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Dialogues between the rehabilitation of buildings and the sustainable development of consolidated metropolises

Rodrigo de Paula Ferreira
PhD Student, ETEC Professor, Brazil
Rodrigo_p_ferreira@hotmail.com

Letícia Moreira Sígolo
PhD Professor, USJT, Brazil
leticia.sigolo@saojudas.br

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SUMMARY

With the 2030 Agenda, the nations that ratified the Paris Agreement have taken steps towards achieving Sustainable Development. Certain strategies have been identified as determining factors to meet the goals outlined in the Sustainable Development Goals (SDG) Number 11. In this context, consolidated cities have buildings that do not meet contemporary needs, being, in many cases, underutilized or in obsolescence integral. This article examines two case studies: the Pruitt-Igoe residential complex built in the city of St. Louis, in the USA and the Wilton Paes de Almeida building, built in the city of São Paulo, in Brazil. Both examples of modern architecture were lost in the context of contemporary metropolises. The study discusses the retrofitting of these urban structures of the metropolises, in the perspective of the 2030 Agenda, highlighting the need to expand the measures of rehabilitation of buildings as a strategy for a Sustainable Development, in order also to reduce the existing idleness built in the areas centers with the use of existing resources and reduce the spread of the urban area that assigns the extremes to the most vulnerable in the context of the São Paulo metropolis. With this analysis, the article seeks to demonstrate that investment in in retrofitting techniques can be a favorable alternative to Sustainable Development and the regeneration of metropolises.

KEYWORDS: Sustainable Development. Agenda 2030. Retrofit. Metropolises.

1 INTRODUCTION

With the progress of global discussions on sustainable cities, particularly since the 2015 Conference of the Parties (COP 21), and through the Sustainable Development Goals (SDGs), especially SDG 11, which directly addresses inclusive, sustainable, and resilient cities, strategies for reducing socio-environmental impacts have become a priority for contemporary architecture and urbanism. Such commitments are even more crucial in the face of the climate emergency and the increase in extreme events and environmental catastrophes. Each nation that signed the Paris Agreement pledged to reduce greenhouse gas emissions through Intended Nationally Determined Contributions (INDCs). According to Professor Jacques Marcovitch (2016, p.5), COP 21 yielded satisfactory results with good prospects for defining future actions in Brazil.

There is a growing trend in development supported by infrastructure that promotes low pollutant emissions and low environmental costs. As construction is one of the most resource- and energy-intensive activities, according to the International Council for Building (CIB), the rehabilitation of the built environment should be a priority for the sustainable development of metropolises.

In Brazil, the situation is further aggravated d by the legacy of the country's urbanization process in the periphery of capitalism, characterized by the precarious use and occupation of urban land in a significant part of Brazilian cities, as part of a frame of abysmal socio-spatial inequality, which persists to this day (MARICATO, 2000).

During the Brazilian industrialization process, there was a high concentration of development in certain regions of the country, particularly in the metropolitan region of São Paulo. This phenomenon was accompanied by rapid urbanization, particularly in the 1950s, 1960s, and 1970s, resulting in significant urban sprawl that, at times, extended into environmentally fragile areas. From the 1980s onward, there was a decrease in population growth and migratory flows, particularly in the capital. At the same time, there was a movement of former residents from central areas to new centralities, resulting in a corresponding increase

in real estate idleness in these locations, which are equipped with infrastructure, services, and urban amenities and have high levels of income and job opportunities (MARICATO, 2000).

More recently, in the city of São Paulo, a significant volume of new developments has responded to the requirements of the Agenda 2030 and SDG 11. In this perspective, strategies to reduce environmental impacts have been applied in new constructions, such as the incorporation of technology into intelligent electronic operation systems, the use of materials with better performance, more sustainable and resilient architectural designs, and the incorporation of the user's connection with natural elements in biophilic design.

On the one hand, some of these new developments even have international certifications that reflect strategies of technical and technological improvement and confer great commercial prominence in a highly competitive environment, even involving investors who operate in the financial market. Examples of these developments that stand out in the landscape of the São Paulo metropolis are the Parque da Cidade building, Rochaverá Corporate Towers, and Matarazzo Tower, whose projects were developed by renowned offices.

On the other hand, the city of São Paulo has a vast built heritage that is partially unoccupied and/or underutilized, mainly in its central areas, due to multiple factors, including the lack of habitable conditions that require rehabilitation actions for this built heritage. Thus, this scenario contradicts the precepts of a sustainable city from the perspective of the 2030 Agenda and SDG 11.

In the face of this situation, it is observed that building rehabilitation techniques and practices have grown, especially in European countries and the USA, which have consolidated urban centers with little land available for new construction. Given this problematic situation, investment in building rehabilitation presents itself as a potential path to reverse the underutilization of built spaces in consolidated urban areas.

In São Paulo, although some regulations have gradually incorporated specific parameters for this practice, such as the Construction and Building Code of the Municipality of São Paulo, Municipal Law No. 16,642/2017, there are still gaps in the legal framework concerning this topic (TERRA; MORETTI, 2019). Certain concepts and definitions are presented by organizations such as the Brazilian Association of Architecture Offices, the Brazilian Council for Sustainable Construction, the Brazilian Association of Technical Standards in NBR 15.575, with the objective of disseminating knowledge and establishing some criteria and parameters.

More recently, Municipal Decree No. 61,311/2022, which regulated the Requalifica Centro Program (Municipal Law No. 17,576/2021), aimed to stimulate the retrofitting[1] of old buildings in the center of the capital, highlighting the relevance of advancing the debate on this topic. In light of these aspects, this article aims to contribute to the debate on the importance of building rehabilitation in consolidated, infrastructure-rich areas served by urban services and equipment, as well as connected to the urban mobility system, from the perspective of

[1] Retrofitting refers to the process of renovating or upgrading a building or its systems through the incorporation of new technologies and concepts. The primary objective of retrofitting is typically to enhance property value, change its use, increase its lifespan, and improve its operational and energy efficiency (ABNT NBR 15.575; ASBEA, 2012, p.127).

sustainable development advocated by the 2030 Agenda.

To this end, two examples of modern architecture were analyzed, which, in opposite directions, were lost along with all the social and environmental efforts involved in their production and use. They are: the Pruitt-Igoe complex in St. Louis, USA, and the Wilton Paes de Almeida Building in São Paulo, Brazil. The fate of these buildings illustrates the linear thinking of industrial economy − produce, use, and discard − and contrasts with the contemporary thinking of circular economy − reduce, rethink, reuse, recycle, and refuse − (MCDONOUGH, 2013). Both buildings could have had another potential fate if all the effort invested in their production was evaluated.

Based on the analysis of the trajectory of these two buildings, it was possible to reflect on the importance of building rehabilitation in the construction of inclusive, sustainable, and resilient cities, considering the socio-environmental challenges posed by the climate emergency, as well as the relevance of regenerating the built heritage aligned with the precepts of sustainable development in increasingly urban societies.

2 LOST MODERN ARCHITECTURE: PRUITT-IGOE – USA.

Designed by architect Minoru Yamasaki in 1951 and built between 1952-1955, the complex comprises 33 identical eleven-story blocks, each containing 3,000 housing units. The blocks are separated by car and pedestrian circulation streets, and the complex features typically segregated monofunctional spaces (see Figure 1).

Figure 1 – Pruitt-Igoe Complex

Source: COMMONS, WIKIMEDIA, 2022[2].

[2] Figure 1 – Pruitt-Igoe Complex. WIKIMEDIA COMMONS CONTRIBUTORS. Wikimedia Commons. Pruitt-igoeUSGS02.jpg. 2022. Available at: https://commons.wikimedia.org/w/index.php?title=File:Pruitt-igoeUSGS02.jpg&oldid=411518899. Accessed on: Feb 09, 2022.

According to Peter Hall (2013), Pruitt-Igoe was an experimental model of verticalized typology for social housing, developed unlike any other in the city of St. Louis. Architecture critic Charles Jencks, in The Language of Post-Modern Architecture (1977), believed that modern architecture lost its reputation at the exact moment of the implosion of the Pruitt-Igoe complex. For Jencks, this implosion marks the death of modernism and the birth of postmodernism in architecture.

The project followed the precepts of modern architecture, such as rationalization, independent structure, free plan, and independent facade with ribbon windows. Moreover, it adhered to the commitment assumed by architects to put social issues at the forefront of this new architecture, as they believed they could transform society through architecture (KOOP, 1982, p. 54). Pruitt-Igoe was an exemplar of these concepts, an award-winning project in St. Louis, but mainly remembered for its implosion after seventeen years of operation.

Initially, Pruitt-Igoe's problems began during construction due to financial cuts and a limited budget, which reflected negatively on the project. Many units were inhabited without finishing touches, one elevator never operated, and there were broken locks and handles, meaning that Pruitt-Igoe was poorly equipped and inadequate since its inauguration (HALL, 2013). According to Peter Hall (2013), residents did not adapt to the reality of the designed apartments. One of the identified problems in the Pruitt-Igoe complex was due to the Corbusian belief that low-income people would have immediate conditions to live in highly technological buildings without requiring specific support.

In fact, like most social housing complexes, the project was intended for vulnerable, needy people, often from unstable families who needed government assistance and could not afford the maintenance costs of the building. This triggered difficulties in adapting to the virtuosity of modern architecture. Gradually, families left the complex, and those who remained were more dependent on social and financial assistance provided, large, destabilized, and income-less families. In less than ten years of operation, Pruitt-Igoe had less than 70% occupancy (HALL, 2013).

A series of situations marked the degradation of the complex, as described by Donald Macdonald (1996, p.13) and Hall (2013, p. 277). There were broken glass and debris scattered in large quantities, trash and cans scattered everywhere, abandoned compartments, cockroaches, and other insects abundantly present, abandoned cars in the parking lot, deteriorated mailboxes, and corridors, lobbies, elevators, and stairs became dangerous places to transit. The walls peeled, elevators malodorous, laundry rooms and communal rooms were broken or stolen, heaters were broken or stolen, no lighting in common areas, including exposed wires (HALL, 2013; MACDONALD, 1996).

In 1970, there were so many broken windows in the Pruitt-Igoe complex that the resulting heat loss caused the pipes to freeze (Figure 2). In these poor conditions, the inhabitants had to be removed. It took years of effort and resources to prevent the complex from becoming obsolete. Planners, architects, and government officials insisted on preserving the building for over seventeen years until authorities decided to implode it in 1972 (Figure 3) (HALL, 2013).

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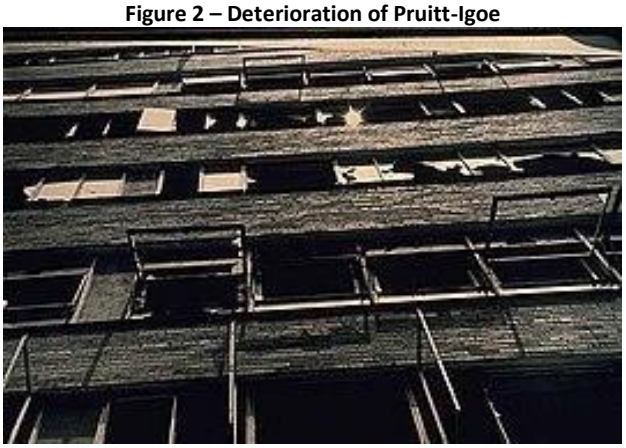
Figure 2 – Deterioration of Pruitt-Igoe



Source: COMMONS, WIKIMEDIA,2021[3]

Figure 3 – Collapse of the Pruitt-Igoe complex

Source: COMMONS, WIKIMEDIA, 2021[4]

The project illustrates the outcome of modern architecture in post-industrial society, oriented towards the rationalization of everyday life and the idea that architecture could materialize responses to social conflicts and transform society (IRAZÁBAL, C. 2003).

From a design point of view, Oscar Newman, in Defensible Space (1972), attributed some of these failures to the architect. For Newman (1972, p. 10), each building was treated as a sculptural object, excluded from any relationship with the land, understood as a base upon which visually pleasing edifices were placed, which became obsolete. Spaces that the architect thought would be filled with children and toys became empty, lifeless, and consequently dangerous.

The problems with Pruitt-Igoe, according to Newman (1972, p.10-11), were attributed to the international style of architecture to which the complex belonged. The tall social housing buildings, characterized by dignifying precepts and high technological apparatus, did not cater

[3] Figure 2 – Deterioration of Pruitt-Igoe. WIKIMEDIA COMMONS CONTRIBUTORS. Wikimedia Commons.Pruitt-Igoe-vandalized-windows.jpg. 2021. Available at: https://commons.wikimedia.org/w/index.php?title=File:Pruitt-Igoe-vandalized-windows.jpg&oldid=235476607. Accessed on: Feb 09, 2021.

[4] Figure 3 – Collapse of the Pruitt-Igoe complex. WIKIMEDIA COMMONS CONTRIBUTORS. Wikimedia Commons. File: Pruitt-Igoe-collapses.jpg. 2021. Available at: https://commons.wikimedia.org/w/index.php?title=File:Pruitt-Igoe-collapses.jpg&oldid=539825688. Accessed on: Feb 09, 2021.

to the needs of its residents. As a result, the residents developed unique ways of appropriating the space, with interventions that reflected their individual identities such as demarcations and private uses of common areas (Figure 4). Moreover, the initial overcrowding was catastrophic, and it was impossible to establish common use of spaces under acceptable conditions of coexistence and safety (NEWMAN, 1972).

Figure 4 – Interventions in common areas

Source: COMMONS, WIKIMEDIA, 2021[5]

From a management perspective, Hall (2013, p. 279) argues that the lack of proper management was the root cause of the complex's failure. Rents needed to cover maintenance costs, but as tenants could not afford payments, the complex was unable to sustain itself. The revenue generated did not cover operational and maintenance costs, resulting in an increase in the deterioration of the complex, particularly in its final years (HALL, 2013).

Journalist Jane Jacobs (2000) attributed the failure of the complex to the ego of the modernist architect. The megacomplex was placed freely in the landscape, with its back to the city, without any relation to its surroundings. In Cairns and Jacobs' analysis (2014), the historiography of architecture characterized Pruitt-Igoe as a "scapegoat," an example of modernism's failure, but they argue that this is a contradiction. Instead of explaining the complex's failure in terms unrelated to the project, a "myth" was created for future generations of architects that "by ridding architecture of a bad project, this new generation is capable of purifying and reauthorizing its role in creating buildings" (CAIRNS; JACOBS, 2014, p.210).

Considering all the efforts put into the project and construction, the outcome of the complex leads to a city-scale view. It shows that, despite the building's deterioration, the negative aspects related to its demolition, due to the environmental, social, and economic impacts caused, outweighed the supposed benefits it promoted.

The implosion of the Pruitt-Igoe complex and all the narratives around it left deep marks in the historiography of architecture, as well as many questions. Despite all the deficiencies presented, could a complex of that size not have been reused? Guided by the principles of Sustainable Development, would 21st-century planners, architects, and urbanists

[5] Figure 4 – Interventions in common areas. WIKIMEDIA COMMONS CONTRIBUTORS. 2021. Wikimedia Commons. Pruitt-Igoe-corridor-actual.jpg. 2021. Available at: https://commons.wikimedia.org/w/index.php?title=File:Pruitt-Igoe-corridor-actual.jpg&oldid=145433260. Accessed on: Feb 09, 2021

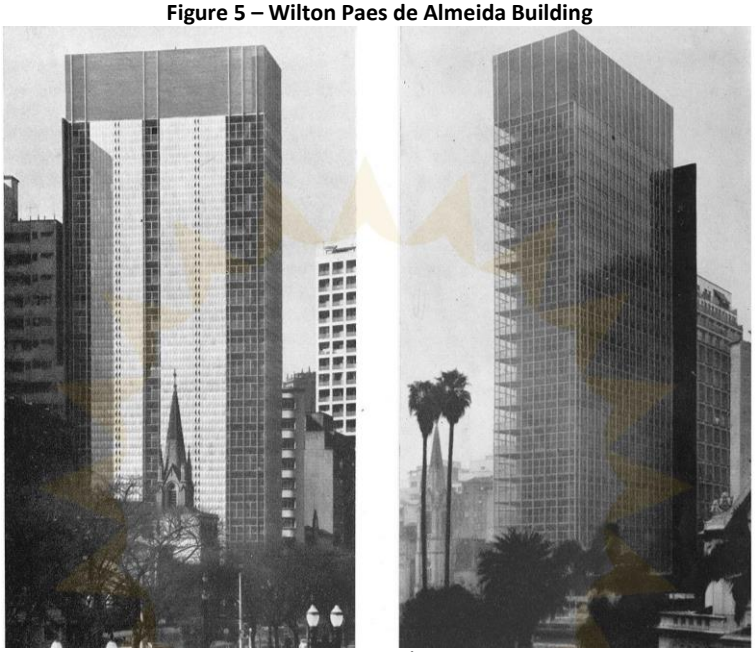
make the same decision to implode it? Would retrofitting techniques be a suitable solution to prevent the waste of similar buildings and their functional reintegration into the urban environment? Could retrofitting promote optimization of facilities and adaptations in the complex to make them more environmentally friendly? Did the demolition of the complex result in more environmental, social, and economic impacts than its deterioration throughout its operation?

In time, this article does not intend to answer all these questions, but rather to contribute to reflections on the topic. Next, the article will present an example of modern Brazilian architecture, the Wilton Paes de Almeida building, which suffered a similar fate to Pruitt-Igoe. Its trajectory also brings relevant contributions to the analyses developed here.

3 LOST MODERN ARCHITECTURE: WILTON PAES DE ALMEIDA – BRAZIL

In 1961, the construction of one of the most technologically advanced buildings of its time was witnessed by the city of São Paulo. The building, designed by architect Roger Zmekhol, had 22 floors and 2 basement levels. It was located in the city center, at Largo do Paissandu, on a plot of land with an area of 650m² and a built area of 12,000m². The building was made of a mixed concrete and steel structure with a glass curtain wall that enveloped the entire facade (Figure 5) (FIALHO, 2007, p.108).

Figure 5 – Wilton Paes de Almeida Building



Source: ACRÓPOLE[6]

The Wilton Paes de Almeida building, located in the city of São Paulo, was completed after seven years of construction in 1968. It housed the Companhia Comercial de Vidros do Brasil (CVB), Socomin, Oleogaza, and two bank agencies, Banco Nacional do Comércio de São Paulo

[6] Figure 5 – Wilton Paes de Almeida building. ACRÓPOLE. Edifício Wilton Paes de Almeida. São Paulo: Fau-Usp, v. 323, nov. 1965. Monthly, p. 34-37.

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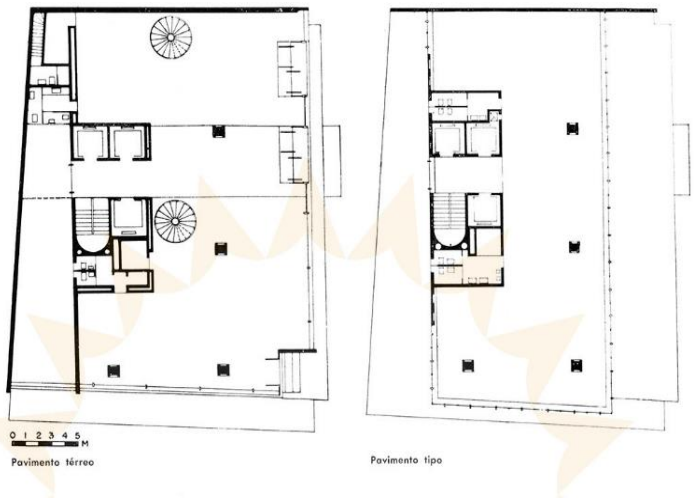
and Banco Mineiro do Oeste S/A (NASCIMENTO, 2018). According to architect Roger Zmekhol (1965), the building was designed as part of a new urban scene that sought modern, open-plan spaces for the city. Noteworthy features included a glass facade with sash windows and embedded counterweights in the uprights, as well as a fully embedded air conditioning system insufflated by the baseboards (Figure 6), utilizing cutting-edge technologies of the time.

Figure 6 – Wilton Paes de Almeida Building



Source: ACRÓPOLE[7]

The Wilton Paes de Almeida building became a symbol for the city and, in 1992, was recognized as a heritage site. It was listed by the Municipal Council for the Preservation of Historical, Cultural and Environmental Heritage of the City of São Paulo (CONPRESP) under resolution No. 37/92. CONPRESP aimed to preserve the building and its operation, as it represents a landmark of São Paulo's progress and modernity. However, this intention arose at a time when operational decline had already begun. Housing businesses owned by individuals with financial instability and successive economic crises had led to the building's deterioration (NASCIMENTO, 2018).

In 1977, the accumulation of public debts in the Brazilian Federal Revenue Service resulted in the building being seized by the Caixa Econômica Federal, which began to use the property as a bank branch on the ground floor. In the 1980s, the tower was occupied by administrative areas of the Federal Police. The operational and maintenance decline of the public asset resulted in the departure of Caixa Econômica and the Federal Police in 2001. From 2001 to 2009, it housed only a branch of the National Institute of Social Security (INSS), and during this period, its 23 floors were vacant (BERGAMASCO, 2009; NASCIMENTO, 2018).

In 2015, the Federal Government unsuccessfully attempted to sell the building. After this failed attempt, it proposed to transfer the obsolete building to the municipality with the aim of turning it into a cultural center. However, the municipality did not accept it on the grounds

[7] Figure 6 – Wilton Paes de Almeida building. ACRÓPOLE. Floor plan of Wilton Paes de Almeida Building. São Paulo: Fau-Usp, v. 323, nov. 1965. Monthly, p. 34-37.

that the renovation costs to make the building operational again were too high.

In the face of the governmental impasse at the municipal and federal levels, the building was occupied by homeless people who began to live there without safety or hygiene conditions. The risks then increased as materials such as electrical cables and metals were frequently removed, and only those that were in use were kept, in precarious maintenance conditions.

By 2018, the building was in a terrible state of conservation, with broken doors and windows, exposed wiring, and homeless people on the sidewalks around it (Figure 7). The Wilton Paes de Almeida building began to represent a mixture of negative feelings, and it was no longer possible to see it as a heritage site for the city. Instead, it became a symbol of social inequality, poverty, abandonment, and danger. Similar conditions were observed in the Pruitt-Igoe complex.

Figure 7 – Deterioration of the Wilton Paes de Almeida building

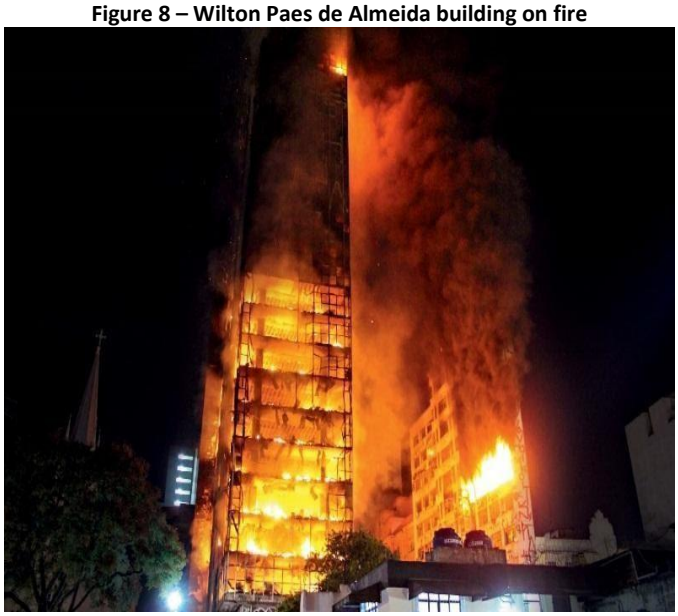
Source: COMMONS, WIKIMEDIA, 2021[8]

The announced catastrophe was confirmed in 2018 when an electrical overload on the fifth floor caused a fire that engulfed the building. The interconnection cores between floors, which housed air conditioner installations, served as vertical corridors for the propagation of the

[8] Figure 7 – Deterioration of the Wilton Paes de Almeida building. WIKIMEDIA COMMONS CONTRIBUTORS. Wikimedia Commons. File:Centro, São Paulo - State of São Paulo, Brazil - panoramio (1).jpg. 2023. Available at: https://commons.wikimedia.org/w/index.php?title=File:Centro,_S%C3%A3o_Paulo_-_State_of_S%C3%A3o_Paulo,_Brazil_-_panoramio_(1).jpg&oldid=729796660. Accessed on: Feb 10, 2021.

fire to the roof (Figure 8). As a result, the building collapsed, leaving seven people dead. Approximately three thousand tons of debris remained on the site and needed to be removed.

Figure 8 – Wilton Paes de Almeida building on fire



Source: VejaSP[9]

The environmental, social, and economic impacts resulting from the Wilton Paes de Almeida building project provide an opportunity to discuss the reuse of obsolete buildings at a city scale. The functional reintegration of the building could counteract urban sprawl and reduce the need for long daily commutes for a significant portion of the population, especially those with lower incomes, while also promoting the optimization of consolidated infrastructures present in the central areas of the São Paulo metropolis.

From the perspective of sustainable development, we will discuss the trajectory of these two examples based on some questions: Despite all the deficiencies presented, should large buildings in consolidated areas not be rehabilitated? How would 21st-century planners, architects, and urbanists address these two cases in the face of the advancing public debate on the need to revise paradigms to address the climate emergency? Would the rehabilitation of buildings, or retrofitting, be an adequate solution to prevent the waste of these structures? Finally, could it be an alternative for the regeneration of built heritage in metropolises like São Paulo?

4 METROPOLITAN CITIES AT A LOSS IN THE PERSPECTIVE OF SUSTAINABLE DEVELOPMENT: SÃO PAULO

[9] Figure 8 – Wilton Paes de Almeida building on fire. Veja Magazine article. MOREIRA, William. Calamidade na habitação: entenda os gargalos da falta de moradia em SP. 2018. Estadão Conteúdo/Veja SP. Available at: https://vejasp.abril.com.br/cidades/desabamento-incendio-edificio-paissandu/. Accessed on: Feb 10, 2021.

In the international scenario, the 1960s were the decade in which ecology became a global issue in discussions after a series of events reported mainly by biologist Rachel Carson in her book "Silent Spring," released in 1962. Gradually, reports published by scientific and nature protection entities began to emphasize the harmful effects of industrial activities. In this context, the idea of sustainability emerged, beginning to be understood as a necessary element for the development of humanity (CARRANZA, 2013, p.47-48).

In architecture, some "ecological agents" were responsible for incorporating these ideas, among them Richard Buckminster Fuller (1895-1983), Norman Foster (1935-), and William McDonough (1951-), who were responsible for propagating construction techniques that highlighted the balance between social, environmental, and economic aspects of sustainability (MCDONOUGH, 2005).

The International Council for Building (CIB) points out the construction industry as the human activity sector that consumes the most natural resources and uses energy intensively, generating considerable environmental impacts. The Brazilian Ministry of the Environment corroborates and affirms that "construction and management of the built environment must be viewed from the perspective of Life Cycle Assessment (LCA)" (BRAZIL, Ministério do Meio Ambiente, 2018). This term LCA arises from the improvement and systematization of measures for evaluating the production stages of the industry. The study carried out by the US agency in 1974 becomes a reference for the beginning of efforts to reduce the greenhouse effect and protect the ozone layer (CHEHEBE, 1997).

In the process of industrialization, no product has zero environmental impact, and even nature emits CO2 into the atmosphere. This means the issue is not to stop producing, but to evaluate what already exists in a way that preserves the biocapacity of the natural environment. Thus, it is necessary to analyze buildings with the aim of utilizing existing materials, as well as all the environmental and human costs mobilized for their production. One alternative to such an impasse would be to think about the LCA of the built heritage to avoid building obsolescence. (BRAZIL, Ministério do Meio Ambiente, 2018).

Indeed, the retrofit technique has been growing in architecture and has shown itself to be a promising path to achieving the goals set out in the 2030 Agenda. The term, in its literal meaning, combines two words: retro, from Latin, meaning to move backwards, and fit, from English, meaning to adjust, which we can understand as adjusting the past.

Internationally, retrofitting is a practice that has been used in buildings since the 1990s, mainly in Europe and the USA, in cities with little demand for new constructions. The technique is used by incorporating new technologies, with the aim of returning functionality to the building that has been lost, as seen in the example of the Empire State Building in New York, USA, built in 1931, which continues to receive updates for longevity and performance optimization (LOURENÇO, 2012).

For the longevity of built heritage, actions such as repair, recovery, requalification, and retrofitting are understood to have distinct objectives. Retrofitting involves a technological upgrade aimed at adapting to new technologies and sustainability principles. As such, in Brazilian metropolises that were consolidated in the mid-20th century, central areas have a series of

abandoned or underutilized buildings that were part of the urban center remodeling processes and replaced past built fabrics, as Benedito Lima de Toledo states in the book “Three Cities in One Century” (1983). Today, these buildings no longer meet contemporary social demands, including the technology brought by the real estate market in new constructions.

However, a significant portion of these buildings may not present serious problems, which allows for the possibility of promoting incentives for investments in building rehabilitation beyond Law 17.576/2021. It is important to have qualified professionals who understand the need to evaluate building elements and propose interventions guided by the principles established by McDonough (2013) to regenerate these buildings with minimal negative environmental impact.

Therefore, if we evaluate retrofitting in conjunction with the LCA methodology, the technique aligns with the 2030 Agenda and allows for a holistic view of the built environment - architectural and urban. This balancing of the city as a built heritage, memory, and landscape in relation to new demands of contemporary architecture, urbanism, and the environment is critical. The reoccupation of old centers in the coming years and the rehabilitation of buildings located there, especially those built from the 1920s onwards, which, according to Nádia Somekh (1987), make up the beginning of the verticalization process in downtown São Paulo, is a path to consider for Sustainable Development.

5 CONCLUSIONS

We have observed that retrofitting can be an alternative to promoting the longevity of built heritage in consolidated metropolises by returning buildings to updated operating conditions that align with the SDGs' goals of sustainable development. This practice decreases the need for continuous demolition and reconstruction of contemporary architecture, which can have negative impacts on the built and natural environment.

The analysis shows that the Pruitt-Igoe complex could have had a more sustainable outcome if it had been retrofitted and reused instead of being demolished, contributing to the city's development while minimizing the economic effort and environmental impact applied to the complex.

Unfortunately, despite standing for half a century, the Wilton Paes de Almeida building did not have an operating life as long as it could have, highlighting the importance of studying and considering retrofitting as a necessary practice for sustainable architecture and urbanism.

We understand that contemporary architecture in São Paulo has attempted to align with the sustainable development context of major global metropolises, as evidenced by examples such as the Parque da Cidade, Rochaverá Corporate Towers, Torre Matarazzo, and retrofitted buildings such as the Citicorp and SESC Paulista. However, little has been done to address obsolete or obsolescent buildings in consolidated areas such as the Wilton Paes de Almeida building that collapsed.

Furthermore, the pattern of dispersed urban expansion has pushed vulnerable populations into precarious and environmentally fragile areas, resulting in significant daily displacements for those living in peripheral areas with few opportunities for income and work. These daily displacements are costly and cause physical and mental wear and tear, and are also harmful to the environment, contributing significantly to greenhouse gas (GHG) emissions and atmospheric pollution.

Despite technological advances and excellent performance incorporated into new buildings, these actions are rarely applied to outdated buildings, even though they do not present structural problems but rather deterioration and a need for updating.

In this sense, we conclude that utilizing existing buildings is essential for sustainable development that aligns with the 2030 Agenda, allowing urban centers equipped with infrastructure and opportunities to reverse their built-in vacancies, reduce urban sprawl, and ease the pressure of occupation on environmentally fragile areas. This approach will also optimize the impacts already caused to society and the environment resulting from construction.

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