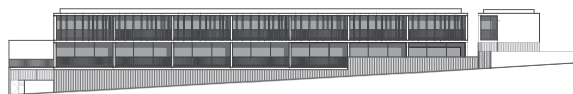
ground floor



North facade



East facade



South facade



Section

Figure 7. Architectural Technical drawings. 2017. ©Murmuro.



Figure 8. Exposed concrete, walls and pavement, garage. 2019. ©Arménio Teixeira.



Figure 9. Exterior images, Interior First-floor Images and Interior Second floor images. 2018/2019. ©Pedro Nuno Pacheco and Arménio Teixeira.



Figure 10. Day and Night images of the south facade. Arménio Teixeira. 2019. ©Arménio Teixeira.

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Co-founder, with João Caldas, of the office murmuro, highlighted one of the Young Talents of Portuguese Architecture, recipient of the 40Under40 Award and shortlisted at FAD Awards 2016 and VII Enor Award 2017.

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Co-founder, along with Rita Breda, of the office murmuro highlighted one of the Young Talents of Portuguese Architecture, recipient of the 40Under40 Award and shortlisted at FAD Awards 2016 and VII Enor Award 2017.

Notes

- ¹ Werner Blaser, *Patios. 5000 años de evolución desde la antigüedad hasta nuestros días* (Barcelona: Editorial Gustavo Gili, S.L., 1997), 7.
- ² Iñaki Ábalos, *A Boa Vida* (Barcelona: Editorial Gustavo Gili, S.L., 2003), 131.
- ³ María Suárez, "Between Indian Tradition and Corbusian Modernity: The Case of the Villa Hutheesing-Shodan," in *Le Corbusier History and Tradition*, ed. Rabaça Armando (Coimbra: Imprensa Universidade de Coimbra: 2017), 284.
- ⁴ Pedro de Llano, *Le Corbusier – Viaxe ó mundo dun creador a través de vinte e cinco arquitecturas* (A Coruña: Fundación Barrie de La Maza, 1997), 261.

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