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AULO MENDES DA ROCHA:
RELATIONSHIP BETWEEN THE
FIESP DESIGN PROCESS AND
DESIGN THINKING

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ABSTRACT

This article presents an analysis of the strategies adopted by Paulo Mendes da Rocha and MMBB Architects team, during the remodeling design process of the reception areas of FIESP building, which occurred between 1996 and 1998. This design process was mapped based on documental analysis supported by information got from non-structured interviews guided by a protocol which consisted of constructs, variables and type of likely evidences. This mapping aimed to present the actions taken on the problems arising from this specific project, in the view of the architects Paulo Mendes da Rocha, Milton Braga, Marta Moreira, Ângelo Bucci and engineer Jorge Zaven Kurkdjian. The result of the study points to a process characterized by the reflection on the values to be built to the situation and the initial structuring of the problem in an isolated way, seeking potentialities of the situation. These potentialities were intrinsic to the personality of the architect Paulo Mendes da Rocha, who values the intelligence of construction techniques, the rational functioning of the project, the connection of the building to the urban context and the proportionality of the elements that make up the building. The analysis of this design process seeks to associate those design actions to the design thinking principles proposed by Rowe (1987), Lawson (2004, 2011) and Cross (2011).

KEYWORDS

Design process. Design thinking. Contemporary Brazilian architecture. Paulo Mendes da Rocha.

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PAULO MENDES DA ROCHA:
RELAÇÃO ENTRE PROCESSO DE
PROJETO DA FIESP E DESIGN
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RESUMO

Este artigo apresenta uma análise das estratégias adotadas por Paulo Mendes da Rocha e pela equipe MMBB Arquitetos durante o projeto de remodelação das áreas de acolhimento do edifício da Fiesp, que ocorreu entre os anos de 1996 e 1998. O mapeamento desse processo de projeto foi desenvolvido com base na análise de documentos, corroborada essencialmente por informações colhidas em entrevistas não estruturadas, mediante um protocolo guiado por constructos, variáveis e tipologias de evidências. Esse mapeamento tem como objetivo apresentar as ações adotadas em função dos problemas decorrentes desse projeto específico pelos arquitetos Paulo Mendes da Rocha, Milton Braga, Marta Moreira e Ângelo Bucci e pelo engenheiro Jorge Zaven Kurkdjian. O resultado do estudo aponta para um processo caracterizado pela reflexão sobre os valores a serem construídos diante da situação e da estruturação inicial do problema, inicialmente de forma isolada, por Mendes da Rocha, que buscava potencialidades nessa situação. Essas potencialidades, intrínsecas a sua prática de projeto, valorizam a inteligência das técnicas de construção, o funcionamento racional do projeto, a ligação do edifício ao contexto urbano e a proporcionalidade dos elementos que compõem o edifício. A análise desse processo de projeto busca associar as ações de projeto a preceitos do *Design Thinking* propostos por Rowe (1987), Lawson (2004, 2011) e Cross (2011).

PALAVRAS-CHAVE

Projeto de Arquitetura - Processo. *Design Thinking*. Arquitetura contemporânea brasileira. Paulo Mendes da Rocha.

INTRODUCTION AND METHOD

The term *Design Thinking* essentially designates studies aimed at understanding the development of the design activity and involves both cognitive and procedural or methodological aspects (CROSS; DORST; ROOZENBURG, 1992; BUCHANAN, 1991; JOHANSSON; WOODILLA, 2009). Throughout the 20th century, a strong spread of the term to designate a new paradigm that dealt with complex problems in the most diverse areas of professional activity was observed (DORST, 2011). However, this article adopts the concept of the term adopted in Peter G. Rowe's book (1987), entitled *Design Thinking*, in which the author sought to understand the sequence of movements and logical procedures employed by designers in the execution of a certain design. For this, he suggests a faithful reconstruction of the process, which represents a record of the most relevant events, through interviews and documentation, in which the designer describes the developed activities with the support of sketches and drawings.

This article proposes the analysis of the design process based on the principles of *Design Thinking* proposed by Rowe (1987), Lawson (2004, 2011) and Cross (2011). Rowe obtains answers by observing the action of designers during problem solving, but indicates that it is also possible to understand the design process by means of autobiographies or reports made *a posteriori* - even if they mean selective rationalization - by drawing analyses or, still, through third party criticism and interpretations (ROWE, 1987).

Is it possible to understand, discover, uncover facts and information from one design process, years after its development? Is it possible to identify design strategies? In an attempt to obtain these answers, the design process of the remodeling of the Fiesp building reception areas (1996-1998) by Paulo Mendes da Rocha and MMBB Arquitetos was established as a case study.

For Lawson (2004), characterizing the sequence of actions and procedures is critical in understanding the design process structure. Therefore, we sought to identify characteristics (Table 1) that permeated the main decision-making processes and the consequences of these decisions (Rowe, 1987), influenced by central constraints and, according to Lawson (2011), by personal designer criteria.

Architectural design processes can be considered an activity that involves problem solving (LAWSON, 2004). Thus it becomes essential to classify these problems, since a hierarchy of importance for their resolution during the design process exists (ROWE, 1987; CROSS, 2011), and the structuring of these problems depends on the preconception that defines the direction of their solution. The designer brings his knowledge to the design, and its use is usually incorporated into his/her thinking (ROWE, 1987; LAWSON, 2004; LAWSON, 2011), that is, his or her common way of solving problems (ROWE, 1987; CROSS, 2011), and this knowledge is usually linked to the use of analogies, environmental relations and typologies (ROWE, 1987).

Briefings linked to programs and solutions, not problems and requirements (LAWSON, 1994), make designers interpreters of the collected information, and their attitude towards this information varies according to their experience (LAWSON, 2011). Thus it is important to verify if the briefing production was

formally carried out by the method suggested by Peña and Parshall (2012), that foresee this activity by means of steps: goal settings; fact collection and analysis; search and test concepts; needs assessment; and indication of the problem.

Drawings contribute to the initial stage of the design process (CROSS, 2011), allowing for the visualization of new possibilities or problems (LAWSON, 2011), registering knowledge, testing hypotheses, connecting ideas and transforming objectives into components. In addition, they may contain notes and captions attached to what they represent (LAWSON, 2004), are remembered in terms of meaning and symbolic value, and require auxiliary information for their interpretation (BARTLETT, 1932 apud LAWSON, 2011).

During the design process, the designer evaluates qualitative and quantitative criteria and can use methods and principles to measure the success of these criteria through theories (what should be), normative (interpretation between dominant practice and opportunity in problem identification) and doctrinal positions (approximation of what is primary), positions, and categorical systems (less prescriptive that make the connection between rules and categories to distinguish what counts and what does not). Therefore, evaluations validate the logical coherence of positions in architecture (ROWE, 1987; LAWSON, 2011).

From the precepts discussed in the texts by Rowe (1987), Lawson (2004, 2011) and Cross (2011) and presented above, a protocol for data collection was developed (Table 1), guiding the formulation of the interview script. The last column presented in Table 1 lists the evidence identified in the study reported below, which were triangulated with the building's icon material in accordance to Yin's (2005) recommendations.

Three interview stages were carried out (Table 2). The first, of an exploratory nature, was carried out with architects Milton Braga, Marta Moreira and Ângelo Bucci, where which work would be analyzed was defined, according to the interest of data availability by the collaborators, with the selected Fiesp headquarters building. In the second stage, architects Milton Braga and Ângelo Bucci sought to identify the presence of the precepts on *Design Thinking* presented by Rowe (1987), Lawson (2004, 2011) and Cross (2011) applied to the chosen building. Finally, the third stage was characterized by the verification and necessary details of the information collected in the previous stages on the *Design Thinking* precepts identified in the Fiesp design process. The collaborating architects of the previous stages participated in this interview stage, namely the team leader, Mendes da Rocha, and the structural engineer Jorge Zaven, the architects of the MMBB¹ Marta Moreira, Milton Braga and Ângelo Bucci, the leader Mendes da Rocha and the engineer Jorge Z. Kurkdjian, responsible for the calculation of the metallic structure of this intervention, given its importance due to the emphasis given to the structure in the Mendes da Rocha design, were interviewed. The structural design was developed in partnership with the Technical Office Arthur Luiz Pitta (Etalp), responsible for the calculation of the original structure of the building, and engineer Jorge Z. Kurkdjian, who assisted in the calculation of the new steel structure.

The interviews took place in the offices of those involved (MMBB, SPBR², Mendes da Rocha, and Kurkdjian & Fruchtengarten Engenheiros Associados³),

¹ Founded in 1991, the MMBB is formed by Fernando de Mello Franco, Marta Moreira and Milton Braga. It had Angelo Bucci as partner from 1996 to 2002. From 2013, Fernando de Mello Franco graduated from the office to assume the position of Secretary of Urban Development of the city of São Paulo (MMBB, 2017). Although he participated in the project, the architect Fernando de Mello Franco was not interviewed in this research, as he was away from office activities.

² SPBR is an architectural office founded in 2003 by the architect Ângelo Bucci (SPBR, 2017).

³ Kurkdjian & Fruchtengarten Engenheiros Associados S/S Ltda. was created in 2000 by engineers Jorge Zaven Kurkdjian and Julio Fruchtengarten (FRUCHTENGARTEN, 2017).

Table 1 – Protocol for data collection
Source: prepared by the authors.

CONSTRUCT	CATEGORY	EVIDENCE FOUND
Information and tools for structuring design problems	Problem identification	Building Operation
		Existing dimensions
		Structure Overloads
		Program
		Flows and conflicts
		Building visuals
		Visual permeability
	Analysis of qualitative and quantitative criteria	Structuring criteria
		Partial evaluations
	Hierarchy of criteria fulfillment	Building technology
		Dimensions
		Accesses
	Drawings	Types of drawings
		Drawing Focus
		Drawing adjustments
		Execution sequence
		Communication
		Influence and importance
	Design values	Individual values
		Team values
	Decisions	Decision authorships
		Subjects discussed
		Structuring of design problems
		Means of interaction in meetings
Design strategies	Primary generators	Evolution of the design from the longitudinal section
		Differentiation between constructive techniques
	Guiding principles	Rationality of the structure
		Geometric Rigor
		Reading of the city
	Organizational principles	Composition rules
	Hierarchy of elements or constructive techniques	Distinction between existing and proposed language
		Element hierarchy
	Language goals	Language Predefinition

Table 2 – Interview information
Source: prepared by the author.

Interviews			
Stage	1 st interview stage	2 nd Interview stage	3 rd interview stage
Interviewees	Milton Braga 03.08.2015	Milton Braga 06.08.2015 Ângelo Bucci 06.08.2015	Milton Braga 15.06.2016
	Marta Moreira 03.08.2015		Marta Moreira 15.06.2016
	Ângelo Bucci 04.08.2015		Ângelo Bucci 14.06.2016
			Paulo M. da Rocha 15.06.2016
			Jorge Z. Kurkdjian 16.06.2016
Objectives	Delimitation of the study and definition of the remodeling project of the Fiesp building reception areas with the interviewed architects	Mapping of relevant aspects of the design and its development	Complementation of the information requested by the research protocol
Interview script	None	According to a questionnaire on the design development	According to the research protocol
Type of data	General information on design developed in collaboration with Mendes da Rocha	Information on the design process of the Fiesp building reception areas	Further information on the design process of the Fiesp building reception areas

individually, and were recorded and transcribed. Some of the transcripts that provided elements for the analysis and reconstruction of this design process are presented herein. Following the recommendations by Yin (2005), the interviews were informal, guided by the protocol, so that the interviewees were free to present additional information regarding the design process.

FIESP BUILDING AND THE COLLABORATION BETWEEN MENDES DA ROCHA AND MMBB

The Fiesp building was designed by Roberto Cerqueira César and Luiz Roberto de Carvalho Franco in 1969. According to these architects, the pyramidal shape emphasized the building in the urban landscape, adapted to the required template and setbacks, improved light distribution under the lower floors, concentrated a larger population on the lower floors, which reduced the probable average path per person, and allowed higher floors to move further away from neighboring buildings (Figure 1). The inner street functions as a regulatory reservoir space, which reduced the formation of vehicle queues in the access roads, Paulista Avenue and Santos Lane (ACRÓPOLE, 1970).

The upper ground floor sought to strengthen the connection between public and private space, as well as carry out the design connection between Paulista Avenue and Santos Lane. Accesses to the tower would be carried out by the upper and lower ground floors. The lower ground floor contained a theater, accessed by a staircase located in the central portion of the upper ground floor, as well as elevators, a library, gallery and support areas (Figure 1).

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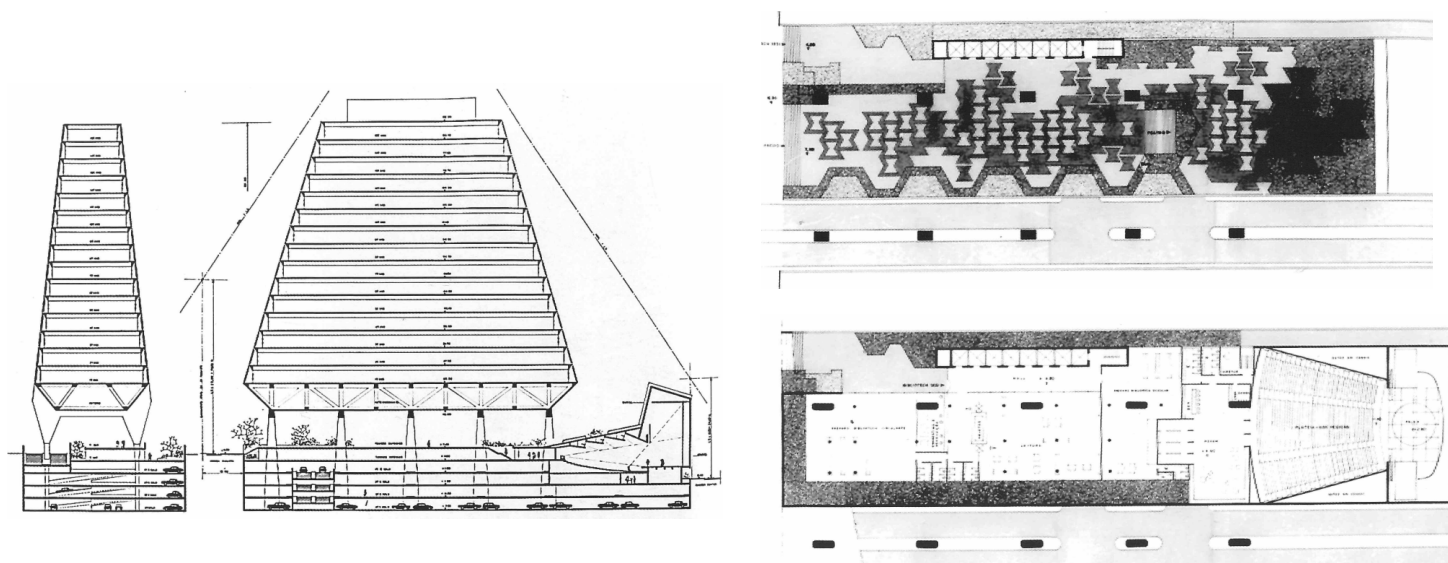


Figure 1 – Technical drawings of the original proposal *

*Note: Left: transverse and longitudinal section. To the right and above: floor plan of the upper ground floor free with landscaping by Burle Marx. To the right and below: floor plan of the lower ground floor with support areas, vertical accesses and auditorium.

Sources: Rino Levi FAU PUC Campinas digital collection.



Figure 2 – Image of the pyramidal volume and structure

Source: Rino Levi FAU PUC Campinas digital

The building visualization was valued by the large width of the public walkway at the time of its construction, which was later reduced, impairing tower visualization by pedestrians (Figure 2).

The construction does not resemble the original proposal, since, due to the structural request, an insertion of a central line of pillars and alteration of the beams and pilotis (columns) design that make up the structure of the ground floor were carried out. Before the intervention, the building was surrounded by a metallic grid, which impaired its plastic composition and, mainly, canceled the architectural party of the connection between building and city (Figures 1 and 2). The original proposal devalued as the design materialized and the building lost some of its design qualities due to the changes carried out. This, coupled with the problem of tower access flow and control due to the existence of two loading and unloading floors, led the Fiesp presidency to invite Mendes da Rocha in 1996 to carry out the design remodeling for the reception areas (lower and upper ground floors and sub-floors), which would reorganize accesses and flows, and renovate the existing library, auditorium and exhibition gallery.

⁴ Collaboration, informal, mutual process, in which two or more individuals work together, have common understanding and vision, share resources, knowledge, and tasks to achieve a common goal through unstructured interpersonal relationships (KAHN, 1996; CHIU, 2002).

Mendes da Rocha and the architects of MMBB began working together when Milton Braga, invited him in 1995, to participate in the execution of the Francisco Morato Bus Corridor project. This collaboration⁴ between these architects remains until today, 2018, with both producing 27 projects in collaboration. The remodeling project for the Fiesp reception areas in 1996 took place through Mendes da Rocha's invitation to the MMBB architects who were in charge of surveying the bases for the design, since the architectural program already existed and was operating at the time.

[...] the programs already existed [...] we searched for bases [...] a very large demand exists therein, delivery services, cars, motorbike deliveries, everything concerning document transport, orders. (BUCCI, 2016a, p. 154).

[...] we needed to [...] improve the foyer, there was the theater, and we knew that the auditorium foyer was not very pleasant, as it was very closed. (BRAGA, 2016a, p. 165).

[...] a project with a clear design like in the case of Fiesp [...]. Control has to be present, it leads to independent theater circulation, library circulation, art gallery circulation, whose programs, theater, gallery, are not mine, but Fiesp's. (ROCHA, 2016, p. 192).

According to the architect reports, the Fiesp president, the project client, did not present a formulated program, but instead, needs concerning the improvement of the reception areas and the vertical flow of users. It was, therefore, Mendes da Rocha's proposal to improve the existing program, as well as the hierarchy of problem solving.

It cannot be said that the architectural program was developed together with the team. Quantitative data related to the pre-dimensioning of some areas were recorded on a slate by Mendes da Rocha (Figure 3), derived from his technical knowledge and experience applied to that design.

DESIGN PROBLEMS

The architectural design process can be considered an activity that involves problem solving and in which the designer recognizes the state of a problem and what is to be achieved (LAWSON, 2004). According to Rowe (1987), Lawson (2004, 2011) and Cross (2011), there is a hierarchy of importance in the design process that considers the relationship between problem complexity, technical-scientific knowledge, professional experience and individual values, so it is essential to classify the existing problems.

Design problems can be classified into three types: well defined, defined and ill defined, or “wicked problems” (NEWELL, SHAW; SIMON, 1958; ROWE, 1987), a term created by the philosopher Karl Popper and used by Rittel in the 1960s in its approach to the processes of logical reasoning in concrete situations (BUCHANAN, 1992). Well-defined problems have prescribed and apparent goals or objectives, for which solutions are known, by simply analyzing the most appropriate means of attaining them. The defined problems have defined ends, but the means for their solution is undefined (NEWELL; SHAW; SIMON, 1958; ROWE, 1987), and part of the activity to solve them is to define and redefine the problem itself. In ill-defined problems, both the ends and the means to obtain the solutions are, *a priori*, unknown (ROWE, 1987), as they exhibit confusing information and ramifications (CHURCHMAN, 1967), do not possess explicit bases to determine the activity capable of solving them and do not present a stop rule in the search for their solution (RITTEL, 1972). Rowe (1987) and Buchanan (1992) highlight the difficulty in reaching a solution: different ways of defining and formulating the problem imply in different solutions and vice versa.

[...] they had a theater [...] a library, [...] an exhibition space that makes up a cultural center, but this did not work very well, [...] there was a lot of circulation conflict with the building [...] the construction had to be done without Fiesp stopping its activities [...] I think it guided the design and the technical choices themselves [...] the elevators were a little congested and there was no way to expand them. (BUCCI, 2016a, p. 153).

[...] to make the building more attractive, more welcoming to those who were arriving in it, to improve its relation with the city, I could even say urbanize it in some sense, to make it more inviting, more open to the city [...]. According to technical challenges, how to improve spaces, building, inside something already built. (BRAGA, 2016a, p. 161).

[...] the first big question, how to reestablish a relationship with Paulista Avenue. (MOREIRA, 2016, p. 180).

There is an issue in Fiesp's case, but also for companies in general, from the point of view of circulation and service traffic. (ROCHA, 2016, p. 184).

According to the point of views of Bucci, Braga, Moreira and Rocha, the central problems identified by the architects could be discriminated by the conflict of pedestrian flow and services in the ground floors and tower access, gallery remodeling, with a continuity of building operations and reconnection of the building to the city. The user flow conflict can be characterized as a defined problem since, although several types of users were directed to different sectors of the building with different intensities and control needs, there were not many people involved in the decision, and the explicit basis solution was related to ordination.

The gallery remodeling and the reconnection of the building to the city could be considered ill-defined problems, as their formulation was not known *a priori*, as observed in the excerpts from the interviews below. Design problems are defined by the relationship between ideas and solutions, and there are attempts to establish a process that efficiently leads the designer to a good solution (CROSS, 2011), and its structuring depends on the preconception that defines the direction to reach the solution (ROWE, 1987; CROSS, 2011), depending also on factors related to the values that the designer has in relation to architecture (LAWSON, 2011).

[...] the work gets done without being confused with that, and you think: "Ah, the luxury that an exhibition gallery is there at the Paulista [...] a beautiful example of how you can transform the city by totally modifying this public plan [...]. Imagine taking Fiesp and replicating it on the whole avenue, with all ground floors permeable [...] as if it were a model [...] transforming the city without breaking down anything [...] another thing that is impressive, which is like [...] remodeling three floors of that building without the building ceasing its function for a single day. (BUCCI, 2016b, p. 173).

[...] I find the contrast between the delicate steel of the new construction as a parasite against the brutality of those transition beams very pretty. (BRAGA, 2016a, p. 164).

Whenever you find a clear setting it is a pleasure to have those expected episodes come true: let's go to the library [...]. You have to seduce yourself [...]. have to see the library [...]. You're on Paulista Avenue, you see the arts hall, you see the library and you feel the existence of the theater, the theater has to be announced for you to buy tickets [...] we made a series of small arrangements that made it all better enjoyed, even from the purely aesthetic point of view [...] to make things clearer, is to bring into harmony what was already there [...] It was a very interesting project perhaps from the point of view of the exercise [...] of these transformations of the same thing that was already there [...] which was already graceful before. (ROCHA, 2016, p. 193).

The architects' discourse demonstrates the connection between their values associated with an adequate architecture and the preconception of the problems that should be solved in the Fiesp design.

SKETCH OF THE FIESP BUILDING PROJECT

There are two records of drawings related to the design phase of the project, however without a defined date. One of them implies the architect's concerns with the vertical movement in the building (Figure 3, left). For Herbert (1988), sketches provide graphic means for adding information from the cognitive repertoire of the designer to the solution of design problems, and the construction of its structure begins before its execution, from the abstraction, selection and organization of the data that make up the description program and the physical and cultural context for the project.

The sketch analysis (Figure 3, left) indicates the intention of the architect to highlight the volume of the intervention in relation to the Paulista Avenue walk and the auditorium/theater.

The idea, in Fiesp's case, of independence for enjoyment, including not feeling as if you were bothering the other, of the circulation of people who go to the theater, which is a completely different category of behavior, three hundred, four hundred people on a coffee break interval [...] has nothing to do with the group going to meetings. (ROCHA, 2016, p. 187).

The sketch made by Mendes da Rocha represents the longitudinal section of the ground floors of the building on the MMBB office blackboard, which served as a support for design process and team communication (Figure 3, right).

[...] palimpsest [...] it was the same design he drew on repeatedly [...] sometimes he erased things, sometimes he drew them over previous annotations. (BUCCI, 2016a, p. 156).

[...] Paulo himself drew the entire design from a longitudinal section [...] of the building on the board [...] as the conversation followed, he would draw on this initial sketch and make the sketch follow the conversation, the understandings, the premises he proposed for the design (MOREIRA, 2016, p. 168).

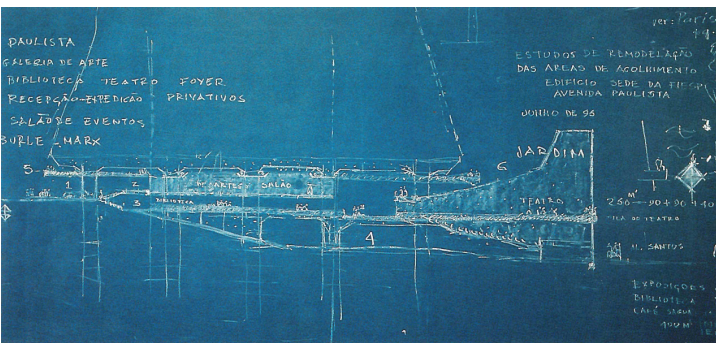
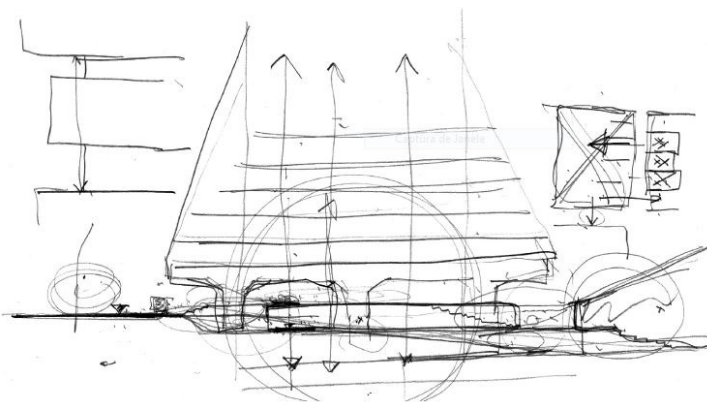


Figure 3 –Sketch by Mendes da Rocha
Source: Personal Paulo Mendes da Rocha collection.

Schön (1984) argues that the designer uses drawings as a reflection process, to visualize new possibilities or problems; and for Davies and Talbot (1987), drawing is a stage of the reasoning process, since it helps reasoning process structuring, and, according to Akin (1986), directing the subsequent decisions and allowing new information from memory and references to be brought to the design process. According to information collected from the interviews, Mendes da Rocha used the slate to develop and refine design strategies, however it is possible that the architect had analyzed other possibilities without presenting them to the team.

The two drawings seem to have aided in the structuring of the strategies that involve this disconnection: an apparent evolution is observed between the blank sketch and the sketch made on the blackboard. The drawings also allowed Mendes da Rocha to register and communicate his knowledge and strategies to his collaborators.

Paulo begins his designs when he is with the team, [...] and does not simply say "draw this, draw that" [...] perhaps he does that when he is alone, quiet, I think that's why he has his office, so that in some moments he can sit quietly and test some ideas on paper [...] but he did not bring out any finished drawings [...] we began to draw on that slate, where he soon did a longitudinal section of what existed, the shape, mainly, of the structure and [...]. Erasing, scratching, erasing [...]. Always on the same drawing, on order to formulate the preliminary study, the party, which ended up being organized there in the first study. (BRAGA, 2016a, p. 162).

The contents of the drawings can surpass their representation and transmit different meanings to the collaborators. However, in the case of the team members under analysis, as they exhibit recognized intellectual affinity and values, the meanings could be, although convergent, different. According to Cross (2011), the design, at the organizational level, allows for the development of parallel levels and interaction simultaneity, as well as feedback among team members. The drawing recorded the strategies of Mendes da Rocha and was being refined according to his interactions with the team members, who transcribed these handmade drawings to a CAD software.

[...] as he talked about the design and described his ideas [...] and looking at the most accurate drawings on the computer, he was indeed reformulating some initial measures and [...] updating the section on the board. (BUCCI, 2016a, p. 155).

DESIGN STRATEGIES

Design requires judgment and decision-making, in which each designer has a belief's knowledge, values and attitudes that lead to the project, seeking to predict the unfolding of their choices (LAWSON, 2011). This knowledge carries great weight in the initial design phase. The architect can use previous ideas, analogies between objects and/or concepts, belonging or not to architecture, that can transcend project proposals and be incorporated into the designer's thinking in the decision-making process (ROWE, 1987) together with idea and concept argumentation, offering answers to problems (LAWSON, 2004).

In order to structure the problems during the design, some designers seek to print order through organizational principles, interpreted and reinterpreted in the context of the problems, guiding and offering starting points, enabling the creation of an output style and being understood as a habitual way, for each designer, to solve problems (ROWE, 1987; CROSS, 2011; LAWSON, 2011). In addition to organizing principles, designers use guiding principles: sets of ideas and beliefs capable of covering many projects, which usually characterize a coherent career path for the designer, not concerning style, but concerning an intellectual program (LAWSON, 2011). These principles help start the work (DARKE, 1979) and instigate a concept, since this does not derive directly from

the affirmation of the problem. The designer introduces external information to the problem (CROSS, 2011), since its resolution depends significantly on the knowledge inserted by the designer (LAWSON, 2004) and by clients, users and legislators. The designer is, therefore, the coordinator of the information sources (LAWSON, 2011).

In this way, an architect production is identified by the strategies and elements that translate his/her knowledge and values that permeate his/her projects. Even if the whole of his/her work goes through a transformation, it happens uniformly and leaves remaining traces of the values of each architect.

Mendes da Rocha's main strategy in this project was the cutting off part of the floor slab of the upper ground floor, which made it possible to reconnect the building to the urban context, to value the art gallery from Paulista Avenue and also to create a foyer with an elevated ceiling for the auditorium (Figure 4). This strategy reflects Norberg-Schulz's (1998) proposal on initial design tasks, in which decisions are taken based on qualitative, rather than quantitative



Figure 4 – Slab cutting*

*Note: Left and above: lobby next to Paulista Avenue. To the right and above: atrium next to the auditorium. Below: floor plan of the upper ground floor. The blue hatch area represents the floor area of the upper ground floor that was demolished. Source: Nelson Kon (left and above and right and above). Prepared by the author based on the personal Paulo Mendes da Rocha collection (below).

information, since this qualitative information is related to the values that Mendes da Rocha considered relevant.

[...] demolished 500 square meters of slab, which is not an obvious operation [...] as it is laborious, on Paulista Avenue [...] saws cut the concrete [...] into pieces that were easy to move and transport. (BRAGA, 2016a, p. 164).

[...] he sawed on a stretch of slab right in front of the entrance of the theater, created a foyer for the theater with a double spaced ceiling, talked a lot about Matta Clark. (BUCCI, 2016a, p. 155).

The choice of the steel construction technique, before being called a parasite structure, was due to the ease of its execution in relation to a concrete structure, which would require preparation of the original structure to receive the new load, a longer execution time due to the time of concrete settling and would not allow for the differentiation between the original design and the intervention.

Another problem identified by the architects concerned access, circulation and control to the design programs: library, tower, auditorium and gallery. Simultaneous accesses and exits to these spaces were present on the ground floors of Santos Lane and the upper and lower ground floors of Paulista Avenue. A resolution was carried out by the orientation of the access and unload flow direction. Mendes da Rocha proposed that service access and document delivery be performed by Santos Lane, on the garage floor, removing some parking spaces from the first underground. The tower exit takes place on the lower ground floor, as well as access to the library, cafe, ticket office and auditorium. Tower and art gallery access is carried out via Paulista Avenue, from the upper ground floor (Figure 5).

[...] one of Paulo's initial premises was to board through [...] the upper ground floor and disembark by the lower ground floor, which greatly improves elevator performance [...]. The ground floor can be called Santos Lane, so it is a building



Figure 5 – Building accesses and exits *

*Note: Left: access by Santos Lane. To the right: access by the upper ground floor.

Source: Nelson Kon.

that can be said to have three ground levels, one at Santos Lane, one on the Upper Paulista and Lower Paulista levels. (BUCCI, 2016a, p. 154).

Mendes da Rocha proposed a ceiling height variation of the gallery, creating two pyramidal volumes that occupy part of the spacing between tower beams (Figure 6).

⁵To see other Burle Marx's panel photographs and Mendes da Rocha's intervention project, we suggest the essays produced by Kon and Finotti (2017).

[...]a skylight [...] that opens and displays the concrete slab lining [...]. with a double height ceiling [...] where the artist can put a larger piece ... this solution [...] is a kind of topography and landscape constructed from all the structures that have been used. Paulo, as an experienced architect, knew that any exhibition space without a high ceiling, in at least some places [...] is not so good. (BRAGA, 2016a, p. 163).

If there was that emptiness up there, in the structural spaces, why not make those lanterns [...] there is a place for something bigger to be on display [...] common sense [...]. this ceiling variation foot to exhibit works of art. (ROCHA, 2016, p.189).

One of the problems not mentioned by the architects as central, however perceived during the design process, was the protection of the tower reception located on the upper ground floor. This was solved by means of a metal bridge approximately 80 meters in length, which, in addition to protecting the reception area, allows for the visualization of the Burle Marx panel, which covers the auditorium roof and elevation contiguous to Santos Lane⁵. The bridge also allows users from Fiesp-restricted events to view Paulista Avenue from a privileged height (Figure 7).

It organized the access area to the elevators with reduced height ceiling, and still created a mezzanine up there that allowed people, during ceremonies and special events [...] to look at Paulista from a privileged height. (BRAGA, 2016a, p. 162).

[...] that bridge [...] became a hall, because it solved the problem of how to close the elevator hall, because it lacked a ceiling, that was a difficult thing to do. (BUCCI, 2016a, p. 157).



Figure 6 – Exhibition Gallery Chapel
Source: Nelson Kon.

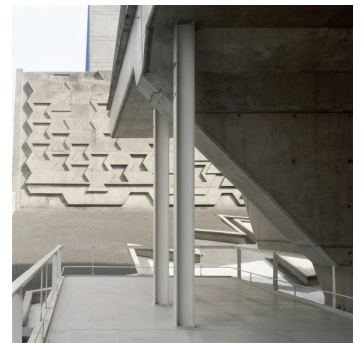


Figure 7 – Metal bridge

*Note: Left: reception and metal bridge. To the center: metal bridge seen from Paulista Avenue. Right: view of the Burle Marx panel from the metal bridge.

Source: Finotti (2017) (left and center). Nelson Kon (right).

[...] that volume that goes from the back garden, on the theater roofing, from Burle Marx. It will also rescue what this place that was [...] rarely seen from a visual point of view [...]. But until you get to Paulista Avenue, look from the balcony, then you go out and make that connection from the garden to Paulista Avenue. (MOREIRA, 2016, p. 181).

That is [...] an invention that seemed interesting, a little hall for extraordinary commission meetings, a joyous and amusing thing that I made the elevators stop there ... to feed people circulation [...] and with that you quickly go and look at Paulista [...] in that situation, of a meeting, some movement [...] and you cannot go there and see, you would have to leave that floor. It's a way for you to go there [...]. It seemed interesting, including displaying the freedom of those metal structures. (ROCHA, 2016, p. 190).

Mendes da Rocha connected the design guidelines (guiding principles), which he attributed as “common sense”, to the elements that materialized these guidelines through his professional experience, his values related to the connection between building and city, and the relation of scale between art objects and building dimensions and human scale. This can be seen from the architect’s concern with the element and environment dimensions, from the visualization of the program by the pedestrian, in the building flows, etc.

Mendes da Rocha proposed cutting off part of the floor slab of the upper ground floor, the intervention volume in glass and steel, and the improvement of the elevator flow through the insertion of flow directions and distribution of accesses between the three floors. Although Mendes da Rocha anticipated the problems related to the dimensioning of the environments and the structural elements, textures, furniture and details, these were incorporated into the design process as the initial idea began to affirm and develop itself.

The strategies that were initially presented by Mendes da Rocha to his team remained unchanged and guided him until the end of the project, with collaborators having to refine the proposal. This is due to the architect’s reflection process around the main design problems before presenting them to the collaborators. It is suggested that Mendes da Rocha formulated the design guidelines in an isolated way in his office. However, this does not exclude the possibility of investigating strategies or parallel proposals at first, before his presentation to the team.

[...] Paulo is the author, [...] he had a lot more experience, as he is notoriously a tremendous talent, so we listened a lot to Paulo and he obviously gave his opinions, dialoguing. (BRAGA, 2016a, p. 162).

[...] Paul conducted the design, as he was the author, and we were in charge of the project production. (BUCCI, 2016b, p. 171).

The knowledge that Mendes da Rocha took to the Fiesp design process is related to how to reflect, think and structure problems. However, Lawson’s (2011) and Cross (2011) propositions regarding an output style seems to be true, since the use of technique, rationality and building connection to the urban context prevails.

He is a technical information guy [...] knows reinforced concrete, knows metallic structures, does things himself, and does so in the architectural design, of

course, his beam comprises fifty instead of sixty, but he does not lose his center, he already comes with things thought out, this is very nice, it is enriching. (KURKDJIAN, 2016, p. 198).

[...] Architecture is art, science and technique all at once, not a little of each, but all at once, it is a peculiar form of knowledge, Architecture, not a confluence of parts, is a peculiar way of reasoning [...]. In our case, the Paulista Avenue class, the São Paulo city class, the Brazil class in relation to the position of the Brazilian industry in counterpoint with the world [...]. Strictly speaking, the projects that shape the contemporary city are collective projects, projects of a republican character, discussed in assemblies, etc., in commissions, ministries, secretaries, it is not you who will solve the city alone, you will have a say of course, that is the policy. You can collaborate to establish a fair management policy, so that all of this is successful. (ROCHA, 2016, p. 192).

It is suggested that Mendes da Rocha utilized conspicuous design strategies of his own production as a means to structure the beginning of the Fiesp reception area remodeling project. In this sense, a relationship exists between the strategies adopted in the project analyzed herein and the elevation and horizontality of the Forma's store volume and the volume of the new Fiesp gallery, as well as the contrast between the concrete and steel materials. On the other hand, the use of grate liner at the Forma store, in the Mube, as well as in Fiesp areas, allows the partial visualization of the facilities. However, these relationships are possible as design strategies, although they originate from different constraints and have different objectives as solutions to the problems faced in each project.

There is evidence that converges with Lawson's (2011) explanation of the importance of using reasoning (including logic, problem solving and concept building) and imagination (combines experience material) for the designer. It is unquestionable to use Mendes da Rocha's imagination to combine existing strategies and elements from the memory of his and others technical repertoire in an arrangement that could satisfy the requirements and constraints of the project, alongside the values to be achieved, that, in turn, reflect his personal values. In the view of the collaborating architects, the combination of his values allied to the technique, the urban insertion of the building and the valorization of the potentialities of the requirements and conditioners of the project make the Fiesp building reception areas an inventive and innovative proposal.

[...] is in Paulo's party, so to speak, in the view of his projects [...] that he has to take advantage of multiple city entrances. (BRAGA, 2016a, p. 162).

[...] his ability to see a problem is amazing, often even the demands come in a certain way, and he gives an answer that reinvents the demand. (MOREIRA, 2016, p. 184).

[...] these are the same questions put back into somewhat new situations [...]. You have to use the experience of the other, things you have already seen [...] you can copy, imitate, after all, we talk about singing, dancing, writing, we do not talk about inventing dance, inventing singing and inventing writing, they

have already been invented, copy them. Find the architects you like, then [...] try to do similar things [...] start carrying out the line that pleases you. Choose a path, don't they tell you to choose a literary school, if that were the case, a poetic school, a technical school. (ROCHA, 2016, p. 191).

[...] you go there, and he's [...] doing "his little models" to put in front of the arts quay [...] trying to imagine the proportion [...] first you think, then you do, that's the truth [...]. Mature it, let some of it fester in your brain, there's a time for ideas to be born. (KURKDJIAN, 2016, p. 201).

In turn, the use of reasoning, especially heuristic reasoning, can be verified in predicting and interrelating the development between the design's initial strategies and conditioners. The relation between the useful height of the gallery and the objects that can be exposed by means of "chapels", the gathering of the tower entrance foyer ceiling, the high ceilings of the building access and auditorium foyer, the proportionality between the glass facade of the gallery and the "emptiness" created by the cutting part of the floor slab of the upper ground floor are examples of the use of environmental relations (relations between man, space and components) in structuring the design problems mentioned by Rowe (1987).

[...] one of Paulo's talents is to know how to develop a project very well, so when he defends an option, he is already showing what the possible outcomes are. (BRAGA, 2016a, p. 166).

When he sketches on the slate [...] everything is already there, the two empty spaces, the volume of the art gallery [...] still on the sketch [...] the idea is already quite evolved in its essence, and then, with the drawing, we obviously refine. We go into the particularities of the structural needs, that was also an interesting thing [...] the structural engineer, Zaven [...] was actively involved from the beginning, so, at the beginning, we had already established conversations with the structure, so we would refine these interlocutions with the structure, with the facilities, with the thinking development of how these details would be. (MOREIRA, 2016, p. 182).

[...] is a process of successive approximation. Usually, they bring the thing half-chewed, kind of "sketched," "fine sketched" [...]. Because you have an idea of size, he does not propose impossible heights. (KURKDJIAN, 2016, p. 200).

Mendes da Rocha used technical knowledge, environmental relations and predictions of the strategies adopted in the design, comprising heuristic reasoning, as well as his experience and values, which, combined to Fiesp's specificity, made up the imaginative part of the design.

RESULT EVALUATION AND ANALYSIS

According to Rowe (1987) and Lawson (2011), evaluations interpret the validation of architecture positions, analyzing their logical coherence. In this study, design evaluations occurred according to its development through a

process of element refinement, their interrelationships and dimensions, based on Mendes da Rocha's experience, especially that related to the proportionality between the elements that make up the building.

[...] Paulo's designs gain wealth, a balance of proportions that not any person is able to give to the drawing and the project, it's great when he draws, more than simply directs or conceptualizes, but Paulo was always an architect who sat by our side when the drawing was already on the computer and said: "look, larger, smaller, pull here, pull there". (BRAGA, 2016a, p. 159).

[...] Paulo has an interesting question that the project does not come in parts, it is obvious that he undoubtedly refines the work, but the initial idea already brings the essence of the problem. (MOREIRA, 2016, p. 182).

[...] something had already been thought out, and from then on we improved what was being proposed, that's how it works. (KURKDJIAN, 2016, p. 200).

We know what is to work together, he proposes, the other one directs, recommends: "this geometry is not good for a structure, I can calculate it, it won't fall, but it's kind of stupid, it's spending a lot of concrete", an ideal geometry for structures does exist. (ROCHA, 2016, p. 189).

It is noted that the evaluation of the strategies proposed by Mendes da Rocha, are convergent to the collaborators values. This convergence is also valid between engineer Zaven and Mendes da Rocha, demonstrating confidence in the team leader judgment. In this project, the final judgment of proposals and complementary strategies must be credited to Mendes da Rocha.

[...] the collaborator in charge of producing the drawings has to work out solutions without taking the main architect decisions, but must offer the developed possibilities so that the judgment is well informed. (BUCCI, 2016b, p. 169).

[...] when we thought something was not very promising, we said it [...] And then [...] he would rethink. So sometimes the dialogue was less [...] textual and more dynamic due to the relationship [...] at the end, I think the solutions were always convincing, and all were convinced that those were the best solutions [...]. What I mean is that there isn't such a thing as one who gives an idea and another who accepts, the idea is built. (BRAGA, 2016b, p. 177).

[...] since the beginning, the idea had already been very strongly configured, ie [...] to inaugurate this new relationship with Paulista Avenue, that was the great question posed in the project [...] the project remained very intact since the beginning. (MOREIRA, 2016, p. 182).

Look, Paulo, I've pre-dimensioned and we have a little problem, he draws two sketches in scale, if you put the scale there, it's cool, that's fine, let's do that then. (KURKDJIAN, 2016, p. 197).

FINAL CONSIDERATIONS

The aim of this study was to identify and analyze the strategies adopted by Mendes da Rocha and the MMBB team for the execution of the remodeling project of Fiesp building reception areas, in agreement with Design Thinking guidelines. This fragments designer thinking, by analyzing the paths that make him/her perceive and act in the face of problems, taking into account individual aspects, perception, technique and tools, experience, environment, his/her own and external methods and concepts and theories, among others (ROWE, 1987; LAWSON, 2004, 2011; CROSS, 2011).

Issues related to the Mendes da Rocha design process were mapped considering the interrelation between the adopted strategies, the vision of those involved about the process, the technical knowledge applied to the project and the developed activities.

The process can be described as follows: reflection on the values to be constructed before the situation and initial structuring of the problem in an isolated way by Mendes da Rocha, seeking potentialities of the situation, with these potentialities intrinsic to his style, that values the intelligence of construction techniques, the rational functioning of the project, the connection of the building to the urban context and the proportionality between the elements that make up the building. For Mendes da Rocha, his values, combined with technical knowledge and professional experience, ensure the feasibility and beauty of his proposals, since, for him, the success of an architecture project varies according to the capacity of the building in being perceived and admired.

What do we call success? The capacity for seduction. (ROCHA, 2016, p. 191).

The architect traced strategies that guided him in the process, some already consecrated in architecture, such as the elevation of volumes in relation to the ground, as seen in the Forma store, the presentation of the independent structure, the plastic valorization of the structural elements, the connection with the urban context through the ground floor free of barriers and compositions with a certain symmetry, the contrast between materials such as glass, steel and concrete, tape openings or “glass curtains” and the display of great structural loads. These strategies can be noticed in previous projects, although the appropriate adaptation to Fiesp specificities is emphasized.

The project seems to defend itself because the architect’s wishes regarding construction are materialized through these strategies, reinforced with each new strategy that is added to the initial proposal. In the stage following the initial structuring of the design, the collaborating architects and the structural engineer entered the process, playing a relevant role due to Mendes da Rocha’s appreciation for the “structural intelligence” of the building. It is not possible to affirm that divergent strategies to the backbone proposed by Mendes da Rocha were present, due to the consonance of values of those involved in the project.

This article sought to contribute to a discussion on the design process of recognized architects, based on the opportunity found in dialoguing about and discussing the remodeling architectural design of the Fiesp building with the main designers involved in the design, aiming to understand the design process of Mendes da Rocha and the MMBB architects. After all, understanding the design process of architects like Mendes da Rocha is of paramount importance not only to assist educators and practitioners in the understanding and evolution of design practice, but also for the appreciation of architecture as part of the science of the artificial, advocated by Simon (1996).

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