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ADEQUACY OF THE ARCHITECTURAL DESIGN OF A MULTIFAMILY BUILDING LOCATED IN CAMPO MOURAO-PR, TO FIT THE CONDITIONS OF ACCESSIBILITY.

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Abstract: Current projects should consider the diversity of people who can acquire a property, making access to it possible to anyone, disabled or not. For this, Brazil has the NBR 9050 norm that determines the basic parameters of accessibility, in addition to other more specific laws and decrees as the Federal Law No. 10,098 / 2000, the Federal Decree No. 5296/2004 and the Municipal Decree No. 4763/2010. This study aimed to analyze the design of a residential building in this parameters and the solution of the requirements not met optimally, creating an accessible project. This was achieved through the application of a check-list prepared based on current standards and a script survey of CREA-RS. The access area of the building, the social area and the typical floor plan were verified. Through this research we can notice small irregularities, especially in access and use of toilet, besides the need to implement new external paving.

Keywords: Adaptation, Mobility, Planning, Architectural Barriers.

1. INTRODUÇÃO

Just like Ergonomics, Accessibility is an area of knowledge that must be mastered across sectors by various engineering specialties. Society has demonstrated concern about mobility (quantity of movement) to reflect on the importance of accessibility (possibility and quality of access) in contemporary urbanism.

According to the 2010 Census, the Brazilian population is aging and life expectancy is increasing. Furthermore, traffic accidents produce 120,000 people with partial or permanent disabilities per year. Therefore, when thinking about adapting a building in terms of accessibility, it is assumed that any person is subject, at some point in their life, to have difficulty performing their motor activities, whether due to a disability, accident or simply getting older.

It is worth noting that the lack of accessibility for people with disabilities in the built space further accelerates the process of separation from coexistence, making spatial and social exclusion have the same meaning. Therefore, many of the limitations and disabilities of some people are due to the inability of the built space to accommodate diversity, demonstrating that "disability in itself is not the causative factor of immobility but rather the lack of adequacy of the environment" (DUARTE; COHEN, 2004, p.6).

Around the world, there is increasing concern about people's mobility and accessibility. Engineers and architects have planned, built and adapted urban spaces with the aim of promoting everyone's right to fully enjoy the place where they live. The global trend is to design spaces, equipment and utilities considering the diversity of human types, adopting a universal design that serves as many different people as possible, in order to ensure that: anyone can use it; is safe and comfortable to use and is suitable for each person's needs and limitations.

NBR nº 9.050/2004 (ABNT, 2004, p. 02) defines accessibility as the "Possibility and condition of reach, perception and understanding for the safe and autonomous use of buildings, space, furniture, urban equipment and elements".

According to Rabelo (2008), accessibility can be considered as the possibility of any person, whatever their mental or physical conditions, of getting somewhere or using information, services, as well as urban space, with autonomy and safety, both for work and for health or for education, which are contained in the basic rights of citizenship.

In this way, the aim is to adapt the project of a residential building to be carried out in the city of Campo Mourão so that it guarantees accessibility conditions, as determined by ABNT Technical Standards and legislation, in particular Federal Decree nº 5.296/2004 . To this end, a checklist

was drawn up to assess accessibility from the sidewalk that gives access to the building, as well as the external area, in addition to the common areas (party room, reception, reception and social hall) and private area (apartment type).

2. BIBLIOGRAPHIC REVIEW

The term "person with a disability", used in the Declaration of the Rights of Persons with Disabilities (UN, 1975), designates any person who cannot acquire the necessities of a normal life, as a consequence of a congenital disability or not, in their physical, sensory or mental capabilities is a person with a disability.

Federal Decree No. 5,296 (2004) classifies the types of disabilities as physical, hearing, visual and reduced mobility. They are described respectively as the loss or impairment of some motor function, reduction of hearing by forty-one decibels, problems such as blindness or low vision and reduced mobility that affects the elderly, pregnant women, obese people, among others.

Each category has its difficulties, which are resolved by changes provided for in NBR 9,050 (2004). For those who require ramps, gentler slopes of a maximum of 8.33% are provided. There is also the implementation of tactile, directional and alert floors, so that the visually impaired can move around safely.

With the evolution of society and greater understanding of people who need accessibility support, in 2004 NBR 9,050 (1994) was modified and adapted with the aim of enabling a greater number of people, whatever their degree of mobility, can make practical, safe and independent use of the environment and elements in which they find themselves.

As it concerns environments, constructions and furniture, it is the role of engineers and architects to develop new projects and improve old ones so that there is access for everyone. It is from this standard that the way in which projects are developed began to gain new priorities and needs (SCARABELLI, 2010).

Within a city, the basic thing is to think about sidewalks, which are a means of access to buildings and the road with an external accessible route. According to NBR 9.050 (2004), this is defined as the connection of external or internal environments through a regular, unimpeded and indicated course, which all people, including those with disabilities, are able to use independently. According to research by Dorneles and Zampieri (2008), sidewalks must have optimal planning so that appropriate dimensions, type of coating and elimination of barriers are applied.

It is recommended that sidewalks

must have at least 1.50m of effectively available width, that is, free from barriers and impediments, which can be trees, urban furniture and equipment, gaps and drops. The types of coating range from interlocking concrete floors to cast-in-place concrete, so that when executed correctly they can ensure mobility for all people (SCARABELLI, 2010).

Furthermore, it is necessary to implement tactile floors that help guide these people. These are manufactured in two types, balls or bands, and are used to ensure the presence of obstacles, such as barriers and corners; and free access respectively.

When it comes to private buildings, the need for architectural adaptation is still not widespread, unlike public buildings. The work of Gasparoto and Alpino (2012) portrays the issue that even with the presence of a physically disabled person in the home environment, it is difficult to adapt the home design. In this work, which focuses on home accessibility for children with disabilities, some common barriers were found, such as unevenness in several rooms, steep ups and downs at the entrance to homes, smooth floors and doors with inadequate width. The authors emphasize that an accessible environment helps to stimulate the functionality of people with disabilities. A major challenge for engineering and architecture professionals is the transfer of client/professional information and vice versa. In the case of clients with some type of disability, this can be an even greater aggravating factor. Aiming to solve this problem, when aimed at a client with reduced vision or completely lacking vision, research was carried out by Faria and Elali (2012) to discover how to carry out this exchange of information. The person with a disability effectively participated in the

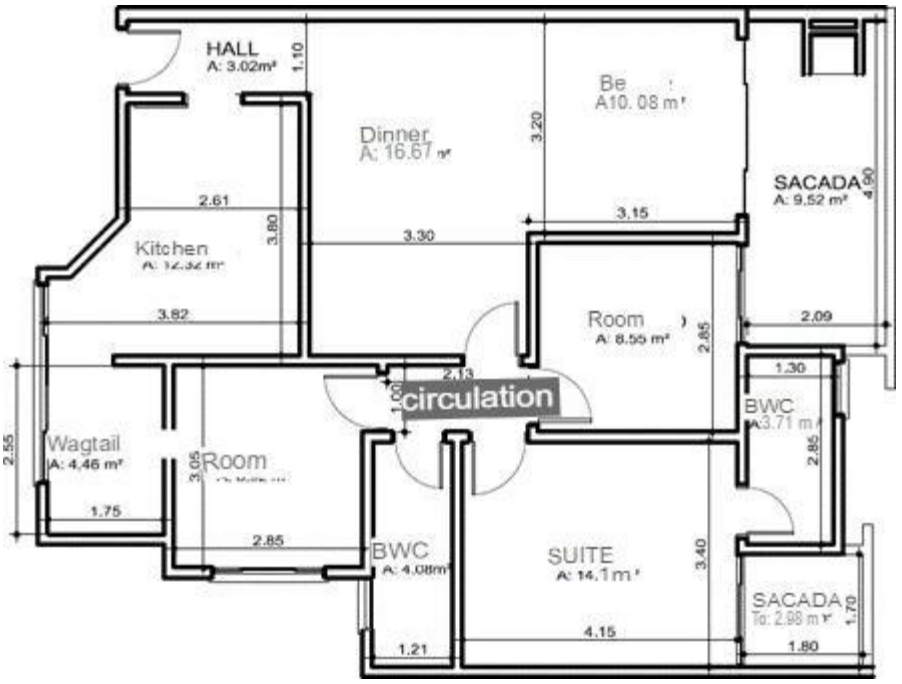
renovation project for the residence where he lives with his parents. In all stages of the project, high-relief models were used that contained different indications for existing walls to be demolished, to be built, windows and doors.

Initially, only the floor plan of the residence was analyzed, which contained the current project and what would be adapted. After defining the necessary modifications, the model gained a new dimension and furniture was included so that one could get an idea of the accessible routes.

3. METHODOLOGICAL PROCEDURES

The study was carried out based on the Philadelphia Residential Building project, under permit no. 677/2012, which is being built on Rua São Paulo, central region of the city of Campo Mourão
– Paraná. It is a vertical project of 2,099.76 m², divided into ground floor and three floors that contain four apartments each, totaling twelve residential units of 174.98 m². These consist of a suite, two bedrooms, dining and living room, kitchen, laundry room and a guest bathroom, as per the floor plan in figure XX. The building also has an area common consisting of reception, circulation and party room.

Figure 1: Floor plan of the typical apartment.



With the relevant legislation in hand, the original design of the building was analyzed and the points in disagreement with Federal Law No. 10,098 (2000), Municipal Decree No. 4,763 (2010) and Federal Decree No. 5,296 (2004), in addition to NBR 9,050, were mapped. (2004). This mapping was done in three stages, separated according to with the locations, with Stage 1 surrounding the building, Stage 2 in the common area and Stage 3 in the standard apartment area.

A check-list was prepared, based on an inspection guide from CREA/RS (2007) and in accordance with the recommendations of Federal Law nº 10,098 (2000), Municipal Decree nº 4,763 (2010) and Federal Decree nº 5,296 (2004), beyond NBR 9,050 (2004). This was used to obtain a quantification of the accessibility of each location, in which, according to which items are met, a score is assigned to the location, in the order presented below:

a) If less than 50% of the necessary items are met, the grade assigned is from 1 to 5 and the location is considered not accessible;

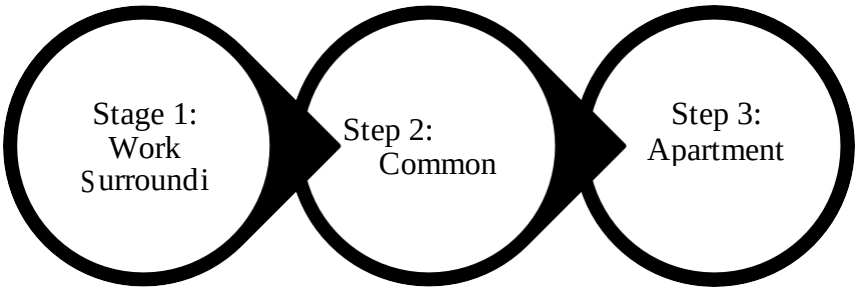
b) If 50% to 80% of the items are met, the grade is between 5 and 8

and the location is identified as partially accessible;

c) Finally, if service is greater than 80%, the score is 8 to 10, and the location is considered accessible.

To analyze the project, a methodological flowchart was used, according to figure 2:

Figure 2: Methodological Flowchart



In stage 1, a visit was made to the location where the building is being built, observing the surrounding pavements, minimum distances and measurements, access ramps, the slope of the land, interference in the free lane and level of the curb guide. It was also verified, together to the public authorities, the type of paving required by municipal legislation.

In stage 2, the width of the corridors, door widths, dimensions of the elevator and stairs and public bathroom were analyzed. Then, using the architectural plan of the building, the checklist was applied to the areas studied.

In stage 3, circulation was assessed in the living room, kitchen and in the suite and bedrooms, dimensions of the bathroom and sanitary appliances, width of the hall and doors. To this end, the same checklist was applied with the recommendations of the Law and the points that required readjustments were identified.

Next, the actions were raised to change and adapt the project to that it is within the standards of accessibility. Then, the project was re-elaborated with the relevant modifications and inclusions.

4. RESULTS AND DISCUSSIONS

The mapping of items that did not comply with standards and legislation began by analyzing the pavement that gives access to the Building. During a visit to the construction site, the photos in figures 3A and 3B were taken.

A

B

Figure 3: (A) Vehicle entrance to the building; (B) Front sidewalk of the building.

In figure 3A you can see the lack of paving, making it difficult for anyone to pass, whatever their motor condition. In the section in figure 3B, it can be seen that there was pavement, but it was not properly maintained and vegetation ended up taking over the area. This is because the work has not yet reached the stage of reconstructing the external floor, which makes it impossible to use the checklist in this part of the project.

As the details of this paving are not foreseen in the project, what is recommended in the Decree must be followed.

Municipal nº 4,763 (2010), with the following items:

a) The longitudinal slope must follow the grade of the road;

b) The transverse slope must be a maximum of 2%;

c) The walkway must be continuous, with no steps, ramps, differences in level of any nature or transversal strips that characterize an obstruction being permitted;

d) The adaptation of the sidewalk regarding accessibility for people with disabilities will be carried out through the implementation of a ramp built in accordance with ABNT – NBR 9050, at each intersection, and a pedestrian crossing with special treatment for circulation (tactile floor) must also be implemented. , at the discretion of the Planning Secretariat

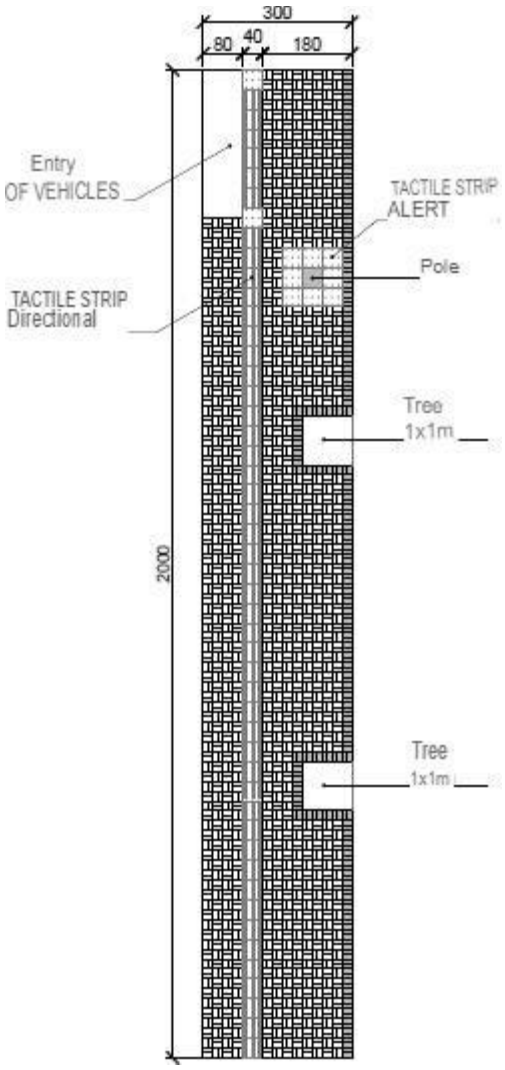
– SEPLA.

Furthermore, as it is included within the area established in the decree as Standard "A", it must be built with an interlocking coating (Paver) with concrete block pressed at 35 Mpa, measuring 22x100x60mm, produced in accordance with the specifications of the NBR 9781 standard of

ABNT (Brazilian Association of Technical Standards) in light gray and graphite gray, ensuring tactile directional signaling strip for guidance for visually impaired people, in red, as determined by NBR 9050, which must be placed in accordance with the provisions of Annex X and specifications provided by the Planning Secretariat – SEPLA.

Below, in figure 4, a model of Standard "A" applied on site, based on the Decree, with some execution details:

Figure 4: New front sidewalk project for the Philadelphia Building



In the common area (stage 2), the checklist was applied and the results were obtained as shown in table 1:

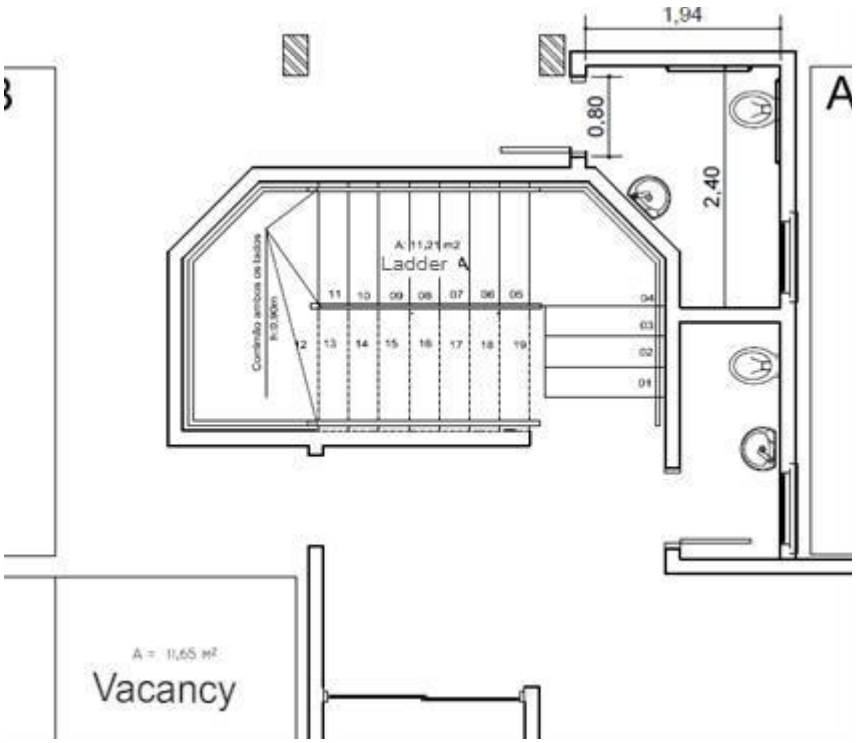
Table 1: Common area service in accordance with NBR 9050

Item Analyzed	**Service with the Standard**	**Unfulfilled items**	**Comments**

Circulation Internal	100%	-	-
Ports	70%	● BWC door smaller than 80 cm ● Doors with a leaf smaller than 80 cm	-
Circulation Vertical	100%	-	-
Ladder	100%	-	-
Ramps	100%	-	There were steps after the ramp that were removed
Sanitary	33%	● Dimensions smaller than 150 cm ● Door smaller than 80 cm ● No approach area	-

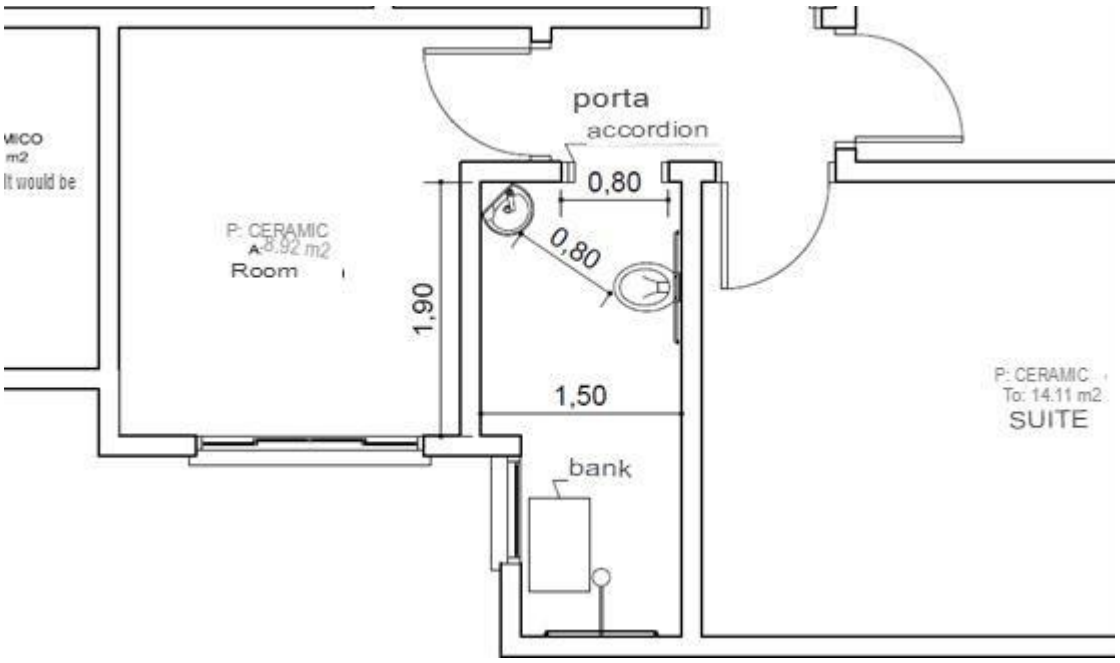
As in the research by Gasparoto and Alpino (2012), doors represented a large part of the problem, therefore they were resized to have a minimum gap of 80cm. As for the toilet found, it was repositioned on the other side of the stairs, as shown in figure 5, so that it could have minimum dimensions for a wheelchair to circulate.

Figure 5: Social bathroom of the modified and relocated building



In the area of the standard apartment, the items that were most non-compliant with the standard were doors and toilets, as also observed in the work of Silva et al (2005), which required greater expansion in these areas. The balcony door was designed with four 60cm leaves, becoming three 80cm leaves. The bathroom doors, as well as their dimensions, were small, so the best bathroom to make modifications was analyzed. The toilet chosen was the social bathroom, which was expanded towards one of the bedrooms and its door was replaced by an 80cm accordion door, as shown in figure 6.

Figura 6: Banheiro social do apartamento tipo modificado



This research confirmed that bathrooms are the main room to be resized in cases of accessibility, as stated by Gasparoto and Alpino (2012). The suitability of this environment means that people with special needs can have greater independence and comfort in their daily lives.

In contrast to Duarte and Cohen (2004), who found several barriers such as stairs and corridors, this study showed that access difficulties are minimal and easy to overcome. Furthermore, it showed that both required recurring bathroom adaptations.

5. CONCLUSION

After analyzing the building and identifying points that do not comply with current standards and guidelines, the need for adaptations and corrections to some items is confirmed, with special attention to the accessibility of the restrooms and existing doors in the project.

The checks took place mainly through the condition of passage of a wheelchair which, being the element that requires the most space to guarantee its movement, ensures the movement of all other people with disabilities.

The measures were basically restricted to doors and bathrooms, which do not require major correctional actions. To the

Proposed adaptations are small interventions that, if they were thought of from the outset, would not take so much time to adapt the building that is already being constructed.

Therefore, we emphasize the importance of establishing awareness that it is necessary to adapt constructions and renovations to accessibility standards, because not only people with disabilities need it, but everyone will one day need a more comfortable space. and passable.

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