The Convent of Santa Maria Madalena – Alagoas – in project of preventive conservation

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ABSTRACT: The project proposes conservative measures in the Franciscan Convent Marechal Deodoro State of Alagoas – Brazil, built between 1689 and 1793, contiguous to the aisle of the Santa Maria Madalena church. The historical relevance and the peculiarity of the baroque composition of the religious set of buildings has been put under federal government trust in 1964 by the National Institute for the Historical and Artistical Patrimony – IPHAN, and in 1983 it was adapted to become the Museum of sacred arts. Today it is still a museum although very vulnerable to geo-physical aggression especially those caused by humidity. Aiming at safeguarding both the building and the museum collection, the project is structured in a way which makes it possible to register the causes of the aggressions which are generating the processes taking place at the moment, to afterwards propose corrective and preventive measurements adequate to the functioning of the museum.

1. THE MACRO PHYSICAL AMBIANCE – THE TOWN

1.1 Geo – Climatic Synthesis and Conditionings

The present urban seat of the municipality of Marechal Deodoro used to be known in the beginning of the colonization process in the 16th and 17th centuries as Madalena do Sumauma and Santa Maria Madalena da Lagoa do Sul Village which is located in the Mid-west region of the state of Alagoas in the northeast of Brazil on the latitude 09º42'24" and longitude 35º50'42'' in an altitude of 5 meters above sea level.

The town is peculiar for being in a region washed by the Atlantic Ocean, by the Manguaba Lagoon, canals and some rivers, marked by the harshness of the following aspects: Mega-thermic and sub-humid climate; the rainiest period between May and June; less rainy period between August and April; Pluviometric precipitation of 1.500mm per year; maximum temperature of 31º Celsius; average temperature of 27º Celsius; and minimum temperature of 22º Celsius; Relative air humidity of 80%.

The humidity is so intense in the region, that its effects were described, in details by the historiographer Octavio Brandão like this:

> *"During winter some medicines moulds. Clothes, boots, walls, sweatbands of hats and books mould. It's terrible. When to this humidity, heat is added, the sensation of agony, which one feels is unbearable. It's a continuous uneasiness and nervous irritation (…) Then, from all over more and more waves of aqueous vapors reaching the higher layers (…) from the lyric limpid lagoon; from the rutilant canals; from the anxious ocean; (…) the evaporation is wonderful, giving everything a sensation of something viscous, humid, sticky. (…) Those waves come up. High up there, over the green hills, over the blue tops, the waves become nimbus, which to the slightest cooling are transformed in a shower of rain."* (Brandão, 1949)

1.2 Historical Synthesis and Socio-economical Conditionings

In the beginning, what is now the state of Alagoas, use to belong the state of Pernambuco (At the time not a state but a "capitania" an administrative division of Brazil during the colonial period.) which had a distinguishing position in the Portuguese Colony due to its economical development caused by the great number of sugar mills, which assisted the sugar industry and the cattle farms, polarizing 1/3 of the population of the state.

The south of the state which corresponds to the town of Marechal Deodoro, was inhabited aiming at imposing itself in this socio-economical context of ascension through agricultural activities and raising of cattle which had a great benefit with the proximity to the Manguaba lagoon, the rivers and canals according to reference of historiographers referring to the 17th century:

> *"The margin of the beautiful lagoon flourished the village with its usually awkward houses; here and there it was possible to distinguish a few buildings, which didn't look like a camping tent. It was them that connected those men to the wild soil, strongly cultivated and filled with cattle."* (Costa, 1983)

As time went by the village of Santa Maria Magdalena da Lagoa do Sul became a center of agricultural and commercial activities supported by the Port of the Franceses, on the margin of the Atlantic Ocean where the agricultural and the sugar productions were shipped to Portugal, Bahia and Pernambuco.

The society was then formed in the Rural Aristocratic Standard composed of farmers, sugar mill owners, followed by common workers, slaves, the mulattos and the indians.

To strengthen the fundaments of the catholic religion, which had been instituted since the Portuguese colonization, the Franciscans were integrated into this context. They were the first religious group to establish and order in the village as early as in 1635.

The pioneer friars build a modest mud house covered in straw, where they stayed for only one year, before they left to Bahia (another state in the Portuguese Colony).

2. THE MICRO AMBIENCE – THE BUILDING

2.1 Historical Circumstances and Uses

In 1657, complying with a request of the inhabitants, it was given permission for the construction of a Franciscan convent built by masonry, and only two years later the first members of the order started arriving.

Nevertheless only in 1684 the construction of the present building – church and convent started, and the main chapel was concluded only in 1689. The work was paralyzed for 30 years, and building was finally ready in 1723, although, much before that the monks, who already lived there, would use some of its premises to give grammar classes to the local population. In 1793 the façade of the building was concluded and a Portuguese bell was placed in its tower. (Photo 1)

Figure1: Church and Convent of St.ª M.ª Madalena.

The Architectural Set of Franciscan buildings – church and convent were soon highlighted in the simple totality of the surrounding houses, not only because of its dimensions but above all for its magnificence and the plastic-decorative force of the composition of baroque voluptuousness.

Added to the set of building the gracious volumetry of the Chapel of the 3rd order of Saint Francisco, whose foundations had started in 1763. Internally the church of the 1st. order is notorious for the ancestrability (ancientness) of the golden carved work of its altarpiece and side altar, described with special emphasis by Germain Basin in his analysis of the Brazilian baroque religious architecture:

"*The oldest example of carved work are a golden chapel, which was begun in 1698 in Recife – Pernambuco and concluded in the first years of the following century and the altarpiece and side altar, made at the same place, to the side chapel of the convent church of Marechal Deodoro in Alagoas.*" (In: Mero, 1995)

In the beginning of the 20th century because of a gradual socio-economical and religious emptying in the city, the convent starts a decadence process being used for many other purposes such as: a camping site for soldiers of the 20th battalion of hunters of Maceió (Capital of Alagoas) between the years of 1821 and 1839; shelter for the unsheltered population coming from drought areas in the region; among other uses which resulted in different types of damage to the convent.

The degradation came to such a level that in 1879 with only a small number of inhabitants with "three monks and four slaves "(Santana, 1970) the convent already showed many significative alterations in its physical structure.

It was also used to house the diocesan Seminar of Alagoas for two years and in 1915, it housed the Sao Jose orphanage, which was then transferred to another building built on the area of the convent.

The original architectural project suffered a modification in 1984 to house the Museum of sacred arts of the state of Alagoas, which it still does until these days, keeping in exposition a great collection of sculptures, golden and silvery pieces, furniture and religious objects.

2.2 Ambiance Circumstances and Aggressions

Generically speaking, the most aggressive problems detected in the buildings – convent and church are caused specially by the fact they were built very close to the lagoon, and on top of outcropped groundwater; to the continuous exposition to salinous aerosol coming through both air and water; and to the exposition to the harshness of the weather like the high level of humidity.

After a detailed analysis, it was possible to identify the main causes of aggression and the deriving processes.

Aggression:

Descending Humidity

Caused by the separation and cracks on the roof tiles, on rufos and roof ridges; as well as the lack of well done cleaning process on the roof emptying drips and gutter pipes and eaves. (Photo 2)

Figure 2 : Roof tiles cracks/ obstruction of drips causing infiltration.

Figure 3: Patio – pillars and pavement.

Consequences:

Continuous absorption of humidity by the roof support structure (truss, clap-board, and roof timber) as well as that of the ceiling (spars, pegs and frameworks of arches and vaults) all made in wood. Lixiviation of the pictorial layer of the ceilings due to leaking of rainwater. Proliferation of superior plants specially on the drips and entablements, which contributes to a bigger separation among the roof tiles and a dilatation of the drips due to the expanding force of the roots.

Aggression:

Ascending Humidity

Due to the permeability of soil, sensitive to the variations of the seasonality of the tides which cause floods in the limits of the vegetable garden and the orchard of the convent, and to the migration of salts from the rain water which sprinkles, specially on the open air patio of the convent, which is completely paved, intensely devastating the base and pole of the limestone columns (Photo 3) as well as in other places where the lack of a grate or drip to collect the volume of water from the eaves, allow a saturation on the inferior base of the walls.

Consequences:

Jeopardizing of the stability of the plasterwork of the masonry walls (internal and external) with partial losses and ascendancy to the uprising of “leprosy” as well as the accentuated abrasion of the base and inferior part of the limestone pillars of the patio. (Photo 4)

Figure 4: Migration of salts and abrasion of pillars.

Obs: Concerning the aggression coming from the humidity, we can also mention one cause, which extrapolates the condition as ascending or descending humidity. This is the action of rainwater associated to the eolian action, which acts making a kind of washing and abrasion on the external mortar of the buildings mainly on the west façade of the convent, besides producing humidity stains (on the external parts of the walls), according to the employees of the museum, "they are temporary stains, as they come and go" but they leave salts deposited on the mortar, especially chloride. Another consequence of this rainwater- eolian transport is abrasion on the ceramic roof tiles from both the roof and the eaves.

The humidity degradation factor is amplified by the salinization condition implied in the building material (rocks) extracted from lagoon and river areas.

Aggression:

Fungus proliferation and biological degradation

In several parts of the façade, especially in those under some type of shade, it was identified dark stains, caused by the lack of direct solar incidence and by the elevated air humidity which resulted in the retention of superficial particles having in some cases already formed dark crust. These stains also reach higher and more extreme points like the pinnacle and the cornice. (Photo5)

We've also identified the proliferation of micro flora in several points of the building, in areas which receive and accumulate too much water and don't have an adequate aeration… such as the edges of walls and roof (close to the gutter vertical pipes); the inferior limit of the external wall bases and of the arches of the "Galilé" (special area in the church reserved for the slaves), on the main façade of the church (which is exposed to sparkles of rain and the accumulation of water due to the low level of drainage from the pavement of the churchyard).

The proximity of the building to the orchard of the Convent, which is full of big bushes, crowns of trees and abundant vegetation helps keeping the building always on the shade which, limits very much the evaporation of humidity of the impregnated masonry.

As to the action of xylophages insects, although there are evidences of an anterior infestation, visible demarcations of ex-paths in some walls and even in arches in stone work of the "Galilé" It wasn't detected any signs of biodegradation caused by their reactivation. They are still repressed by the efficacy of the treatment applied on the last restorations made by the IPHAN.

Consequence:

Bio-chemical wastage of the surface of the plasterwork of the masonry and of the limestone on the elements such as arches, pillars, borders, lintel, doorposts, entablement, corners, etc., accumulating a risk of diminution of the durability of the building materials; besides creating a visual pollution, which deforms the esthetic reading through the decorative contrast, intended on the façades and on the internal spaces.

Figure 5: Impregnation of humidity on the external plasterwork.

Aggression:

Vulnerability of the structure

The self-carrying structures made in masonry of stones and plastered with lime in thick layers on the buildings, generates a high thermic inertia, which can be alleviated on the areas with many external openings, through the effect of convection. From the visual analysis of the global stability, it wasn't identified any emergent problem, because the stone masonry always have a high resistance and rigidity and the buildings aren't exposed to overloads or excessive traffic vibrations.

Because the framework of the building is topped by a wooden supported structure roof covered by ceramic tiles "capa and canal" type and eaves, which is threatened by the low level of conservation given to it as has been mentioned before. The infiltration of rainwater has contributed to put in risk the stability of the ceilings and of all the supporting woodwork of the floor of the upper pavement (joists and boards) also in wood where we can find some areas with small problems.

Consequences:

The masonry work although resistant due to its rocky nature, must always be free from humidity and salt to escape from the very aggressive effects of solubility and re-crystallization. The happening to the wood structure, which supports the roof, ceiling and floor, which should be free from the contact with rainwater.

Aggression:

Insufficient security against fire and thefts

The building contains a protection system against fire, which is not sufficient for all its area, taking into account that the present electric fitting is under very bad conditions. The risk is even bigger considering the constant leaking of rainwater and the small number of steam fire extinguishers which exist there and which very few of the employees are able to manage well. One guard, alternating shifts, has maintained the physical security of the museum and its collection. On the internal areas the security is limited to the presence of the six employees. There isn't an electronic complementary security system on the areas where the technical reserve is kept neither where the collection is exhibited nor in exposition windows.

Consequences:

Imminent risk of temporary or partial loss

Imminence of fire on the museum collection and on the Franciscan set of religious buildings due to the restrict capacity of the electric wiring system and vulnerability of the security of the museum collection, most of all the golden and silver pieces to thefts.

3. GENERAL PROPOSITIONS

The more the buildings resist to time, if they aren't provided for against aggressions even the insignificant ones, they will reach ruin prematurely, interrupting a social cycle which they should complete, that is, that of lodging man to accomplish the function it houses and its previous functions narrated by history.

Taking into account that the building of the ex- Franciscan Convent in Marechal Deodoro – Alagoas, at the moment houses and exhibits a museum collection of relevance to the sacred arts of Alagoas and Brazil specially considering the Portuguese origin of many pieces, it's understandable that it urges for preventive measures so as to minimize the interferences and aggressions to which it's been exposed, notoriously to what concerns the adjustment of the building to the climatic conditioning retained in its interior.

Below are the general propositions to activate the simultaneous conservation of the building and the museum collection. They have been distributed in a sequence of immediate priorities taking into account the economical limitations which the institution Museum of Sacred Arts of the State of Alagoas faces to undertake all the necessary measures for the necessary conservation.

It's worth mentioning the need for deeper studies which will indicate posterior more radical interventions, which whenever are able to happen must evaluate the physical circumstances of the building, once the aggressions must have been repressed by the conservation measures now proposed. It must also be respected the essence of the spatiality of the building, under the focus of reversibility of the contemporary interventions, in case of the technological implementation environmental thermo control.

3.1 Immediate Emergent Solutions

Pruning the trees and bushes to the admissible limits of each vegetal species, maintaining a distance of 2 meters from the façade of the building.

Leave the door and windows of the exposition rooms open for as long as possible (when it's not raining) observing the incidence of the sun in the rooms so as not to damage any of the pieces. This simple aid will contribute to the creation of natural convective currents all over the building, which will enormously benefit the areas more saturated with humidity.

Making a general revision on the roofing of the building, substituting all the broken tiles and fastening the ones, which may be loose.

Clear and recover all the drips, gutter pipes and eaves to avoid the retention and leaking of rainwater.

Install a direct telephone line to the fire department and to the police in order to reinforce the physical security against fire and thefts.

Introduce a security system on the pieces of the collection to make it difficult or better still impossible their removal by visitors.

To check all the electric wiring system, substituting the incandescent lamps by the ones indicated for the emergency energy rationing control the country is facing at the moment.

Install smoke detectors in all the areas of the building.

Check-up the hydro-sanitary installations of the building and make periodical maintenance.

Remove the existing amount of saline efflorescence by using a soft brush or vacuum cleaner, maintaining the action while others appear along the drying process. Each part must be monitored to accompany the proportions and absorption of salt for the planning of possible renovations and the creation of a control process.

3.2 Emergent solutions at medium and long terms

Explore in details the conditions of the external revetment of the buildings, because of great occurrence of infiltration points in the church and convent. In some cases it occurred vertical percolation. The mortar for the complementation of the exploratory cuts and of the other needs for the recomposition of the plasterwork or bricklaying, must be produced without any use of cement, having as a base lime under the specifications and methods of preparation recommended by the TERRACAL / IPHAN.

The use of sacrifice plasterwork (reboco de sacrificio) equally having as a base the use of lime (as a temporary revetment) as an option for removing the salinity of the walls stimulating a process of evaporation. The plaster must be made of lime and grain of sand of (0,500mm to 1.000mm) and the proportion of ingredients of concrete of 1-4. The inclusion of materials such as bricks and crushed shells is indicated and this procedure has been tested and approved by the TERRACAL / IPHAN program, having its application been recommended to minimize the effects of the salinity, where it's impossible to eliminate the ascending humidity. It's recommended the definition of a mapping for the gradual implementation of the plaster.

Correcting the falling of water retained in the cornice and at the top of the frontispiece of the church with an appropriated mortar, associated to a superficial impermeable process to extinguish the retention and impregnation of water in them.

Develop a specific project such as illumination and technological thermo-ambiance control in qualitative and quantitative terms, considering the restringing reality of energy consumption in the country.

Define optional control elements for the gradation of excessive luminosity in the areas of exposition of the artistic pieces trying to interact in the reduction of the ultra violet radiation absorption, in such a way that does not reduce the existing entrance of air.

Develop a landscape study so as to introduce in the land surrounding the Convent, species of vegetation with a certain capacity to drain the land.

Review through drilling the total stability degree of the structures.

Gradual elaboration of prospects and drillings for the definition of the superficial and sub-superficial drainage of the land, with a redefinition of the present system of dropping and leveling of the constructed area in relation to the public system of rainwater flowage.

It's also recommended, besides the use of a sub-superficial drainage system to capture unfiltered water, the execution of aeration chambers between the buildings and the land.

4. CONCLUSION

We've tried to act in an investigative way in relation to the causes and agents which are influencing in the physical degradation of the buildings, and with great criteria when choosing the treatment to the installed pathologies, having two main worries: that of trying to immediately potentize the present functioning conditions avoiding the possibility of a paralyzation of the museum activities due to recurring damages on the collection; and that of recommending actions whose effects have more impact to the executions of the posterior phases, when the institution has enough financial resources, for at the moment it has a very tight budget.

The technical behavior we've adopted for the definitions of the propositions, aimed at intervening where the damages are visible or scientifically foreseeable based on continuous analysis and monitoring of the pathologies for the definition of a set of interventions versus the degree of intensity.

With the objective of acting in a very effective way in the control of humidity retained in the masonry, the project uses the technology developed by the TERRACAL, which explores corrective procedures using lime as a resource of conservation on conditions.

Believing in the success of this process of gradual control and elimination of the impregnated humidity, the project proposes that the Convent of Santa Maria Madalena becomes a trial of application of these technological procedures, compatible with the constructive and environmental essentiality of an example of great representative ness in the cultural patrimony of Alagoas and Brazil.

Figure 6: Recurrence of restoration on pieces degraded by the action of humidity.

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