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Sergio Rodrigues and the SR2 System: pre-manufacturing from daily life

Sergio Rodrigues e o Sistema SR2: a pré-fabricação a partir do cotidiano

Sergio Rodrigues y el Sistema SR2: prefabricación basada en la vida cotidiana

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Abstract

The SR2 Prefabrication System, developed in the late 1950s by the architect Sergio Rodrigues, was showcased at the Museum of Modern Art in Rio de Janeiro (MAM Rio) in 1960 as part of the exhibition *Casa individual pré-fabricada*. Originally conceived to address a personal issue, it took on a new direction when the architect realized it could be a solution to an everyday issue: that of individual housing units. Within the theoretical-methodological framework, the draws on Michel de Certeau to highlight the prosaic issues addressed by Rodrigues with the SR2. The text reflects on the housing unit built at MAM Rio through analyzes involving its origin and the project. Then, three cases are studied: the OCA II building at the University of Brasília *campus*, the second headquarters of the Brasília Yacht Club and the first headquarters of the Goiás Country Club to investigate some of the uses that the system made possible. In addition to the literature review, field visits were made to the Sergio Rodrigues Institute and to the three cases mentioned for material collection. Rodrigues' production with the SR2 sparked some discussions, which we can summarize in the relationship between everyday life, the planned, and the unexpected.

Keywords: Architectural culture; Modern housing; Brazilian architecture; Prefabrication; Architectural design; Sergio Rodrigues.

Resumo

O Sistema de Pré-fabricação SR2, desenvolvido no fim da década de 1950 pelo arquiteto Sergio Rodrigues, foi apresentado no Museu de Arte Moderna do Rio de Janeiro (MAM Rio) em 1960, na exposição *Casa Individual Pré-Fabricada*. Concebido para resolver um problema pessoal, teve um novo direcionamento quando o arquiteto percebeu que essa poderia ser uma solução para atender uma questão cotidiana: a da unidade habitacional individualizada. No limite teórico-metodológico, o artigo apoia-se em Michel de Certeau, a fim de evidenciar as questões prosaicas respondidas por Rodrigues com o SR2. O texto reflete sobre a unidade habitacional executada no MAM Rio através de análises que envolvem sua origem e o projeto. Em seguida, para investigar alguns dos usos que o sistema possibilitou, três casos são estudados: o edifício OCA II, no *campus* da Universidade de Brasília; a segunda sede social do Iate Clube de Brasília; e a primeira sede do Country Clube de Goiás. Além de revisão de literatura, foram realizadas visitas de campo ao Instituto Sergio Rodrigues e aos três casos mencionados para coleta de material. A produção de Rodrigues com o SR2 provocou algumas discussões, as quais podemos sintetizar na relação entre o cotidiano, o planejado e o inusitado.

Palavras-chave: Cultura arquitetônica; Habitação moderna; Arquitetura brasileira; Pré-fabricação; Projeto; Sergio Rodrigues.

Resumen

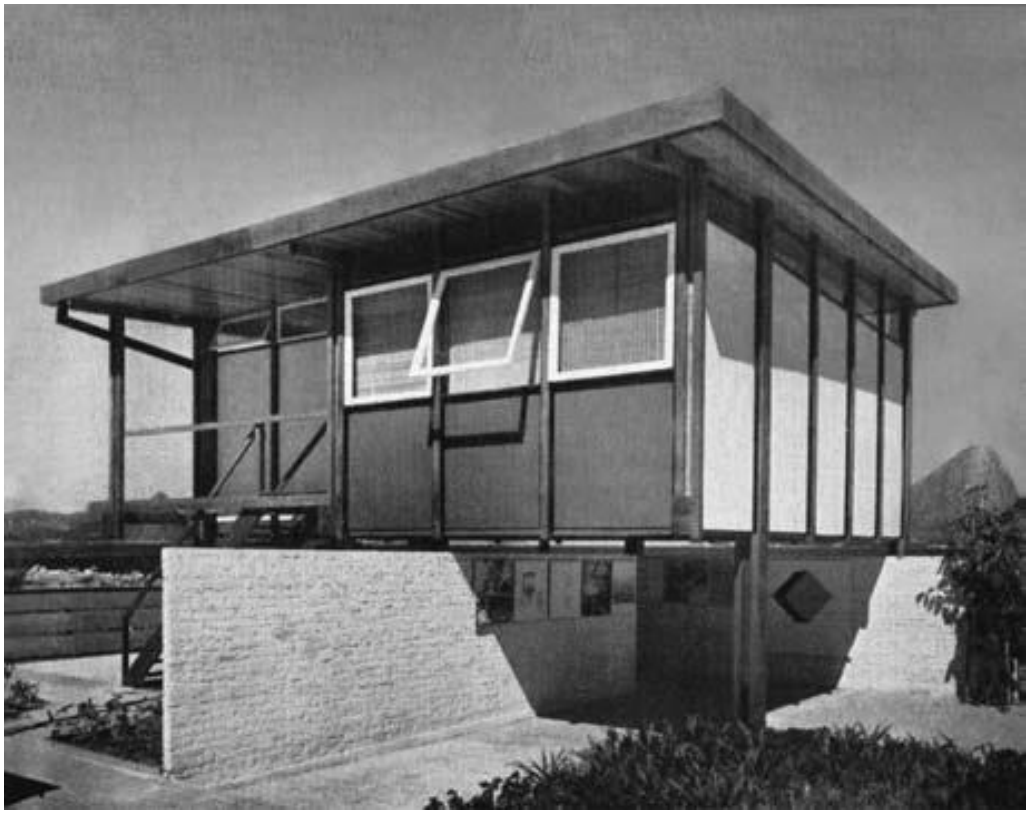
El Sistema de Prefabricación SR2, desarrollado a fines de la década de 1950 por el arquitecto Sergio Rodrigues, fue presentado en el Museo de Arte Moderno de Río de Janeiro, en 1960, en la exposición *Casa individual pré-fabricada*. Concebido para resolver un problema personal, tuvo un nuevo rumbo cuando el arquitecto se dio cuenta de que podría ser una solución para abordar una cuestión cotidiana: la de la unidad habitacional individualizada. Dentro del marco teórico-metodológico, el artículo se basa en Michel de Certeau para resaltar las prosaicas preguntas respondidas por Rodrigues con el SR2. El texto reflexiona sobre la unidad habitacional construida en el MAM Rio a través de análisis que involucran su origen y el proyecto. Luego, se estudian tres casos: el edificio OCA II del *campus* de la Universidad de Brasília, la segunda sede del Iate Clube de Brasília y la primera sede del Country Clube de Goiás, para investigar algunos de los usos que el Sistema viabilizó. Además de la revisión bibliográfica, se realizaron visitas de campo al Instituto Sergio Rodrigues ya los tres casos mencionados para la recolección de material. La producción de Rodrigues con el SR2 suscitó algunas discusiones, que podemos resumir en la relación entre lo cotidiano, lo planificado y lo insólito.

Palabras-clave: Cultura arquitectónica; Vivienda moderna; Arquitectura brasileña; Prefabricación; Diseño arquitectonico; Sergio Rodrigues.

1 In the gardens of the MAM Rio

In 1960, with the exhibition entitled *Casa Individual Pré-Fabricada* [*Individual Prefabricated House*] (Figure 1), the SR2, a prefabricated wooden system developed by architect Sergio Rodrigues, was presented for the first time in the gardens of the Modern Art Museum in Rio de Janeiro (MAM Rio). The proposal arose from a personal restlessness experienced at that time, the late 1950s, a period marked by a critical effervescence in the ways of thinking and acting in modern housing[1]. Initially, the architect studied a prefabrication system to build his own house on temporary land. He intended to develop a low-cost project that could also be disassembled and reassembled elsewhere (Rodrigues, 2013). Along the way, he concluded that instead of making a house for himself, "he should make a house for the people" (Rodrigues, 2013, p. 276). As he looked at the daily lives of ordinary Brazilians, he realized that his problem was not exclusive and that prefabrication, using a flexible construction system and materials accessible on the market, was a way to meet current demand. The need to constantly change and adapt housing to different situations could be made possible by a quick-to-construct, low-cost building that could be adapted to any location and which would allow for future modifications in line with the residents' daily lives.

Figure 1: Prototype of the housing module in Sistema SR2 executed on a 1:1 scale in the gardens of MAM Rio, in 1960, in the exhibition *Casa Individual Pré-Fabricada*.



Source: Luz (2018, p. 45).

The art critic Mário Pedrosa, responsible for the text of the catalog, mentions the role that

[1] The European debate on mass housing, within the Modern Movement, was marked by the II *Congrès internationaux d'architecture modern* (CIAM), held in 1929 in Frankfurt, Germany. In Brazil, the buildings designed by Reidy in the 1950s, Gávea and Pedregulho, established a starting point for the debate in the country. For Bonduki (2010), these buildings are not isolated and spontaneous cases, although the historiography of architecture did not notice other examples that preceded the buildings mentioned.

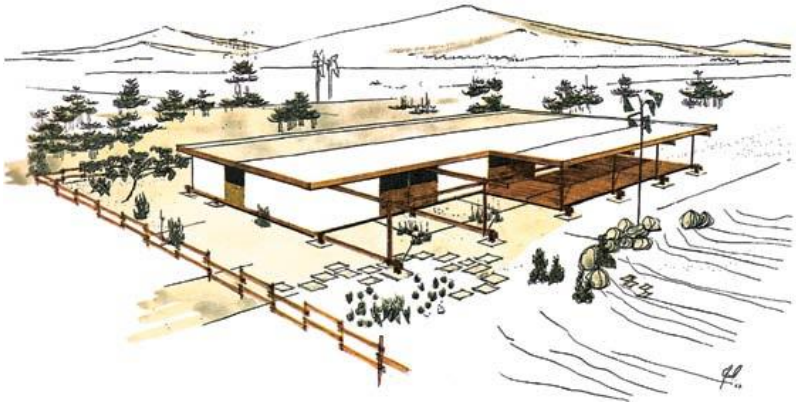
the Oca store had been playing in the 1960s in the discussion about the problem of housing the common man, contextualizing SR2 as a breakthrough in this scenario. The beginning of Pedrosa's text (2018), originally published in 1960, calls into question modern architecture in the country because it was "reserved for millionaires or public authorities". This analysis can be understood when Pedrosa (2015b) talks about the pioneering spirit of the group formed by Lucio Costa, Oscar Niemeyer, Carlos Leão, Jorge Moreira, and Affonso Eduardo Reidy, with the ideals of Le Corbusier. According to him, the revolutionary architectural spirit crystallized in Brazil from the 1930s onwards, as it found a country that was also experiencing a political and economic revolution. National architecture aimed for a new identity based on Le Corbusier's theories, disseminated above all by the group in projects for wealthy clients and "government palaces". Rodrigues' experience with the SR2 therefore calls into question the way of doing architecture in the country. Pedrosa (2018) acknowledges the architect's style as a "healthy reaction, albeit unconscious, to the associative or antisocial excess" present in artistic and architectural achievements in Brazil.

In 1952, for the *Jornal do Brasil*, a Brazilian newspaper, the critic emphasized the need to create flexible architectural spaces, contrary to the masonry experiments that were being carried out in most modern buildings. Pedrosa (2015a) argued that the interior of buildings was just as important, if not more so, than their exterior, and that the malleability of interior spaces was responsible for an architectural revolution that organized itself outside and inside the building. In the catalog text, Pedrosa (2018) says that SR2's solution meets the demand of Brazilians who like to "improvise, straighten, add or remove parts, [...] whether a rich man in his palace or a poor man in his shack".

These characteristics analyzed by the critic can be seen in the independence between the structure and the enclosures in the system. Based on waterproof plywood sheets, the structure of the house was entirely modular. Pillars, beams, and joists, all made of solid *Peroba* wood (a timber tree from the *Apocynaceae* family), had a three-inch gauge, as this was a market product available at the time (Pedrosa, 2018). The removable walls allowed for flexibility and greater internal movement. This versatility meant that residents could alter the rooms according to their functional needs and particular aspirations. The main structure had 5 m high supports so there was a 2 m ceiling height on the first floor, to double the built area and allocate the use of this space according to each resident's program.

According to Fernando Mendes and Dimitri Buriti (2021), there are three phases to the system. The periods correspond to 1958 to 1968 for the first phase, 1973 to 1982 for the second, and 1983 to 2012 for the third. Each period has its characteristics, but it is worth highlighting two aspects that have changed according to market conditions and the research carried out on the construction system: modulation and formal typology. In the first case, the plywood boards available on the market determined the width of the spans with their multiples and submultiples. As the measurements of this material changed over the years, the modules of the projects also changed: 1.22 x 2.50 m in the first phase; 1.60 x 2.20 m in the second; and 1.60 x 2.20 m or 1.20 x 2.50 m in the third. Another feature that has changed over the years and has a direct impact on the shape of the building is the solution given to the roof, which was initially flat and made of bituminous membrane. Later, the sloping roof solution was adopted, which became increasingly complex, especially with floor plans that were no longer configured as rectangles but articulated with internal courtyards and a set of volumes that moved forward or backward (Figures 2 and 3).

Figure 2: A sketch of the project developed in the 1960s.



Source: Luz (2018, p. 173).

Figure 3: A drawing dated 1990. Sergio Rodrigues Institute (ISR) Archive.

Source: ISR (1990).

About the work carried out using SR2, the first phase includes important buildings, such as the pavilions that compose the second headquarters of the Brasília Yacht Club, the first headquarters of the Goiás Country Club, and three pavilions at University of Brasília (UnB), the latter of which were built at the invitation of Darcy Ribeiro to house the restaurant and dormitories for students and teachers on the university campus. During this period, according to Santos (2000), the SR2 System enabled around 200 units to be built – including houses, clubs, hotels, field offices, and other types of buildings – almost all over the country. The author also states that in 1977, the year of the second phase, the SR2 was adapted in collaboration with the Danish architect Leif-Artzen, to adapt it to the conditions in the Nordic countries and implement it locally.

It should be noted that the system arose from a problem related to the architect's daily life at the time, the problem of building emergency housing, which was solved with products routinely available on the market to make the work feasible quickly and economically. In the light of Michel de Certeau (1988), we can find intersections that contribute to a reflection on the design of the SR2 System: the architect's concern to design this system from a critical viewpoint on prefabrication as an industrialized system and to get closer to the possible readings of future residents, to foresee solutions to everyday problems. The French thinker writes about the exercise of this reading:

> [...] The thin film of writing becomes a movement of strata, a play of spaces. A different world (the reader's) slips into the author's place.
>
> This mutation makes the text habitable, like a rented apartment. It transforms another person's property into a space borrowed for a moment by a transient. Renters make comparable changes in an apartment they furnish with their acts and memories [...]. (Certeau, 1988, p. xxi)

Based on this citation, this article borrows the words from *The Practice of Everyday Life* (Certeau, 1988) to read, reflect on and interpret SR2, taking into account the everyday life that is presented in the system's conception through the model project of the *Casa individual pré-fabricada* [*Individual prefabricated hous*e] and three subsequent buildings: the first headquarters of the Goiás Country Club, the second headquarters of the Brasília Yacht Club of and the first housing pavilion of the University of Brasília.

2 A brief introduction to the SR2

The idea was to design a building that could be assembled, disassembled, transported, and reassembled, while at the same time being economically accessible. For this reason, galvanized steel tubes were initially envisioned as the structural elements. This proposal was soon abandoned, and wood became the building's basic material. Rodrigues (2013, p. 287) "wanted to find a way to connect architecture with wood, design[2], what I [he] was doing". Inspired by the ideals of the Ulm School, he says he developed studies whose pieces would be patterned after materials easily accessible on the market. There would be no need to process them to produce fittings, in other words, the building would be erected by juxtaposing and screwing together these wooden components, available in building supply stores.

Founded in Germany in 1952, the Ulm School had four departments: Product Design, Visual Communication, Building, and Information. According to Hernan Garcia (2001), the Department of Building, also known as Industrialized Buildings, focused on studying industrial production systems with more efficient and economical solutions. Prefabricated structures, with connecting elements that allowed for easy, low-cost, and waste-free assembly, met the demands of the course. Often, issues from the Product Design Department were shared with the Building Department. The solutions adopted by Sergio Rodrigues to solve prefabrication in the SR2 System show the contribution of the Ulm School's discussions regarding modulation, the assembly system, the materials, and form design.

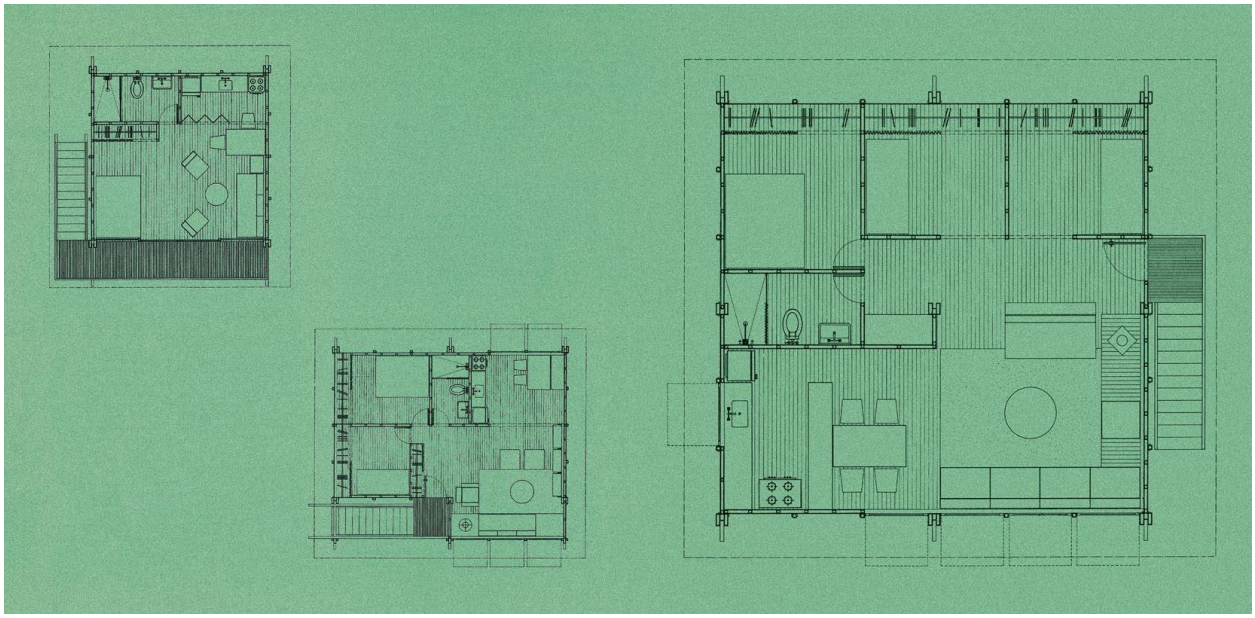
According to Rodrigues (2013, p. 292), in 1960, during one of his constant visits to the Oca store, Niomar Moniz Sodré Bittencourt, director of MAM Rio at the time, observed the sketches of the prefabrication system on the architect's drawing boards and invited him to exhibit a 1:1 scale model in the museum's gardens, as "the first manifestation of the Museum of Modern Art for architecture". He says that within twenty days, the *Casa individual pré-fabricada* module was built and ready for visitors.

Three floor plans were shown to illustrate SR2 (Figure 4). In the first case, of 25 m^2, all the rooms were combined, except for the bathroom. In the second and third cases of 47 m^2 and 65 m^2 respectively, the kitchen, living room, and dining room were combined, and the bedrooms were individualized and isolated. In all three proposals, one enters the house

[2] The term "design" can be read as furniture design and/ or industrial design.

through a staircase that leads the visitor to the social areas of the house. Once there, sofas, tables, benches, chairs, and armchairs make up the internal furniture arrangement and help to articulate circulation and define environments. Cupboards are used not only for storage but also to replace the wall in the medium-sized pavilion and/ or to create a visual buffer between the living room and bathroom in the larger floor plan. In the latter, it is also valid to understand them as benches, transforming the circulation into some sort of home office.

Figure 4: Three floor plans proposed by Rodrigues to illustrate SR2.



Source: Pedrosa (2018).

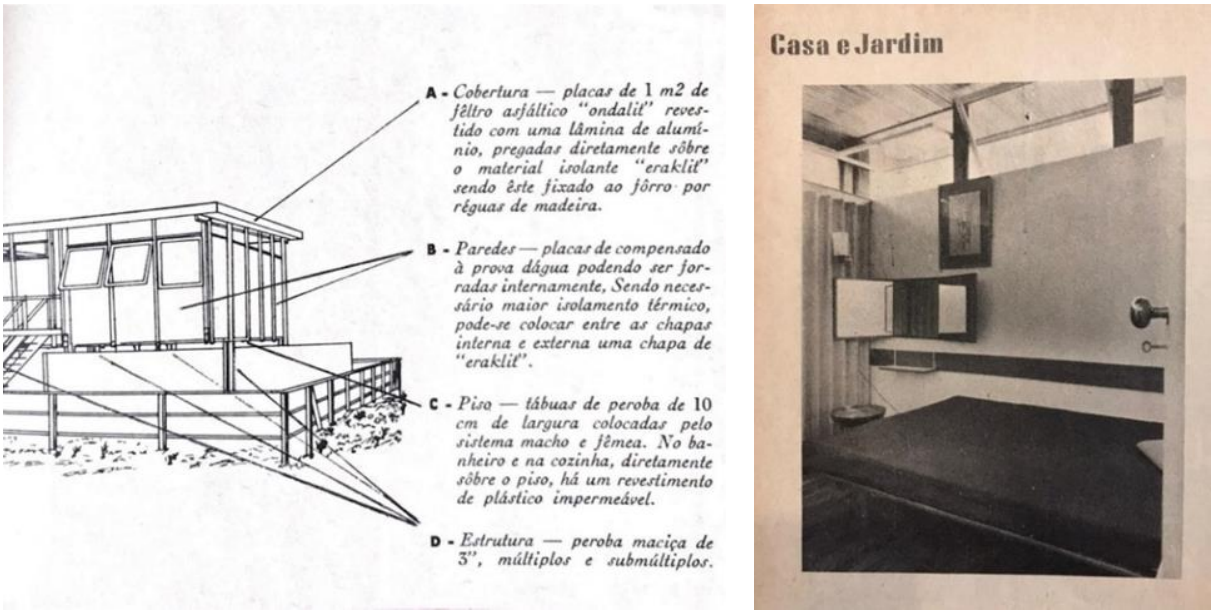
According to Pedrosa (2018) and Rodrigues *et al*. (1961), the legislation in force at the time called for the building to be elevated 60 centimeters above the ground. However, the architect's proposal, exemplified by the project he carried out, was to raise the building 2 meters above the ground to respond to the issue of health and safety and, at the same time, allow the space generated by this distance to double the built area. The solution adopted catered to the particularities of each resident, with the first floor being able to house a garage, playground, service area, and/ or other uses. Also noteworthy was the project's concern with thermo-acoustic insulation by planning double walls with blankets between the closing plates, cross-ventilation, and cupboards acting as room dividers.

Issue 68 of *Casa e Jardim* magazine, September 1960, features a photo of the *Casa individual pré-fabricada* on the cover and an article by Rachel E. Prochnik. The journalist points out that the built model, costing Cr$ 560.00, was flexible enough to meet the individual demands of each project. According to the author, the project had the advantage of a building designed with prefabricated elements that were "interchangeable and could be repeated indefinitely, making different layouts and façade compositions possible" (Prochnik, 1960, p. 28), distinguishing itself from conventional prefabricated buildings at the time, sold as ready-made models, without the possibility of internal and external rearrangement, according to Sergio Rodrigues (2013). This shows how close the architect was to the Ulm School's discussions on modulation. In the exhibition catalog, for example, we find information about the structure of the house that illustrates this issue:

> Its dimensions are 1.22 m x 2.50 m, with its multiples and submultiples. The structure is made of solid peroba wood, following the gauges available at the

time, i.e. 3 inches (0.075 m) and its multiples and submultiples. If public acceptance is such as to lead architect-designers to undertake large-scale production of these wooden models, this will force them to leave the experimental phase and enter a real industrialization process[3]. To begin with, they will change the typical module of the solid pieces from 3 to 2 inches (0.05 m), since the strength and flexural properties of the pieces will be the same as those of the current gauges on the market (3 inches), with the advantage of reducing the wood by a third and making the material more accessible and even more elegant. At this experimental stage, OCA believes, and rightly so, that there is no advantage in adapting its sawmills to the new types straight away, adding to the costs of the model the work of adjusting the machines to the reduced prototypes. (Pedrosa, 2018)

Figure 5: Diagram of the *Casa individual pré-fabricada* showing the materials of SR2 and a photograph of the room with the gap between the wall and the ceiling.



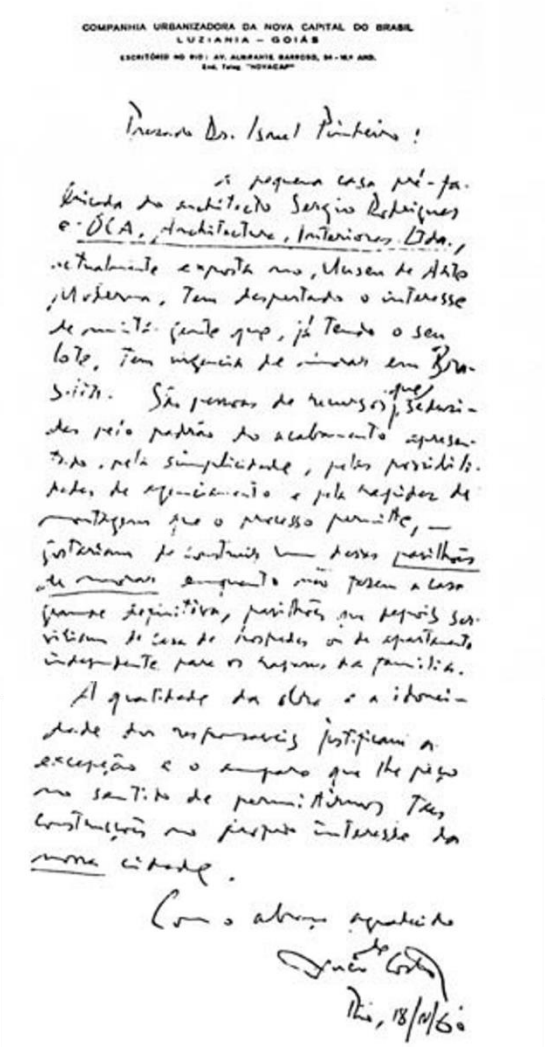
Source: *Casa e Jardim* magazine, ed. 68, September 1960.

While the structure is separated from the enclosures, the internal walls made of plywood sheets are removable, just like the external walls, where waterproof plywood sheets are used for the same purpose. For the bathroom and kitchen, fiber cement sheets are used as a sealing material. The floor, made of peroba-rosa wood sheets, is covered in plastic in wet areas. "The roof, in turn, will be made of 1 m^2 sheet of 'modality' asphalt felt coated with aluminum foil nailed directly onto the 'backlit' insulating material, which, in turn, is fixed to the ceiling, made of wooden planks" (Pedrosa, 2018). For the window openings in the rooms, slits are proposed between the wall and the roof (Figure 5).

At the same time when Lucio Costa observed the settlements around Brasília construction site, he visited the exhibition of *Casa Individual Pré-Fabricada* and pointed out SR2 to Israel Pinheiro, president of the *Companhia Urbanizadora da Nova Capital do Brasil* (Novacap) [Urbanization Company of the New Capital of Brazil], as a possible solution to the problems they were facing (Figure 6).

[3] Mendes and Buriti (2021) state that SR2 has never been industrialized since its creation.

Figure 6: Letter from Lucio Costa to Israel Pinheiro.


COMPANHIA URBANIZADORA DA NOVA CAPITAL DO BRASIL
LUZIANIA – GOIÁS

Prezado Dr. Israel Pinheiro!

A pequena casa pré-fa-
bricada do arquiteto Sergio Rodrigues
e "OCA, Architecture, Interiores Ltda.,"
atualmente exposta no Museum de Arte
Moderna, tem despertado o interesse
de muita gente que, já tendo o seu
lote, tem urgência de morar em Bra-
sília. São pessoas de recursos que, seduzi-
das pelo padrão de acabamento apresen-
tado, pela simplicidade, pelas possibili-
dades de financiamento e pela rapidez de
montagem que o processo permite, —
gostariam de construir uma desses pavilhões
de morar enquanto não põem a casa
grande definitiva, pavilhões que depois ser-
viriam de casa de hóspedes ou de apartamento
independente para os rapazes da família.

A qualidade da obra e a idonei-
dade dos responsáveis justificam a
exceção e o amparo que lhe peço
no sentido de permitirem tais
construções no próprio interesse da
nossa cidade.

Com o abraço agradecido

Lucio Costa

Rio, 18/IV/60

"Estimated Dr. Israel Pinheiro!

The small prefabricated house by architect Sergio Rodrigues and OCA, Architectura, Interiores, Ltda., currently on display at the Museum of Modern Art, has aroused the interest of many people who, having already got their plot, urgently want to live in Brasília. They are people of means who, seduced by the standard of the finish presented, the simplicity, the possibilities of financing, and the speed of assembly that the process allows, would like to build one of these living pavilions while they don't build the definitive big house, pavilions that would later serve as a guest house or independent apartment for the boys in the family.

The quality of the work and the suitability of those responsible justify the exception and the support I'm asking for to allow such constructions in the interests of our city.

With the grateful embrace

from

Lucio Costa.

Rio, 18/IV/1960."

(Costa, 2018, p. 58)

Source: Luz (2018, p. 58).

Rodrigues' initial desire to solve a personal concern found reverberations in the demands of everyday life at the time, and also subsidized the construction of hundreds of built works in SR2, a system that made it possible to place the user and their daily movements as the protagonists of the process, such as the unit exhibited at MAM Rio, which was sold to a buyer from Mato Grosso, according to the architect, being disassembled and reassembled on the client's plot.

3 SR2 and the practice of everyday life

For Certeau (1988, p. xv), "'popular culture,' as well as a whole literature called 'popular,' take on a different aspect: they present themselves essentially as 'arts of making' this or that, i.e., as combinatory or utilizing modes of consumption". In other words, through various combinations, popular art is always associated with some use, even if that use is a symbolic attribution to the artifact. Despite this, objects and space come to fulfill another function, in this case metaphorical. In an article written for *Módulo* magazine, Rodrigues (1958, p. 29) states that the housing unit tends to become standardized with modern architecture but concludes by saying that "the cult and veneration of things

related to the regional past are indispensable to the development of a people" and that their insertion can be achieved through an object and/ or a piece of furniture. The dialog between Certeau and Rodrigues proposed in this article allows us to look at SR2 from a new perspective, understanding the architect's project beyond the building. The analysis is divided into three moments: origin, project, and use.

3.1 The origin

Three aspects of the origin and idealization of the SR2 can be highlighted: the common or ordinary man, flexibility, and the standardized components of the system. For Pedrosa (2018), the SR2 System was trying to solve the problem of the common man, the one who routinely modifies and rearranges his living space. Certeau (1998, p. 58), in turn, qualifies and problematizes the "ordinary man" as part of a multitude whose individuality is normally erased and transformed into statistical or marketing numbers, "a multitude of quantified heroes who lose their names and faces by becoming language, the mobile of calculations and rationalities that belong to no one".

The SR2 experience, characterized by flexibility as a design premise, offers individuals the chance to express their own identity and consequent uniqueness in the management of internal and external spaces. In an unsigned article in *Módulo* magazine in August 1962, the magazine discusses the achievements of the Oca store up to that point and touches about the housing unit in SR2, revealing characteristics of this common man:

> [...] [I]t was hailed by critics at the time as the most appropriate response to the housing question of the common man. [...] [I]ts success in Brazil would be supported by three conditions inherent to our life and our way of thinking: the desire, never fully satisfied in houses and building apartments, or even with usual prefabricated houses, for liberation and individualization of the salaried man; the use of easily acquired materials; the fertile imagination and improvisation of objects that fall into monotony or need to be reformulated. (Oca [...], 1962, p. 30)

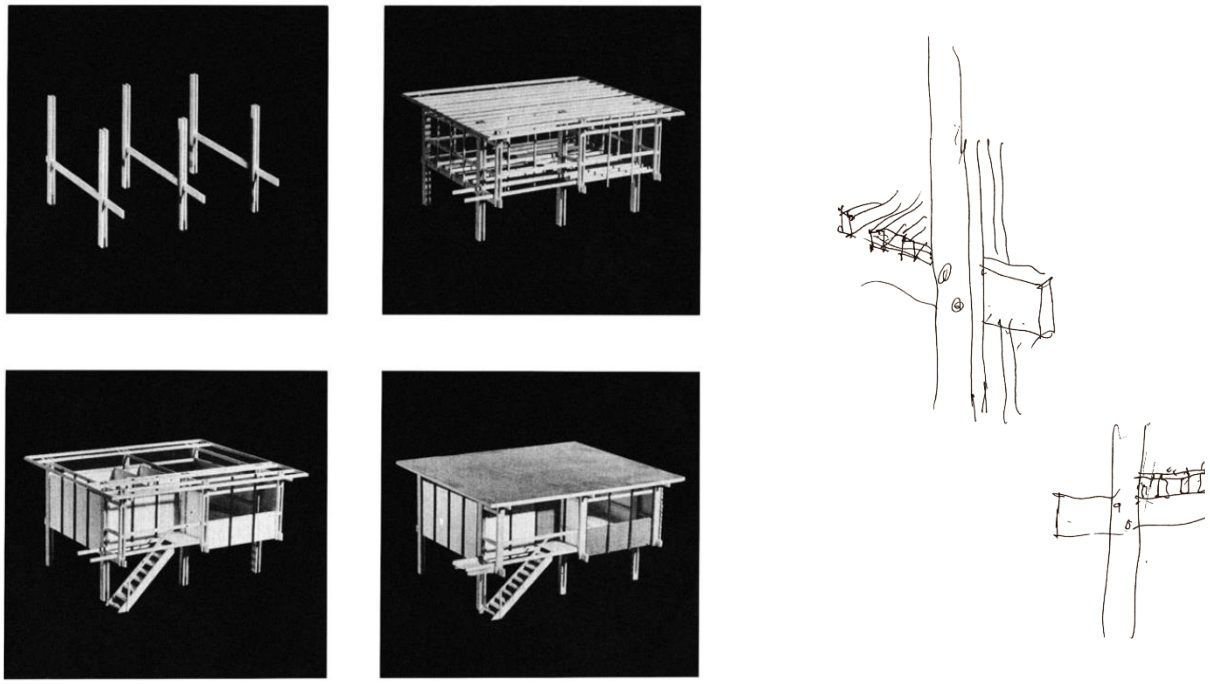
While developing a system in which the components are interchangeable and the work is not delivered as a final object, Sergio Rodrigues seeks to allow the user to appropriate of the work by building a house according to their wishes. In the words of Certeau (1988, p. 5), "the approach to culture begins when the ordinary man becomes the narrator, when it is he who defines the (common) place of discourse and the (anonymous) space of its development". In other words, one of the possibilities of being the narrator of your story is to make the space of the house habitable with a certain autonomy. The system created by Rodrigues seeks to respond to this much-desired autonomy.

When discussing Freudian theories, Certeau (1988, p. 4) says that the psychoanalyst distances himself from the great thinkers and places himself in front of the crowd to elaborate his thoughts: "he is *himself* the ordinary man of whom he speaks". In this way, Freud places himself as a constituent actor of the masses, allowing for the universalization of a theory based on reality. In comparison with Rodrigues' stance in *Casa pré-fabricada e individual* (1961), it can be said that he places himself in the situation of an ordinary man, not least because SR2 arises from a real individual demand but becomes universal when the architect expands his creation to respond to a social issue.

The origin of the standardized components is also an important aspect. The architect defined the modulation of all three phases of the system from existing elements available on the market. Fernando Mendes, an architect who worked with Rodrigues and the current

director of the Sergio Rodrigues Institute, comments on the three different modulations that the SR2 underwent due to the raw materials available on supply stores (Mendes; Buriti; Bezerra, 2021). In the first phase, it was sized using multiples and submultiples of 1.22 m plywood sheets, generating spans of up to 3.66 m. In the second phase, the sheets used were 1.60 m in size and, by joining two sheets of plywood together, a span of 3.20 m was achieved. In the third period, the 1.20 m x 2.50 m sheets defined spans of 3.60 m and/ or 5 m. The extension of the beams beyond the pillars determined a remarkable formal aspect in the three periods of the SR2. This element was called an "ear" by Rodrigues and had the function of extending the building in case it was necessary to increase its area in the future (Figure 7).

Figure 7: On the left, assembly diagram of the model house presented in 1960 at MAM Rio. On the right, sketch by Sergio Rodrigues illustrating the juxtaposition and bolting of the structure.



Sources: Pedrosa (2018), and Rodrigues (2013, p. 277), respectively.

From the moment Rodrigues appropriated industrialized products available on the market, he subjected the modulation to these products and changed the ideal gauge of the pillars from two to three inches. In this sense, we can infer that the project is no longer a "strategy" but a "tactic."[4] At first, Rodrigues envisioned a system that could be as slender as possible. The two-inch gauge would fulfill the structural function with the smallest acceptable dimension, but he adapted his initial desire, prioritizing the use of industrialized components on the market. The architect decided to modify the project to the detriment of the cost of implementing the work, in other words, the structure adapts to materials easily found and used without the need for processing with a specific destination for the system.

In the text for the exhibition catalog, Pedrosa (2018) reflects on Rodrigues' decision to adapt the initial planning of the slender structure and compares the *carioca* architect to the experimentations carried out by Walter Gropius forty years before the SR2 was

[4] Strategies, according to Certeau (1988, p. 30), "are able to produce, tabulate, and impose" types of operation in space. Tactics, on the other hand, can only "use, manipulate and divert these spaces." The term "use," in this case, refers to the possibility of appropriating in a non-imposing way with the aim of interpreting and/ or reinterpreting a product.

proposed. The critic also adds the question of the flexibility of the spaces proposed by both of them, warning that in prefabrication there is a need to individualize the system. He says that the flexibility proposed in Europe is superior to that presented by Rodrigues at MAM Rio, but warns that, in the case of the German architect, "such freedom in the combinatorial arrangement was only possible due to the organization of a real industrial company, the General Panel Corporation, owned by Wachsmann and Gropius" (Pedrosa, 2018).

The three-inch structural elements, in short, would form the fixed components of the SR2, and the plywood boards would allow the space to be flexible. This flexibility can be understood as a "bricolage" (Certeau, 1988, p. 29), a term also pointed out by Luz (2018, p. 55) when commenting on the article written in 1961 by Rodrigues and his team for *Módulo* magazine: "Here Sergio practically abolishes the figure of an author by transferring the virtues of design to the technological game and to the commitment of the resident himself to embody the virtues of this kind of bricolage of his housing device." As such, SR2 allows the user to modify the space, (re)configuring it based on their daily needs.

By associating the use of materials available on the market with Gropius initial propositions and the inspiration of the Ulm School, it can be understood that the SR2 was not a new idea, but a different way of bringing industry closer to architecture and design amid the Brazilian reality. Rodrigues (1958, p. 29) points out that, at the time the system was conceived, the plastics industry was beginning to establish itself in Brazil, while wood was still the most economical raw material[5]. It is, therefore, a kind of "anthropophagy"[6] when Rodrigues starts his studies from European ideas but reformulates and adapts the project to his local context. On the other hand, regarding the use of wood as the main raw material for this system, Pedrosa (2018) assesses the cultural aversion that Brazilians had (and still have) to building houses with this material:

> There are, however, several prejudices to overcome. And perhaps the most immediate, although certainly not the most difficult to overcome, is that against the wooden house. We don't have a tradition of this type of construction. The Portuguese have always dispensed with them for their building purposes (Pedrosa, 2018).

The abundance of this raw material on Brazilian soil may be the key to its low cost and its cultural devaluation for building purposes in some regions of the country, as this material is generally used for temporary constructions. Although some people's reality went in the opposite direction, using conventional masonry and reinforced concrete for their constructions, there were wooden dwellings erected in various parts of the country, whether they were the shacks of the informal settlement communities in big cities, or the wooden constructions belonging to the rural tradition, such as the stilts in the North, the shacks in the Midwest or the wooden houses of European colonization in the South. According to Certeau (1988, p. xvii), this would be a "cultural activity of the non-producers of culture, an activity that is unsigned , unreadable, and unsymbolized, remains the only one possible for all those who nevertheless buy and pay [...]. Marginality is becoming

[5] The affirmation is for the scale of the individual housing unit and small buildings, with the premise of making spaces more flexible.

[6] In May 1928, the writer Oswald de Andrade published *The Anthropophagic Manifesto* in the first edition of the *Revista de Antropofagia* [*Anthropophagy Magazine*], in which he metaphorically discusses the swallowing of concepts from abroad and the necessary adaptation to Brazilian culture, which had been considered primordial before the arrival of the Portuguese caravels. According to Oswald de Andrade, only anthropophagy unites Brazilian people "Socially. Economically. Philosophically" (Andrade, 2017, p. 49).

universal." Rodrigues appropriates wood strategically, with the desire to industrialize the material in the future. This differs from tactical use, when, in these communities, its consumption is imposed as the only alternative for building houses. Even so, there is a point of convergence with Certeau's discourse that will be seen later: the question of use. In this way, it is worth highlighting Rodrigues' efforts to continue the universalization of the use of wood in national architecture, which was widely used in the buildings of the colonial period, associated with self-supporting masonry, but was neglected by the new construction possibilities characteristic of the 20th century.

3.2 The project

Analyzing the set of design solutions adopted in SR2, another parallel can be drawn with the combination "which cannot be dissociated from an art of using," according to Certeau (1988, p. xv). For Rodrigues (1961, p. 27), the removable nature of the walls from the structure of the house, independent of the closures, allows the architect to distance himself from his own project and the "taste or idiosyncrasies of the inhabitant to be met." In other words, architecture does not impose itself on the real needs of everyone's daily life. According to Pedrosa (2018), this is "where its peculiarly architectural function begins." In a plural Brazil, Rodrigues highlights the common man and develops a system that suits the wishes and needs of each client. The search for an affordable construction democratizes the architect's proposal not only in words. It allows architecture to be an expression, a language for a people whose upbringing is still artisanal, exploring the idea of improvising, supplying, or removing parts. As the architect said: "The advantages of the independent structure are visualized even by laymen, thanks to the removable character of the walls, freer distribution of the openings and greater flexibility in the internal movement of the specialized spaces" (Rodrigues, 1961, p. 27).

It is understood that these solutions reveal the architect's concern with the actions to be carried out inside the house and the construction because of the agency of the elements that make up the domestic interior and its daily demands for modifications. The external constraints (the place) were credited with the project but were subjugated to the interiority of the architecture. This can be seen in Rodrigues' statement (1961, p. 28), when he suggests that, "because the walls function only as sealing, architects foresee and encourage the whim of the inhabitant to open holes in the wood to the outside, here and there." It can therefore be concluded that this was a decision made based on the relationship between the interior of the building and its exterior, prioritizing the view that the user would have from the inside out (Figure 8).

The intention was to bring the outside into the internal environment, where the daily activity, designed by the architect, takes place. The sketch in Figure 8 illustrates a project in SR2 and a possible appropriation, with human figures isolated or interacting with each other or with some object. It is from this activity that spaces are articulated, through the positioning of furniture and/ or the establishment of the necessary openings to meet the specific demands of each project. In the chapter *Walking in the City*, Certeau (1988) begins his discourse by reporting what can be seen from the 110th floor of the World Trade Center when looking down. He understands that the agglomerated individuals become a single texture, in which the opposing and/ or complementary individualities feature only a single perception: the visual one. From this verticalized and impersonalized scale of the subject, we can understand the importance of the domestic interior space, where everyone, in their way, can be observed as a single body in its various scales of perception. Through an architecture designed from the inside out, Rodrigues encourages the inhabitant to modify

these spaces, occupying the interstices of this environment and subverting any design logic that can only see from the top down, whose gaze values the project itself more than the individuality of its user. In this sense, the building now serves the user. The architect takes a different stance on design responses, which were commonplace at the time but were aware of their benefits for the daily lives of their inhabitants.

Figure 8: Sketch by Sergio Rodrigues showing everyday activities in domestic interiors through the representation of human figures in an SR2 System project.

Source: Luz (2018, p. 150). See also Rodrigues (1962, p. 13).

In the *Casa individual pré-fabricada*, Rodrigues proposes that the closets in the bedrooms are not just spaces for storing clothes but encourage this furniture to be transformed into dividing walls. This dual function also happens with the decision to raise the floor supports by 2 m. That space which, considering only the issue of healthiness in the wooden house, could only be raised 60 cm, becomes a first floor that can be appropriated. The buyer purchases a module with a certain area, but the project allows it to be twice as large.

It can therefore be understood that flexibility, at the various levels proposed by SR2, transforms the term “project” into a synthesis open to tactical developments. The combinatorial diversity of the components can produce a multiplicity of shapes and facades and cater to different programs and tastes. The proposition of the cabinets that make up the internal space as hybrid furniture integrated into the architecture and the building that emerges from the imagination of the daily activity of its interiors expands SR2 into a field of possibilities that reaches the subjective particularities of the individual.

3.3 The use

Through an exploratory search of the Sergio Rodrigues Institute’s digitalized collection, no records of projects were found with the characteristics of the three basic residential models (25 m^2, 47 m^2, 65 m^2) featured by the architect in the exhibition *Casa Individual Pré-Fabricada*. Certainly, the public that the architect intended to reach, a lower-middle-class

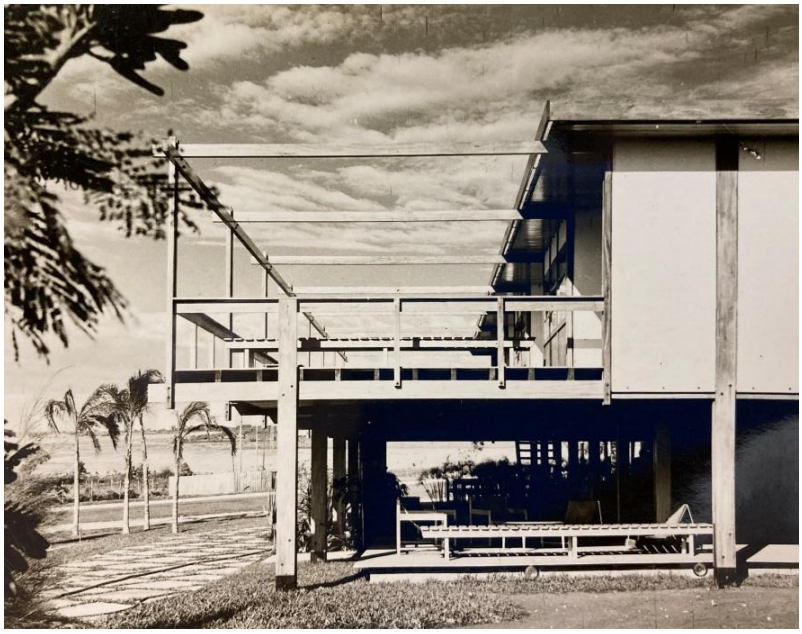
wage-earner who had few resources to build their own home, was not contemplated with the system on national territory. Nevertheless, Maurício (1961) published in the *Correio da Manhã* newspaper on October 29, 1961, the interest of Brazilian authorities in establishing a partnership with the government of Ghana to export SR2 houses to the African country, but no records were found of the outcome of these negotiations.

Because it was made up of standardized components that adapted to the peculiarities of each project, SR2 began to serve programs other than just single-family homes, such as the first headquarters of the Brasília Yacht Club and the Goiás Country Club and three pavilions built on the UnB campus to house professors, students, and the university restaurant (Figures 9 to 11).

Figure 9: A 1963 photo showing the OCA I building on the UnB campus.

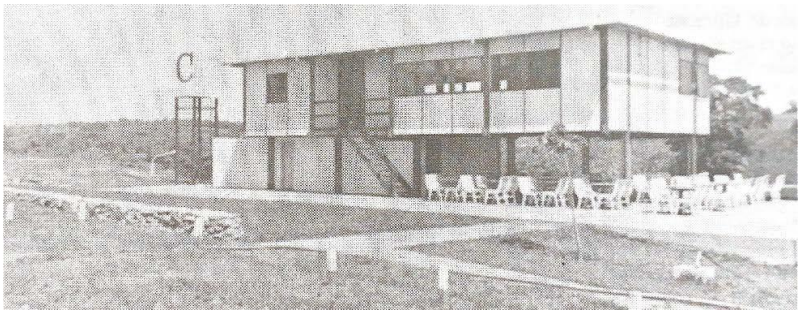
Source: University of Brasília. Central Archive. AtoM UnB. https://atom.unb.br/index.php/00269-06. Access: 20 May 2024.

Figure 10: A 1962 photo of the second headquarters of the Brasília Yacht Club. Sergio Rodrigues Institute (ISR) Archive.



Source: ISR (1962).

Figure 11: The first headquarters of the Goiás Country Club.



Source: Cunha (1992, p. 53).

In an interview with José Airton Costa Júnior (2014), Sergio e Vera Beatriz Rodrigues (2014) say that three buildings were built on the campus. The two residential pavilions were named OCA I and OCA II[7]. The third building temporarily housed the university restaurant, with the capacity to provide 2,000 meals a day. It is known that OCA I housed accommodation for professors and visitors, but it was destroyed after a fire (Figure 12). Originally intended as a student residence, OCA II has been used for a variety of purposes, albeit in very poor condition, according to Teles, Ribeiro and Menezzi (2008):

> OCA II was UnB's first definitive building, initially destined for the Faculty of Architecture[8], and served as student and teacher housing and later housed community services (nursery school on the first floor) and administrative services, as well as the university's cooperative. By act of the rectorate no. 1.035/94, the building was listed as a historical heritage site and will house the Historical Museum of the University of Brasília. The campus security service is currently operating here on the upper floor, with the first floor closed due to public safety measures. (Teles; Ribeiro; Menezzi, 2008, p. 2)

Figure 12: OCA I after the fire.

Source: Costa Junior (2014, p. 208).

[7] The namesake of Sergio Rodrigues' store in Ipanema, Rio de Janeiro. Because it was a place where intellectuals and important players on the country's cultural scene met, Darcy Ribeiro named the first UnB buildings after the *carioca* retreat founded by Rodrigues in 1955.

[8] This information differs from the plans dated 1962 and archived at the Sergio Rodrigues Institute, which reveal the original intended use for the building. According to stamps on the boards, the textual specifications and the drawing of the furniture arrangement, the architect planned two residential pavilions and a block for the restaurant.

The first floor is currently in use, and there are several spontaneous additions and renovations overlapped, evidenced by the different finishing materials and construction systems marked on the body of the building. The building today houses everything from campus security, with meeting rooms, break rooms, a kitchen, and a storeroom, to spaces for the university's cleaning staff (Figure 13).

Figure 13: OCA II, housing the University of Brasília's Security Department.

Source: Photo by Ogawa, 2021.

The Brasília Yacht Club (acronym in Portuguese: ICB), founded in 1959, had its first temporary headquarters designed by Rodrigues and it was built the following year. Few records of this building have been found. In 1962, the same year as the construction of the UnB pavilions, the architect designed and built the club's second headquarters, this time a building intended to be permanent. In the image found in the collection of the Sergio Rodrigues Institute (Figure 10), the first floor was open and housed some pool furniture. Today, some changes in use and adaptations of the 1962 project can be seen in the building. In a conversation with members of the ICB's Department of Culture and Memorial Preservation, it was found that the first floor underwent its first modification, with no definite date, with the insertion of window frames and its total closure (Figure 14[9]).

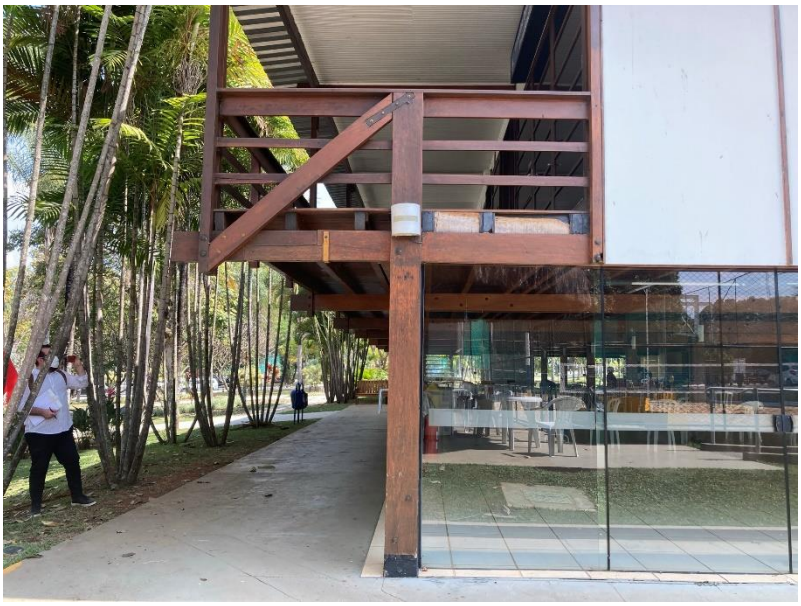
A major renovation in 2003 replaced all the doors and windows with frames using fixed glazing installed from floor to beam (Figure 15) and allocated the ground floor for a party room. In conventional masonry, bathrooms, a storage room, a bar, and a kitchen were added. The balcony on the upper floor, previously open and comprising of four modules in length (about 4.88 meters), is covered and has two modules incorporated into the internal environments to house the ICB Memorial and the department that preserves the Club's memorial. Currently, the upper floor houses the club's board of directors, with financial and administrative sectors, and the ground floor continues to be used as an events hall (Figure 15). In 2022, a new renovation restored worn-out floors and walls, as well as replacing all the lighting with a new lighting project, but the distribution of spaces and their

[9] Although the image shows the date 1962, there is a discrepancy between the photograph in question and the information. This building was, in fact, inaugurated in 1962, as shown in Figure 10, but the window frames were added after that date.. To produce the book *Brasília Yacht Club: A Dream Come True* (Finger, 2020), the editorial team did not have access to original images of the building. As a result, they had to illustrate its inauguration with the oldest photograph catalogued in their collection showing the pavilion.

uses remained unchanged.

Figure 14: The second headquarters of the Brasília Yacht Club with the first floor enclosed.

Figure 15: The second headquarters of the Brasília Yacht Club, housing the club's board of directors on the upper floor and the events hall on the ground floor.



Source: Photo by Ogawa, 2021.

That same year, 1962, still in the Midwest of the country, Sergio Rodrigues' work with SR2 extended to the capital of Goiás when, at the invitation of Eurico de Godoi, his contemporary at the University of Brazil, he designed the first headquarters of the recently opened Goiás Country Club (Figure 11). Built in fifteen days, the building housed the administration and part of the association's recreational program. Almost fifteen years later, the board of directors left the building and occupy to a new space. Between 1978 and 1979, according to Cunha (1992, p. 51), the pioneering headquarters underwent a major renovation (Figure 14). The building, which was in terrible condition, was restored and a "small restaurant serving typical food and a barbecue area" was added to it.

Figure 14: The first renovation of the pioneering headquarters of the Goiás Country Club.

Fonte: Galli (1993, p. 169).

On a visit to the building in August 2021, it was noted that the pavilion had been highlighted in the club's landscape to reveal its historical importance. The interventions made to install the restaurant had been removed, and its immediate surroundings had been reconfigured so that it stands out without blocking the view. The site is home to the Country Club Memorial, where one can find diverse textual and iconographic documents, objects, and furniture – the latter mostly designed by Sergio Rodrigues – that preserve its history. The renovation reconfigured the first floor as a free space, of undefined use (Figure 17), as well as reinforcing the structure by creating wooden supports at the limits of the building, which was originally cantilevered.

Figure 17: The pioneering headquarters of the Goiás Country Club, currently used as a memorial space for the club.

Source: Photo by Ogawa, 2021.

Pedrosa (2018) argued that the approximation of architecture with prefabrication, proposed by Rodrigues with the SR2, allowed "a new notion of the house, which is no longer an irremovable piece of junk, tied to a certain place, but which we can 'carry on our backs,' like a piece of junk". In this sense, the work is almost left to chance. The pavilion could be on a beach today, and on a mountain the following month. This has been planned,

as have the modifications within the system's limits. Regardless of the stimulus of transporting the building and/ or reconfiguring its plywood closures, in the three scenarios studied, the renovations reinterpreted the project in a "quasi-invisibility" (Certeau, 1988, p. 31). This occurred when elements alien to the system were added and/ or its original components removed, a "fragmentation" of what had been planned to the detriment of everyday needs, although the essence of the projects, especially the structural elements, remained preserved in all three cases.

4 Final remarks

When Rodrigues proposed the housing unit, in 1960, in the gardens of MAM Rio, he had the system to solve the problem of housing for people. However, according to Prochnik (1960), the system is made up of interchangeable elements that can be reconfigured to form new buildings for uses other than just residential. This can be seen in the three cases analyzed in the article: the first residential pavilion at UnB, the second headquarters of the Brasília Yacht Club, and the first headquarters of the Goiás Country Club. For this reason, these appropriations cannot be understood as a subversion of SR2, but rather as an expansion of its constructive potential to include various uses, even though it was not initially planned by the architect. This is reinforced by the fact that the three cases mentioned were designed by Rodrigues himself.

The flexibility of the space, with the possibility of rearranging it internally or disassembling, transporting, and reassembling the building in another location, was one of the most striking features of the system, which dialogues directly with the dynamics of everyday life. Despite the planned flexibility, as it was a project rationalized to encourage spatial reconfiguration, the modifications in the cases presented went beyond the logic of SR2. Certeau (1988) explains this relationship between the planned and its appropriation using the metaphor of "fragmentation" as "consumption" of the object in a "clandestine" way, leading to its "quasi-invisibility":

> In reality, a rationalized, expansionist, centralized, spectacular and clamorous production is confronted by an entirely different kind of production, called "consumption" and characterized by its ruses, its fragmentation (the result of the circumstances), its poaching, its clandestine nature, its tireless but quiet activity, in short by its quasi-invisibility, since it shows itself not in its own products (where would it place them?) but in an art of using those imposed on it. (Certeau, 1988, p. 31)

Over time, there have been renovations that have added or removed important elements in the composition of the three buildings. In the Goiás Country Club, although the most drastic interventions in masonry were added and later removed, there are now pillars carved and fitted into the "ears" of the building, subverting what was originally cantilevered with the structure all juxtaposed and screwed together. In the UnB pavilion, conventional masonry and reinforced concrete were used to build annexes adjacent to the wooden beams, all of which had the "ear" proposed by Rodrigues for future extensions but were incorporated into the walls built later.

This subverted the originality of SR2. This seems to be a contradiction in terms, given that the system was born with the premise of reconfigurable spaces and is alive with these changes over time. Within the game that involved the structural elements (beams, pillars, and joists) with the sealing elements (floors, roof, external and internal closings), the three cases subverted this constructive logic and added other methods for carrying out the

renovations. What is noticeable is the "crumbling" of the limits that SR2 proposed for these modifications.

The architectural project, as its name implies, is a plan, a resolution for future appropriation. How can the unusual be included in this chain of thought? Certainly, this is a question with countless consequences, but with SR2, Rodrigues answers the question with a construction system that has proved to be dynamic over the years. Faced with the changes made over the years, the three cases analyzed housed new uses and generated new spaces, while retaining their structural elements. This validates the system with its use. If the buildings have stood the test of time and changed in terms of their uses and even their form, this is a testament to SR2.

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