

Elaboration of a damage map the facades of a public building in the city of Triunfo/PE

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Abstract – This research seeks to identify and explore the main pathological manifestations found in the facades of Guarany Theater Cinema, in the city of Triunfo/PE, with the objective of elaborating a damage map. For the purposes of analysis, visits were made to the historic building to inspect the facades, as well as the capture of photographs that identify and guide pathological manifestations. Cracks and stains resulting from infiltration were found, but the existence of vegetation and places with deteriorated paint and plaster was still localized. This study enhances that analyses of a given constructions extremely important for the production of a damage map that assists, for example, in a possible project of restoration and preservation. In short, studying a construction with immeasurable historical, artistic, cultural value and of great relevance is necessary, not only for the Pernambuco Sertão, but also for the entire state of Pernambuco.

I. INTRODUCTION

The municipality of Triunfo is located in the mesoregion of Sertão Pernambucano, at the top of the Serra da Baixa Verde. Distant approximately 405 km from the capital Recife, it is the highest city in the state of Pernambuco, situated more than a thousand meters above sea level. Due to its privileged geographical location, Triunfo has distinct climatological characteristics from other Sertaneja snow cities, often recording temperatures below 12 °C in winter, and having the historical record of the lowest temperature in the state of Pernambuco: 6.8 °C, measured on July 7, 1975.

Triunfo has a strong European influence, noted mainly in architecture and local gastronomy, a heritage left by the Dutch, German, Portuguese and Italian settlers, who arrived in the lands of the Cariris Indians in the mid-1800s. Currently, the city contains a set of historical buildings from the middle of the 19th and early 20th centuries.

Through a brief analysis of the churches and historical mansions that mark the scenario of Triumph, one can perceive the clear difference in the constructive methods used at the time, in contrast to those that are commonly used today.

Very thick masonry and facades with wealth of detail and symbologies are some of the differences that can be mentioned. The archaic construction techniques used and the lack of some primordial materials for civil construction today, such as cement and steel, have contributed to the occurrence of surface and/or structural damage in buildings over the years.

It is necessary, in this way, to intervene in the emergence of a greater number of pathological manifestations, as well as the control of existing ones, in order to preserve the historical heritage. The preservation of these historical monuments, as is the case of Guarany Theater Cinema, must ensure measures that keep both the

structure and cultural and artistic memory preserved - which needs to be passed on to future generations.

In addition, it is necessary to integrate the Federal, State and Municipal powers, in addition to the sectors of society responsible for issues related to the preservation of cultural heritage, in order to ensure more action in the physical, economic and social recovery of historical assets.

Taking into account the importance that Guarany Theater Cinema plays for the country scene, bringing artistic events and promoting culture to Triunfo and other cities of Pernambuco, it is necessary to value the construction and preserve its original characteristics. For this reason, this work aims to map the pathological manifestations in a damage map clearly enabling the analysis of the reasons that generated them.

The accomplishment of this research is also of fundamental importance in view of the scarcity of literature and available documents regarding restoration processes in historic buildings, thus contributing as material that can be used as a form of consultation and assistance in future research with themes related to pathological manifestations.

In a statement, the work addresses the importance of historical monuments, based on the Guarany Theater Cinema, also points out the concern to preserve the heritage, through its restoration, being made an analysis from the public policies and the responsible body, as well as the legislation of tipping in force.

II. THEORETICAL FRAMEWORK

2.1 History of the Guarany Theater Cinema

In 1919, the construction of what would become triunfo's most iconic building began: The Guarany Theater Cinema, the city's main postcard, built in eclectic style, mainly with characteristics of neoclassical architecture. The building marks the Triunfense scenery, and enchants not only the locals, but also the tourists who visit Triunfo daily.

Conceived by Carolino Campos, Guarany Theater Cinema was built on top of a slab, on the site where previously it was a garage of cousin Manoel de Siqueira Campos. The project came from France, where Carolino traveled for a walk and glimpsed with French architecture, brought from there, the architectural plan. The work was completed and had its inauguration on February 17, 1922, with the show "Cenas Mudas", a success at the time. In this same period, the week of modern art took place in Brazil: a great artistic, cultural and political-social

movement that would bring great changes to the art scene in Brazil.

The Guarany Theater Cinema is a building that does not contain steel or cement in its structure, due to the time it was built, in this way were added to the mass, cocoa, sand, clay and whale oil – a technique in disuse, but that guaranteed the construction and structural stability of the buildings of the time. The Theater belonged to Carolino Campos until 1937, the year he lost it, the victim of a coup by the Sertão Improvement Company, a shell company.

In 1952, the theater was bought by friars who used the space as a place of training of men for theological activities.

Faced with many requests from the Triunfense population, in July 1988, the State Council of Culture overturned the building and in August of the same year the state bought it. From then on, taking into account the importance that the Theater already had, social movements emerged in the city that aimed to preserve the building.

The Guarany Theater Cinema, represented a milestone in the cultural life of Triunfo and the region. Imposing, the building is today the living testimony of the golden age through which the municipality passed in the early 20s. Few cities in the interior of the state have an architectural copy of the size of Guarany.

Currently, Guarany Theater Cinema is owned by FUNDARPE, and it has been held for 12 editions, the Triunfo Film Festival. Since its first edition in 2008, the Festival has exhibited more than 650 films, contributing to the formation of audiences and professionals in the film and theatrical market in the Sertão do Pajeú. In Fig. 1 and Fig. 2 we can see the reproduction of the structure of the Guarany Theater Cinema.

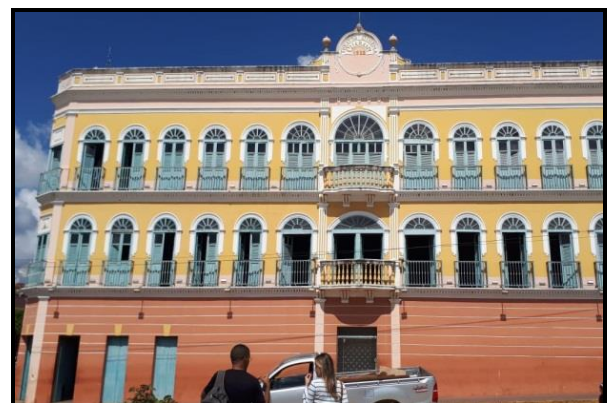


Fig. 1: Guarany Theater Cinema



Fig. 2: Guarany Theater Cinema

2.2 History of the Guarany Cinema Theater

The word "pathology" is derived from the Greek (pathos - disease, and logia - science, study) and means "study of the disease". In civil construction, it refers to the study of the damage present in buildings, exploring its causes and effects, as well as its viable means of solution and prevention. Pathological manifestations can be evidenced in various ways, the main ones being: infiltrations, cracks, efflorescence, displacement of plasters and floors, growth of vegetation, corrosion of hardware, deterioration of concrete, in addition to damage caused by human action, such as vandalism and graffiti.

According [1] and [2] the origin of pathological manifestations may result from poorly elaborated projects, the poor quality of the materials used in construction, the lack of technological control, mainly related to concrete, the failure in the construction stage, a team without preparation for the execution of more elaborate projects, lack of supervision by managers or those responsible for the execution of the enterprise, buildings being used for purposes other than the initial (project) or even by its improper use and lack of maintenance.

Damage to buildings can also occur due to chemical reactions, erosion, temperature fluctuations, vibrations and corrosion. For each type of pathological manifestation, one should seek the correct measure of treatment, first performing the correct diagnosis [3].

In order to prevent pathological manifestations from becoming common in constructions, the user must make the correct use of the building, obeying the requirements made by the designers and other responsible for the work and performing preventive and corrective maintenance in accordance with the manual of use, operation and maintenance formatted, written according to [4], in addition to making documented records of pathological maintenance.

III. RESULTS AND DISCUSSIONS

3.1 Analysis of physical conditions at Guarany Theater Cinema

The pathological manifestations present in the two facades of the Guarany Theater Cinema building were identified. The identification of such pathological manifestations was made through a survey of the local where the theater is located by those involved in the work. Then there was the elaboration of the damage map.

It was possible to understand from the analysis of the physical situation of the facades of the historic building, which is a still preserved construction, evidencing the value that Cinema Teatro has for the Triunfense citizens. Despite containing pathological manifestations, which will be explored below, the Guarany Theater Cinema, maintained by FUNDARPE, is in a good condition, but it is of great importance to carry out the mapping of pathological problems, in order to make an intervention and repair of existing damages, thus preventing them from spreading over the years and compromising the structure of Guarany Theater Cinema.

3.2 Pathological manifestations present in the facades of Guarany Theater Cinema

3.2.1 Surface stains

Surface stains are present on the two facades of the theater, all located at the same height. Such stains were caused by the constant passage of people through the sidewalks of the building, where they lay hands on the walls. The appearance of this type of pathological manifestation occurring over time, p and a repetitive and constant act. The result of the presence of this problem can be seen in Fig. 3.



Fig. 3: Surface stains on the facades of the building

This is a type of only aesthetic damage, which does not compromise in any way the functioning of the building, but it should be in addition to the fact of the visual

importance that the Theater has, in this way, simple maintenance, as paintings performed on a regular basis could solve this problem. Another suggestion for this problem is the use of super washable anti-stain paints, which can be applied both indoors and outdoors and that use special additives that allow the elimination of dirt without changing the paint.

The additive used in stain paints is a hydro repellent additive that prevents stains and dirt from attaching under paint, repelling them from the surface when it is washed with a damp cloth and neutral soap.

3.2.2 Plaster detachment

Some small areas with plaster detachment were identified Fig. 4, this pathological manifestation also called deplanement consists of the rupture of a part of the coating in relation to the whole, that is, a stretch of the mortar is parted from the surface (floor, ceiling, internal and external masonry), leaving exposed the area of occurrence of this pathological manifestation.

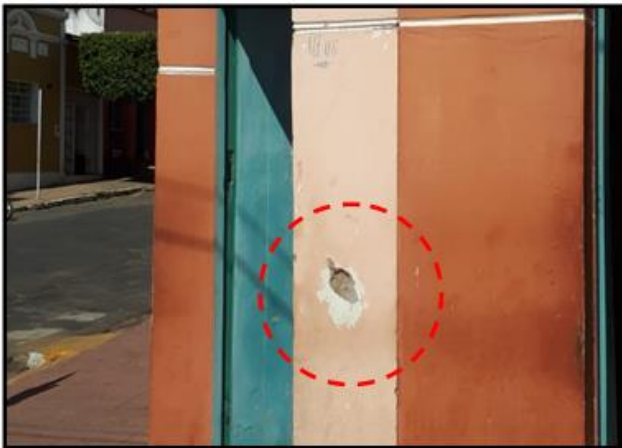


Fig. 4: Plaster detachment

Detachment can be caused due to sudden and continuous temperature changes, poorly executed labor, execution of very thin or very thick layers of plaster, among other factors. In the case of the external analysis of Guarany Theater Cinema, and observing that the plastering displacements are of low occurrence and in sizes considered small, one should first request the correct diagnosis with a professional in the area, to ensure that the "neighboring" regions are not compromised.

From this diagnosis, a new coating with mortar can be made at the site of pathological manifestation, and later apply a new painting, thus preventing these damages from spreading and causing major disorders. On the other hand, in the case of surfaces with a lot of occurrence of detachments, the most recommended is the complete

removal of the damaged mortar and the application of a new one.

3.2.3 Peeling of paint due to capillarity absorption

At the western end of the front façade at the bottom, there is the presence of peeling of the painting Fig. 5, in this particular case due to the absorption of water by a phenomenon known as capillarity – it is the ability that some substances have to climb or descend through capillary tubes or move through short spaces present in porous materials. This mechanism allows fluids to move against gravitational force.



Fig. 5: Detachment of the painting

The peeling of the painting presents on the façade occurred, therefore, due to the porosity of the material that composes the pillar where this pathological manifestation was identified, which allowed the transport of water by capillarity. As a solution to this problem, it is recommended to scrape and sand the surface and then apply a layer of waterproofing.

It is necessary to eliminate the contact between the surface and moisture, to ensure that the problem does not appear again over time. According to Demetrius da Rocha Ramos, Civil Engineer and technical advisor at Weber Saint-Gobain, there are waterproofing mortars available in the market that can solve this problem. He states that it is important to perform all the removal of the wall cladding and then apply the product, both on the inner and outer side.

To carry out the prevention of this type of pathological manifestation during the construction process of the work, it costs cheaper than to perform methods of solving the problem, when it arises after the building is ready.

3.2.4 Surface stains

Moisture stains were noted on both theater facades, between the cornice components and especially in the upper regions of the building, as shown in Fig. 6. With the moisture present in the wall, it can trigger mold and the action of microorganisms. Moisture spots can appear in various situations and climates, such as in coastal regions and in cities such as Triunfo – with rainy winter and low temperatures.



Fig. 6: Surface spots characterized by moisture

The presence of moisture can affect the paint, flooring, ceramic coatings and even the structure of buildings. In the case of Guarany Theater Cinema, it is believed that the climate and frequency of precipitation (especially between May and July) have contributed to the emergence of this type of pathological manifestation. Unlike the peeling of the paint due to the absorption of water by capillarity, these types of moisture stains found on the facades, are derived from the contact that the surfaces have with the fluids, which are damaged by not having a correct waterproofing.

Even though the Guarany Theater was built with the use of whale oil, both as a binder and as a waterproofing agent, the age of the building may have made the oil's waterproofing capacity lost.

To treat this pathological manifestation, the procedures are to clean the region of occurrence to eliminate and prevent mold, perform proper waterproofing and then remake the finishes on the walls or any surfaces.

Expanded Polystyrene (EPS), for example, is being increasingly applied, mainly in external coatings, due to its thermal insulation capacity, prevention against molds and moisture, low water absorption, in addition to sustainability, economy, and the property of preventing the proliferation of microorganisms, among other factors.

3.2.5 Regions with loss of concrete used

It was located on the front façade, a broken capital as shown in Fig. 7. In architecture, capital refers to the top of the column, located above the steel. In the case of the damaged capital at Guarany Theater Cinema, the cause of the damage is unknown, but it is believed to have been caused simply by the use of a weak mass or the presence of fissures in the region of the collapse, which over time occurred the detachment of part of the structure.

As in the construction of the theater, no cement was used, this may also have contributed to this architectural component breaking down. For correction, the reconstruction of the workpiece must be performed, maintaining its characteristics.



Fig. 7: Areas with loss of concrete

Another component found broken was a piece of the cornice, located on the side façade seen in Fig. 8. In the same way as the capital, cracks may have caused the damage in the cornice region and consequently its detachment, therefore to reconstitution of the same, it must be carried out the reconstruction and reform of the piece.



Fig. 8: Areas with loss of concrete

In this context it can also be mentioned the wear of the frames that is related to the peeling of the painting, having been identified in almost all doors and windows, in addition to the wear noticed in the bodyguards, which are also wooden as seen in Fig. 9. To solve this problem, just sand the frames in order to remove the damaged paint and make a new one, which is proper for external environments, that is, with waterproofing properties.



Fig. 9: Wear of the frames

3.2.6 Cracks

The fissures were identified in the lateral façade as shown in Fig. 10. According to their physical characteristics, they were possibly caused by the vibration of cars that travel daily in the streets in front of the two façades, another possibility that should be taken into account is the vibration that was caused in the building when these highways were paved at the time of the use of compactor rollers, which are heavy machinery used to compact the asphalt mixture. Another point that may have generated the cracks is the temperature oscillation, which causes the materials to dilate and contract.

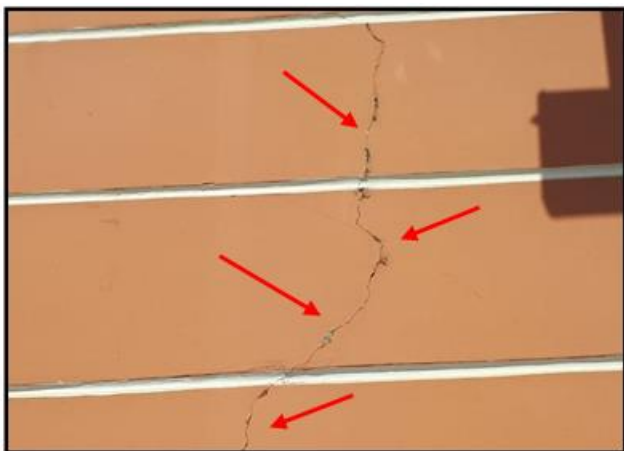


Fig. 10: Occurrence of fissures

Fissures are pathological manifestations that generally deserve special attention, because they are directly linked to the physical functioning of the building, and may worsen and become larger in larger cracks – cracks, which alert to structural problems.

A professional in the area needs to make the correct diagnosis about the fissures in order to point out what is the best method of treatment. For small cracks, you can retouch the plaster using acrylic mass or mortar, but they can reappear over time. Another option is to pass pure elastomeric paint at the crack site and then apply two or three coats of paint.

Another alternative to repair, is to open the crack using an equipment called "crack open", in addition to taking the paint present in the side bands, then you should remove the dust and clean the surface using a brush and a damp cloth, the next step is to fill the crack with dough, after full need to cover with a thin mesh canvas and cover the screen with the dough used previously, finally, sand and paint the surface that has been restored.

3.2.7 Vegetation

It was also noted the presence of vegetation at the eastern end of the side façade, at the limit where the Guarany Theater Cinema ends and begins the masonry of the neighboring building, possibly indicating a joint between the two buildings, which allowed the development of such pathological manifestation. The presence of this vegetation still exposes the lack of maintenance of the external area of the theater. This pathological manifestation can be seen as shown in Fig. 11.



Fig. 11: Presence of vegetation

3.3 Damage map

According [7] defines damage maps as the graphical-photographic, synoptic representation, where all manifestations of building deterioration are illustrated and

discriminated, rigorously and thoroughly, in order to synthesize the result of investigations on structural and functional changes in materials, techniques, systems and construction components.

The author warns that the term damage map should not be confused with damage mapping, since the former corresponds to the document or sets of documents that illustrate the state of conservation of the building on a specific date. The damage mapping, on the other hand, consists of a phase of the surveys where the surveys, investigations and production of the data for the elaboration of the damage map are done [5].

Thus, for the elaboration of the damage map, it is essential to collect information about the building studied in order to better understand the pathological problems that can be found in the damage survey phase. Thus, the constructive methods, the history of interventions and the understanding of the area where the building is located are primordial factors for the analysis of the pathological manifestations [5] and [6].

Thus, it was possible to identify the damages in the analyzed façade (with the identification of a symbology for each found damage). The Fig. 12 and Fig.13 below presents the damage maps produced for the Guarany theater facades.



Fig. 12: Damage map of the front façade

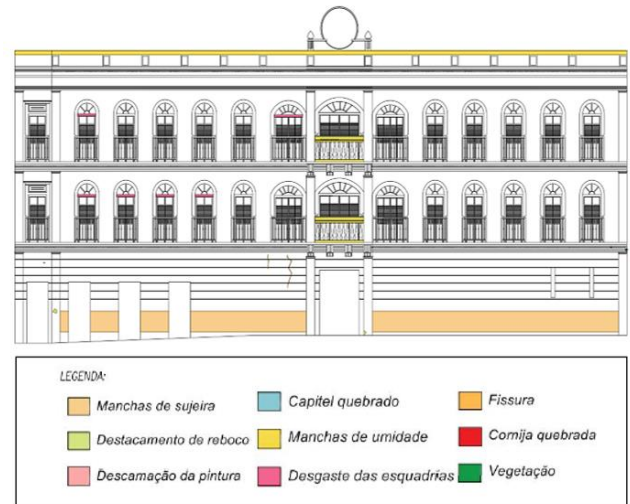


Fig. 13: Damage map of the side façade

IV. CONCLUSION

This work aimed to identify the pathological manifestations of Guarany Theater Cinema and to evidence them in a damage map, in this way managed to point out the damage present in the facades of the historic building and showed viable means of solution.

Taking into account the external analysis of the theater, it is of great relevance to explain that the building is in good condition of preservation, and that the pathological manifestations present in it are of simple eradication, but we see the need to repair the existing damages with the objective of prevention about the proliferation of construction problems already identified and the emergence of more pathological manifestations.

Considering that a simple maintenance would bring a better condition to the building, this work maps causes and solutions of pathological manifestations, proving that common processes related to restoration, can guarantee a better functioning and a better visual aspect, considering the cultural and historical value that theater plays.

This research is a document that seeks to show the importance regarding the valorization of Brazilian historical buildings, through the Guarany Theater Cinema.

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