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THE SOCIAL RISE OF A HOUSING INTERVENTION: ÁLVARO SIZA PROJECT FOR BOUÇA NEIGHBOURHOOD

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Abstract *The creation, in 1974, of SAAL was intended to assist financially challenged populations to obtain a decent dwelling. It corresponded to a unique moment in the history of Portugal, following April 25th revolution, where participatory processes were tested in a close relationship between the designers (the brigades) and the population.*

The Bouça Housing Complex, a project of Álvaro Siza, was included in SAAL promotion and corresponded to an adaptation of a pre-revolution project, prepared for FFH. The construction process was interrupted in 1978 (following SAAL's extinction in October 1976) and only the first phase was completed - 58 houses out of a total of 131 - corresponding to intermediate areas of implantation and without definitive access. In a central area of Porto, Bouça remained as a revolutionary open scar for almost 25 years, until 1999, when Álvaro Siza was invited to conclude the intervention with the construction of the absent buildings and the rehabilitation of existing ones, work that was finished in 2006. Bouça Housing Complex corresponds to an exceptional operation in national context, not only due to the intrinsic characteristics of the project but also because of its process and constructive definition.

Bouça was finished nearly three decades after its starting, incorporating new issues that buildings and architecture meanwhile had to face - such as the inescapable role of the car or new demands of comfort and energy consumption – and rethinking the whole construction system balancing new requirements and respect for the initial idea. Even though new intervention should have been based on the same initial conditions, in terms of areas, building systems but also the social population for which it was intended - the former residents of 1974's degraded houses and who were eventually relocated to other urban areas - upon conclusion few were the initial residents who decided to return to their place of origin and a middle-upper class population (with an expected high incidence of architects) acquired the small houses.

The objective of this paper is to present an analysis of the two constructive phases of Bouça Housing Complex, assessing design, constructive definition, occupancy and social transformations.

1. INTRODUCTION

The right to a decent home is everyone's desire that gains a special capacity of expression in times of regime change or revolution, as it was the case in Portugal, after the 25th of April 1974. In the 1970s, almost a quarter of the country's population lived in precarious conditions, a situation mostly concentrated in the two largest cities, Lisbon and Porto, and in their surrounding municipalities. With the revolution, the hidden poverty of dictatorship's time takes the streets (Figure 1), claiming 'peace bread housing health education', slogan immortalized in the lyrics of 'Freedom', Sérgio Godinho's song. Vacant building occupation's started and spread throughout all the country.

As a response to people's demands, in August 1974, SAAL (Serviço Ambulatório de Apoio Local /Local Support Ambulatory Service) was created. In an order signed by the Secretary of State for Housing and Urban Planning, Architect Nuno Portas, the creation of a technical body organized by the FFH (Fundo de Fomento da Habitação / Housing Development Fund) was intended *"to support, through the municipal councils, the initiatives of the poorly housed population, to collaborate in the transformation of their own neighbourhoods, investing their own resources and, eventually, their monetary resources"* [1]. The intention was to give the initiative to people, organized in associations of residents, who could even contribute with labour, leaving to the municipal councils the task of land infrastructure and of *"urban location control, land registry transfer and acting as direct interlocutors with the associations of residents (...)"* [1].



Figure 1. Revolutionary times in Porto [2-4]

2. BOUÇA HOUSING COMPLEX – A SAAL OPERATION

The Bouça Housing Complex (Conjunto Habitacional da Bouça), designed by Architect Álvaro Siza, was included in SAAL operations, corresponding to an adaptation of a pre-revolution preliminary project. It is located in the central part of Porto, near Rua da Boavista, one of the streets opened at the end of the 18th century that guided the urban expansion of the city towards the west and the sea.

In 1973, the FFH, an organization that was intended to *"contribute to the resolution of the housing problem, especially of the classes that do not benefit from 'Previdência' social*

plans or from any other similar institutions" [5], commissioned Álvaro Siza the project for a group of social houses in a big lot located between Rua da Boavista, Rua das Águas Férreas, and Rua do Melo, near the 'Tribunal Central de Menores'. In that project Siza intended to "adopt apparently costly criteria of comfort, but which are considered indispensable and available by the economy obtained from standardization principles regarding the adopted schemes, of the lot characteristics usage, with respect to the systems of association and of access, and with the architectural expression itself (...)" [6].

Siza's proposal, even though "still very schematic, aims to avoid a declared rupture in the urban fabric in which it is inserted. (...) From a wall parallel to the existing street, which protects the dwellings from the noise of the railroad and protects the privacy of the north terrain, the dwellings are grouped in four parallel buildings, of four floors the central ones (C2 and C3) and six the others (C1 and C4). In general, the dwellings are organized on two floors (...)" [6].

As Bandeirinha points out, Siza's project was based on an "high-density solution, albeit of reduced height, clearly emphasizing the complementarity relationship between the built space and the interstitial free space and thus ensuring the scale and semantic clarity of the areas of public use" [7].

After the revolution, the lot was included in a larger SAAL operation area - Bouça operation -, which comprised 3 levels of intervention: the first two of rehabilitation and reconstruction of existing precarious housing, and the third corresponding to the construction of a new housing area, near Rua da Boavista – the former location of 1973 project.

Architects Anni Gunther Nonell, Sérgio Gamelas and Maria José Abrunhosa de Castro, who invited Álvaro Siza to develop the architectural project, formed the SAAL Brigade responsible for this operation. This invitation was mainly due to the need for quick response times. For that reason, the Bouça Housing Complex process, unlike other SAAL operations, is carried out at two levels: one, of direct contact with the people that it would serve, made by the Brigade; and, another, of architectural project development.

Siza reviews the 1973 study, making *"an adaptation of the program to the needs of the Association of Residents of Bouça"* which *"will occupy wings C, D and E, in a total of approximately 110 dwellings, being the rest expected to be assigned to the Association of Cedofeita, with whom the same Brigade is working"* [8]. It maintains the structure of 4 wings (now buildings A, B, C, and D) and a fifth building (building E, smaller, that connects with the Rua da Boavista alignment), but reduces the number of floors of buildings A and D (from 6 to 4), planning a total of 158 houses.

In direct relation to the railway line, on the north side, the 'wall' that houses the vertical access system and the interconnection between galleries is also maintained. In this revision were included some spaces for commerce or services, as well as a small covered car park.

This implantation evokes, in some way, the 'ilhas' of Porto¹, in an inversion from the traditional relation: Bouça opens up to the main street, to the exterior, to the city. The north 'wall' takes the role of the houses, that, in the 'ilhas', would face the street, and the interstitial spaces between the buildings (made up by dwellings with access direct from the outside) would replace what was the ambiance of the 'ilha' common space, but on a larger scale, healthier and much more pleasant (Figure 2).

"The layout of the blocks, parallel to each other, sheltered from the railroad and announced from the city, generates a kind of internal housing order, tributary to the specific logic of intervention. Without renouncing this firm but difficult commitment to the city, Siza creates an environment that is not alien to some of the more motivating models of urban community life" [7].



Figure 2. 'Ilhas' of Porto, in the 1970s [9].

2.1. The future residents

The intended people for Bouça houses were the residents of the degraded and overcrowded houses of this area of Porto (Figure 3). SAAL operations, as they are grounded on the initiative of the population, presupposed that the relocation would take place in the same area of the city where the old dwellings were located. A principle that contrasted with the previous 1956 'Improvements Plan' for the sanitation of workers precarious dwellings ('ilhas') [10], or with the 1969 intervention in the historic centre of Ribeira Barredo [11], in which the populations were moved to (at that time) zones far from the city centre.

The Porto City Council began the process of Public Utility Declaration and land expropriation of Bouça operation area (inside a larger area, that ends near Rua da Constituição). The residents of the 'ilhas' and other precarious houses organized themselves in the "Association of Residents of Bouça", which still exists today (statutes approved on March 23, 1975, and published on September 20).

¹ "Ilha", is a type of working-class low-income housing development that were built inside city blocks from mid nineteenth century onwards and that still exist today. As an island is surrounded by the sea, an 'ilha' is surrounded by other constructions, using what were the backyards of the middle-class houses. The contact to the street is granted through a small corridor, sometimes tunnel shaped.



Figure 3. Bouça Housing Complex residents in the late 1970s [12]

2.2. The dwellings

The dwellings, of different typologies (one to five bedrooms -T1 to T5) and with a width of 4 meters were organized in two floors (duplex), separating a more 'social' area on a floor (kitchen and living room), and a more intimate area on the other floor (bedrooms). For various reasons, including social coexistence issues, the social areas of the two houses were on consecutive floors (floors 2 and 3), and the bedrooms were located on the farthest floors (floors 1 and 4). The access to the lower-floor dwellings was done from the common spaces between the wings (at level 1, directly to the bedrooms hall, and going upstairs to the living room, and, at level 2, through an outside stair linking to a small patio that communicated with the kitchen). Access to upper-floor dwellings was done through the elevated galleries (without the double entrance but also with the existence of small patio in direct relation to the kitchen).

The metric of 4 meters wide has a direct relationship with the 'ilha' house. However, instead of the 4 x 4 meters that usually constituted the minimum housing cell in an 'ilha', in Bouça the dimensions expand in depth (for 12 meters) and in height (occupying two floors).

The way the accesses were made also evokes the usual lifestyle of that time (and not only of the 'ilha' houses), in which the kitchen plays the main role in the daily use of the house. The set of direct stairs that strongly characterize the image of Bouça, allow direct access to the kitchens, making them effectively the entrance of the house. The small patios, opened to the kitchens, guarantee the existence of an intermediate space, used for the social coexistence between neighbours, but also becoming a kitchen extension, where it would be possible, for example, to grill the traditional sardines.

The gallery of access to the upper-floor houses becomes a true space of collective fruition, using the entrances recesses as space protected from the sun and the rain.

The small benches, shaped on the floor, which connected the patio and the living room, allowed the connection and the closure of the two spaces.

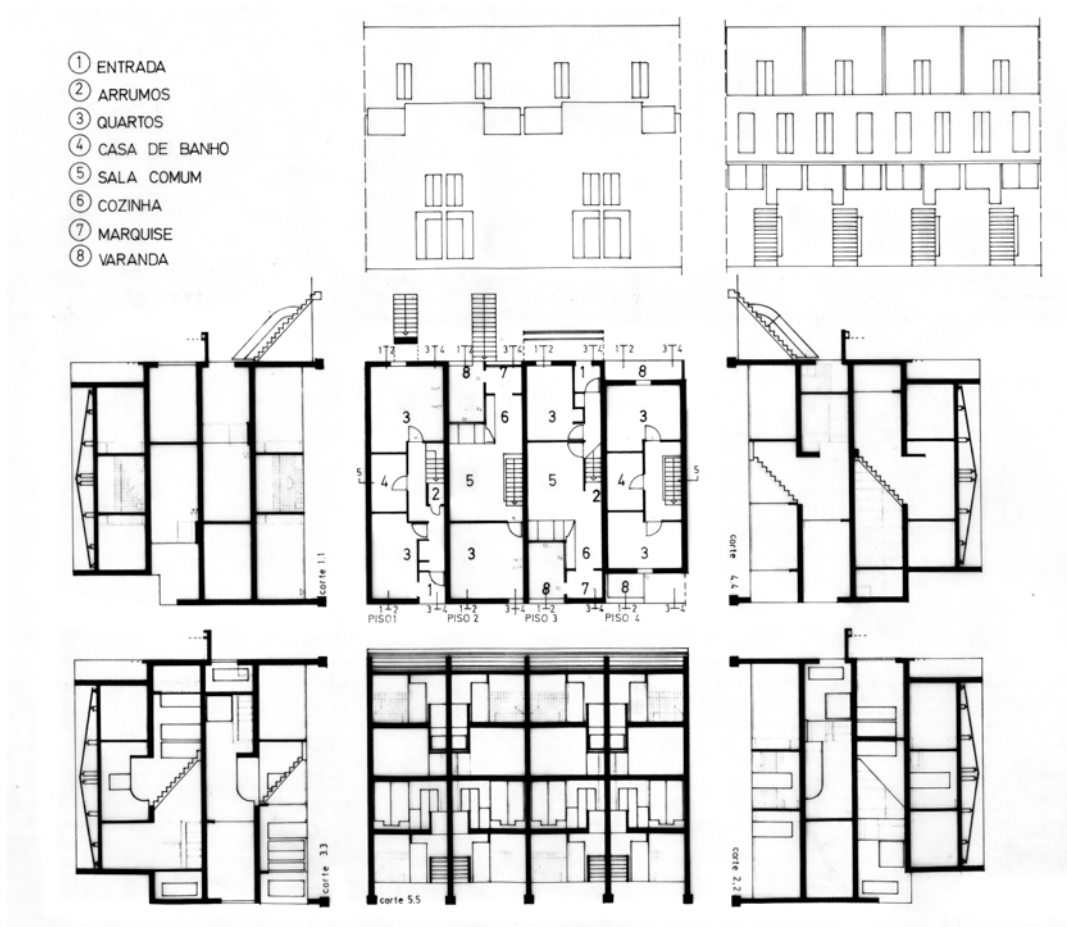


Figure 4. Bouça Housing Complex 1970s design [13]

2.3. The constructive System

There is a strong connection between the spatial and typological definition and the constructive solution used.

A sequence of masonry walls, spaced 4 m apart between axes, which correspond to the partition walls between dwellings, guarantee the vertical structure of support. Four meters was a metric that would correspond to the minimum possible distance that would satisfactorily solve the house internal distribution, also allowing the resolution, in an economic and slender manner, of the horizontal supporting structure.

The first option (represented in the first structural drawings) would use granite masonry (*'perpianho'*), that later was changed to concrete building blocks (Mecan type, series 300, with 30x20x20 cm), the solution that was shown in the second phase drawings [14]. If the use of stone masonry was a current situation until the middle of the twentieth century (falling out of use with the introduction of reinforced concrete frame structures), the use of masonry of concrete blocks, although not new (there are examples from the 1920s onwards) was not usual, even less in collective housing programs.

The two facades (main and rear) are not part of the supporting structure but contribute to the bracing of the building, together with the floor slabs (Daviga type).

2.4. Comfort and infrastructures

In order to guarantee a greater soundproofing between fractions, in the *"separation walls between dwellings, the blocks' voids"* would be *"filled with dry sand"* [15]. The internal partition walls would be executed in 10 cm thick Ytong blocks, which with their well-worked faces and without burrs of mortar (if compared to the usually used hollow brick partition wall) would allow a reduced thickness of plaster projected on the surface, a minimum of 2 mm as stated in the written documentation.

The choice of slab systems also considered soundproof effects and the introduction of infrastructures. In fact, the use of a 20 cm Daviga slab instead of the usual 15 cm flat concrete slab would allow for the pipes to be inserted in the slab thickness, as was pointed out by the engineer João Sobreira [14], dispensing fillers in lightweight concrete or false ceilings in the floor bellow.

The roofs would be executed with a slab identical to the floor slabs, insulated with a 5 cm layer of cellular concrete, over which a ventilated fibre cement roof would be superimposed. The terraces would be waterproofed over the cellular concrete layer [15].

2.5. Cost Control

The choice of constructive and material solutions was guided by a desire for an economy that was not based on the direct use of the cheaper solution, by the use of low-quality and/or low-cost materials. It was based on a judicious choice of quality systems and materials (some of which, at the time, with little tradition of application in Portugal), which, combined with the architectural solution, allowed for cost savings due to economies of scale, rationality of execution and slender solutions that ensures a more favourable ratio between gross area and floor area.

The resistant masonry solution, with the rationality with which it was designed, would be more economical in the 1970s, if compared to a frame structure of reinforced concrete, and would allowed its easy execution by the future residents if Nuno Portas ideas about 'auto construction' had been followed by the population. As the work ends up being carried out by the company Soares da Costa, the issue of facilitated execution was not an added value. Already in the 1973 project, Siza stated that *"if, viewed in the abstract, elements such as the gallery, the flat roof, the terrace, the interior staircase in most dwellings, the service balcony with glazing, the adopted structural metric, will not be economical, but the way these elements fit into the solution, adapting to the terrain and the program, allows to obtain economically favourable results"* [6].

2.6. The beginning of construction and the interruption of works

With the extinction of SAAL in October 1976 (resulting from Portugal new political redirection), the design and construction processes were not immediately discontinued, continuing under the FFH framework.

Between 1977 and 1978, two parts of the C and D wings were built, and until 1979 the projects and processes that would allow the launch of a second stage construction contract were completed (which would partially complete the north and south tops of the wings). A third phase was also planned, divided into three parts, in which the west wing would be executed, as well as the North wall that made the connection between wings.

The execution project of this second phase is much more complete than the initial one, both in drawings and in written documents, and it has been integrally archived and preserved, thus elucidating the intended form of execution (that corresponds to first phase execution but that was not properly detailed in drawing and in written documents).

However, the competition for the second phase construction was never launched and the Bouça Housing Complex remained unfinished for about three decades. For a long time, the recognition and visibility of SAAL operations (both as a process and as an architectural project) were made at international rather than national level, and this is evident even in the fact that Bouça incomplete intervention remained an unsolved problem for so long.

“Of the one hundred and thirty-one dwellings planned, only fifty-eight were built, with the buildings blocks unfinished and truncated, no external arrangements were made, the definitive accesses to the galleries of the upper houses were not constructed, being the access made by stairs of provisional structure and construction” [16].

3. THE COMPLETION OF THE BOUÇA HOUSING COMPLEX

In March 1999, the Federation of Cooperatives invited Álvaro Siza to make the revision of the initial project and, at the same time, began the necessary procedures for solving the complex issue of land ownership. In a certain way, the international notoriety that Álvaro Siza and his work had meanwhile achieved (including Bouça intervention) are arguments in favour of the completion of the initial project (more than just resolving an open wound in the urban fabric), creating the political will to finally end a long process.

The support of INH (Instituto Nacional de Habitação / National Housing Institute) is obtained for a housing development at controlled costs, which allows the completion process to proceed [17]. In June 2000 "Águas Férreas - Cooperativa de Habitação e Construção, CRL" was created, by an association of "CETA - Cooperativa de Habitação Económica, CRL", of "Cooperativa de Habitação Económica «As sete bicas», CRL", of "Association of Residents of Bouça" and another 6 persons in individual name, who will function as owner. And on October 15, 2003, a tripartite sale deed for the land was made between the Municipality of Oporto, IGAPHE, and the aforementioned Águas Férreas Cooperative [18].

The conditions for the completion of the project are thus met.

The licensing process begins in January 2001, obtaining the building permit in April 2004, with work commencing the same month. The construction was adjudicated to the construction company FDO, and was completed in April 2006.

The more than two decades that elapsed between the completion of the first phase in 1978

and the decision to end the Housing Complex in 1999 correspond to a significant change in the Portuguese context in terms of the construction activity, from the regulatory point of view, but mainly at the people's current minimum requirements. The scope in which the first intervention had been carried out had also determined a substantial saving of means, materials, and areas. At the same time, the first phase, unfinished and without maintenance, had degraded considerably. The exterior surrounding spaces not cared for long-time and some clandestine interventions in some fractions complement the scenery.

3.1. The 'new' dwellings

The new project, while respecting the original idea, has to incorporate several adaptations both by regulatory changes and by the very alteration of lifestyles and general requirements. As Álvaro Siza points out, *"the revision of the project obliged us to consider the deep evolution of the resident population, in relation to the context prior to the 1974 revolution (it was unthinkable the need for a garage or the concern to delimitate public and private spaces, and impossible to foresee the requirements of the current regulations). Bouca was a radically economic project, and nothing else could be or should be in 1974. The discussion of the project revealed, years later, the desire (and the possibility, although reduced) of occasional improvements in quality and comfort. It was necessary to meet the demands manifested, some due to prejudices that accompany the objective improvement of the quality of life. It was for this and again a participated project, in the relation with the resident families"*[19].

"The houses to be built, whose typology and organization are identical to those already built, that is to say, overlapping dwellings, with two floors each, direct access to the lower houses and by gallery to the upper ones, will have slight modifications with respect to the initial project that seek to respond to the new living and working conditions, in particular with regard to the increasing of living room area and the relationship between the dwelling and the outside, which is revised in the light of new security needs" [16].

The adaptation of the initial project to the current constraints determines some changes but does not compromise the legibility of the original architectural solution. Full compliance with the present regulatory framework would have led to a major change in the project. However, and without compromise security issues, there was a political will to accept a less demanding regulatory framework, allowing for surgical changes (necessary as a direct response to the last 3 decades evolution).

The first important change corresponded to a greater closure of the housing space, due to security issues, the need to increase living space, but also the change in lifestyle and home requirements. The recesses of the access doors, on the first floor and the third floor, are now protected by a gate, yet remaining as outer space. The patios are annulled, being its space divided between the living room and the laundry (as a conservatory). This change ends up determining an alteration of the kitchen space's perception, more merged with the living room (Figure 5). The inclusion of a large sliding door in the separation between the bedroom and the living room gives more versatility to the house space.

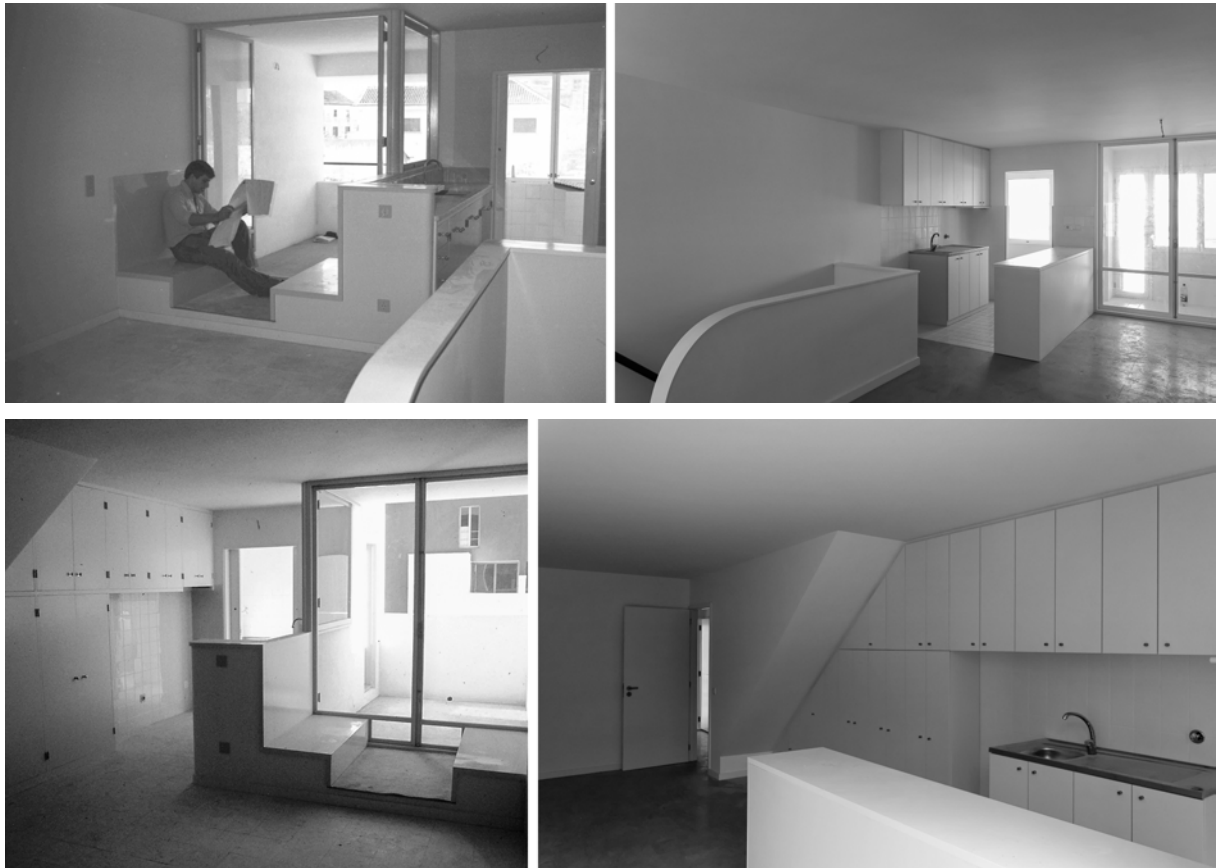


Figure 5. Kitchen and living room areas of the lower-floor dwellings (top) and upper-floor dwellings (bottom), in the 1970s (left) and in the 2000s (right) [12, 20]

Another important change concerns the toilet facilities. Since there is no possibility of placing a second bathroom, a separation of the existing sanitary installation in two nuclei, of independent accesses, is made.

3.2. The updated constructive system

The completion of the project is done by continuity with the pre-existence, also in the constructive point of view, being mentioned, in the architecture project description, that *"(...) it is proposed to re-edit the initial system of load-bearing walls, now with the substitution of the inconvenient blocks of concrete by reinforced concrete"* [16], ie based on the same principles but with different materials. The interior finishes and window frames would also be made with materials identical to the initial ones. The exterior finishes would be altered (in terms of its constituent elements but not in aspect) mainly to respond to *"thermal comfort aspects, through the outer coating by 'capotto' plastic plaster, with the respective (fiberglass) nets, and thermal insulation of expanded polystyrene"*[16].

One of the aspects that strongly influenced the new constructive solution was the need to provide for underground parking under the buildings. The 4-meter structural modulation,

which is maintained in the new project, is not compatible with a cost-effective and economical parking solution, a 'problem' to be solved.

The new structural project (2002) already presents a constructive solution slightly different from that mentioned in the 2001 architectural project description, continuing, as in the 1970s, to rely on masonry load-bearing walls, now complemented with reinforced concrete walls in specific areas. In fact *"the 1975 structural project conceived the buildings using traditional construction, load-bearing walls of concrete blocks and slabs of prefabricated reinforced concrete beams, meeting the need to a very economical construction (4000\$/m² in 1975) (that) at the time (...) were very competitive if compared with reinforced concrete even because technologies for the execution of reinforced concrete were incipient, not very economical, and not all constructors had them (eg tunnel construction). The newly designed buildings maintain an identical solution consisting of prefabricated slabs with pre-stressed beams resting on mixed masonry brick walls and solid reinforced concrete pillars. The existence of the basement for parking, on top of which some of the housing blocks, now designed, will be supported, justifies the option for reinforced concrete up to the first-floor level in this area, since this is a structure less-sensitive to the small deformations of the base support (...)"* [21].

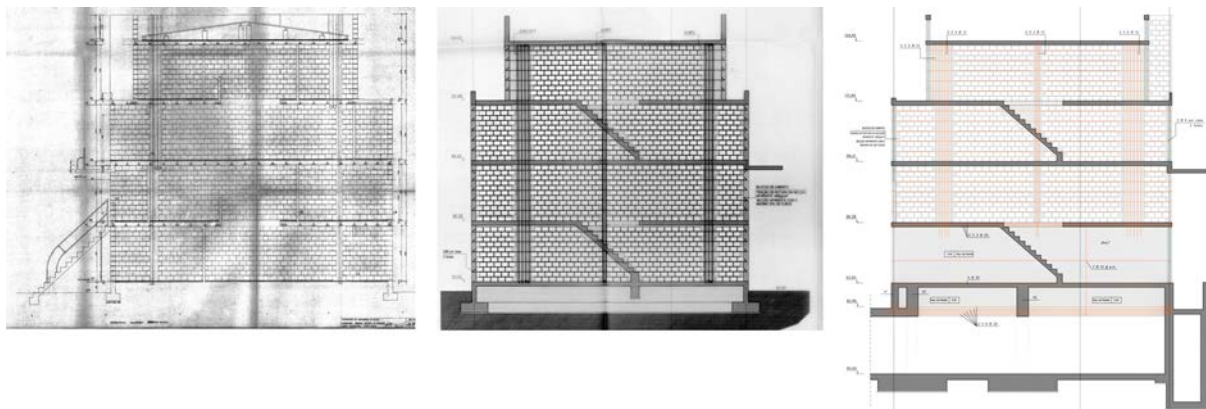


Figure 6. Section, with stereotomy representation. 1978s project (left), 2002 project (centre), and the built structure, in 2006 final project (right) [22-24].

Despite the mention of bricks in the description, the structural drawings indicate concrete blocks, which are the actually used. Thus, in the buildings with a basement, the structure up to the first floor is guaranteed by reinforced concrete walls, and on the following three floors, by load-bearing masonry walls of concrete blocks and reinforced concrete elements. In the buildings without a basement, the four floors use the solution of load-bearing masonry walls (Figure 6).

To solve the need for two different structural grids (4-meters on the dwelling floors and 8-meters on the parking), beams of high height are created and, in certain zones, a system of a double slab (one slab aligned by the beams underside and another aligned by the upper face).

Another major change in relation to the first phase is the roof. The existing fiber cement roof is dismantled and a new not accessible flat roof is done, one that is properly thermal insulated and finished with gravel.

The construction phase also determines some changes, which are evident in the final drawings presented in 2005 and 2006. In relation to the 2001 project, the two slabs solution disappears almost completely, remaining only the upper slab and the high-beam system in both directions. In this new solution, the transverse beams correspond to the separation walls between dwellings, executed in reinforced concrete on the ground floor that extend about one meter and thirty to the basement level. In the longitudinal orientation, the location of the beams corresponds to the limits of the buildings and another one roughly halfway between them (the location is dictated by the parking lot and not by the dwelling structural metrics). In areas where the double slab solution still exists, the upper slab is apparently prefabricated. Also the structure of the buildings without a basement is changed, using now the same solution of the other buildings, ie, reinforced concrete wall up to the first floor (certainly reasons of construction systematization and stability assurance).

This phase drawings are based on the execution drawings (architecture and structures) so there is a greater definition of the construction system. As in the 1970s project, modulation of masonry elements continues to be important in this stability project, but not with the same rigor as the first phase, despite the current ease brought by CAD software (Figure 6). In the 2000s drawings, the representation of masonry elements functions more as a material identification hatch than as a stereotomy to be followed. The marking of the joints evidences this since they are not represented in the support of the slab and are thicker in the top of the wall. It is also important to note that at this phase, rather than following a placement metric for the concrete blocks, it is important to follow the alignments of the first phase buildings. Adding the fact that it was necessary to change the dimensions of the blocks, since 30 cm length blocks are no longer made (construction industry standardization adopted the 40 cm length).

4. CONCLUSIONS

Upon construction conclusion, few were the initial residents who decided to return to their place of origin (abandoned almost 3 decades before), and it was a middle-upper class (with a natural high incidence of architects) that acquired the small houses, for their own home or for rent. Indeed, unlike in the 1970s, where future residents were already perfectly identified, participating in the design and construction process, in 1999, when the decision to conclude the intervention was taken, it did not correspond to a real or urgent need of the houses, but was justified by the desire to end the long process. Thus, in a certain way, we can consider that in the initial process the primacy was given to the social concerns, to an urgent need response, while in the 2000s process of completion, the emphasis was placed on architectural and urban issues. In fact, contrary to what happens in most real-estate developments, of a progressive decrease over time of the social status of their residents (reflecting also the reduction of building's quality and compliance with contemporary requirements), in the case of Bouça there is an increase of the social status,

to which are not unrelated, of course, the building architectural quality and the notoriety of the architect.

Bouça Housing Complex is a very interesting example, where architectural and structural concerns and definitions merge together, to achieve a sustainable and resilient intervention. And History is a safe place to seek inspiration and knowledge to guide us in the search for a future that respects the maintenance of resources available to future generations.

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