

THE CARIBBEAN FORTRESSES AND THEIR STRUCTURAL DEGRADATION: TWO EMBLEMATIC CASE STUDIES | LE FORTEZZE CARAIBICHE E IL LORO STATO DI DEGRADO STRUTTURALE: DUE EMBLEMATICI CASI-STUDIO

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Abstract

The paper describes the structural situation of two case studies, emblematic of the degradation situation of Latin American historical military fortresses: the first one is the Morro Castle in La Habana-Cuba, and the second one is the Fortress of San Fernando in Cartagena de Indias-Colombia. In both cases the state of structural degradation is briefly described. The study was carried out on two master theses at the School of Architecture in Florence. The surveys covered: historical analysis, geometric survey, analysis of the general state of degradation, identification of causes of structural degradation. The aim was to draw attention to the need for immediate structural rehabilitation. In territories where, for cultural and economic reasons, the preservation of historic heritage is not yet a priority. Perhaps the best known Castle of the Antonelli, in Havana, has been suffering for a long time the effects of deterioration of both of a material and structural nature. The San Fernando Fortress is an outstanding example of the fortified historic heritage of the colonial era and testifies a building experience of over 200 years. The fort, built in mid-eighteenth century to defend the city, stands out for its particular curved oceanfront. This configuration leads to unique and beautiful interior space solutions in plan and elevation. The erosion of the waves of the sea has endangered its stability.

Key-words: Havana, Cartagena, fortress, structural degradation, conservation

Parole chiave: : Havana, Cartagena, fortezza, degrado strutturale, conservazione

Introduction

It seems common to believe that military fortresses, which have accompanied human history throughout its development, for their grandeur, can be considered "eternal" and almost nothing at all affected by both material and structural degradation. If we add that in the modern era, these constructions still convey a negative idea, as an emblem of violence, which prevents, as in a psychological block, the problem of their re-functionalization and conservation, we understand how it is necessary now to address the problem from a work of knowledge and dissemination of their current state of conservation. The issue is even more urgent when referring to Military Fortresses in the Latin American area, especially those from the 16th to the 18th centuries. Here, we want to look at the situation of two case studies, emblematic of the above-mentioned considerations: the first one is the Morro Castle in La Habana-Cuba, and the second one is the Fortress of San Fernando in Cartagena de Indias-Colombia.

The Castle of Morro in La Habana

The Castillo de Los Tres Reyes del Morro is, for its citizens, still one of the most recognized symbols of the city of Havana. For Cubans, the Morro is the imposing fortress, that with its lighthouse, visible from anywhere in the city and in particular from the very popular Malecón, overlooks the access channel to the port of the large bay. Built between the late sixteenth and the first half of the seventeenth century by the Spanish Crown, it is part of the complex system of fortifications built to defend the then important colony. It was commissioned from the illustrious military engineer of Italian origin (Gatteo, Emilia Romagna) Battista Antonelli. He was one of the six members of the family of engineers who devoted themselves for nearly a century to the service of Spain and became protagonists of an impressive number of works for war purposes, between fortresses, city walls, navigation of rivers,

bridges, aqueducts, to real urban city plans. Their scope is incredible when we think back to the period they were working: Spain, North Africa, Central America from Panama to Veracruz, from Cuba to Cartagena de Indias to the coasts of Venezuela and Brazil. They were certainly not alone, but it is significant that Battista was directly appointed by King Philip II, in the late sixteenth century, to direct the overall project of the fortification system of the entire area of the Caribbean. The Morro Castle in Havana, according to most historians and international scholars, is the most important work of Battista Antonelli, representing the model of military architecture called *the modern*. It has its origins in Italy during first half of the sixteenth century with the founding fathers, the Sieneese architect Francesco di Giorgio Martini and the Florentine Giuliano and Antonio da Sangallo.



Fig. 1 – Location of the Castle Tres Reyes del Morro in the city of Havana.

Work started on the Morro Castle under the direction of Battista Antonelli and Juan de Tejeda on the 20 September 1589 as evidenced by the precious inscription on the stone near the "Platform of Estrella", the battery by the sea. The function of the fortress was to protect the city and the many Spanish fleets laden with merchandise that passed through the large bay, used from the start a natural harbour, from the repeated and threatening incursions of privateers financed by the British and French governments. The entrance of the access channel to the port was the strategic point of defence, and Antonelli was the first to design such an imposing fortified system in the city: the Morro Castle on the headland of the north shore and the castle of San Salvador La Punta on the opposite bank. The two forts were functional to each other, connected by a chain that controlled the port traffic and, if necessary, assured the crossfire against enemy ships. For the Morro, Battista Antonelli envisaged a building constructed out of limestone extracted from the nearby Cabaña quarries, and because of the rocky nature of the terrain the building fits on a slope descending towards the sea in an irregular polygon plan, created to defend three lines of attack: the land front, the sea front and the harbour channel front. The construction technique adopted for the building of the fronts was that of *terreplein* although in most of them vaulted interiors were obtained and used as dwellings, powder stores and casemates. The land

front (east) is the most regular, where the dictates of Renaissance Italian architecture are recognisable: It is made up of the curtain wall connecting the two side bastions, the moat, the counterscarp, the walkway covered with redan and the rampart. The two bastions are equipped with curved walls or with covered sides inside each of which were created a casemate with two embrasures to protect the curtain wall and moat. The bastions are named Tejada (actually a demi-bastion) and Austria. The deep moat was designed to remain dry. The sea front (north-west) is characterized by an irregular curtain wall, which in plan forms a broken line with three points (vertexes) reaching out to the sea. This part of the wall connected the tip of Morrillo with its watchtower to the batteries of San Nicolás and Santo Tomás, which stood out from the demi-bastion of Tejada. The harbour channel front (south-west) is opposite the la Punta castle and contains the main entrance to the fortress. This defensive front is made up of the Austria bulwark front, and faces south, continuing with a curtain that ends in the small, demi-bastion of Santiago. The front ends at the tip of Morrillo. Below the latter there is the "Platform of Estrella". moat, the reconstruction of the ancient tower and so on.



Fig. 2 – The elements and areas of the fortress complex that are preserved today.

During the following centuries the castle retained its new eighteenth century shape, not far from the original, at least as long as it had its military defence purpose. With the approach of the HispanicAmerican conflict at the end of the nineteenth century, the Velasco battery was built to strengthen the northern part of the sea front as well as a series of minor adaptations, such as the insertion of the powder magazines and the new modern cannons. Also in the nineteenth century its role as a maritime traffic station was strengthened with the complete reconstruction (1844-45) of the lighthouse and the commissioning of the first semaphore station (1888), later rebuilt in the following century (1926). With the conclusion of the last military confrontation, the rooms of the castle hosted the first Army Cadet School (1911-45) and then, with the advent of the revolutionary movement, a prison (1967). In 1977 it was decided to transfer the prison from Morro to concentrate everything in the fortress of San Carlos de la Cabaña. Furthermore, 1982 was a pivotal year for the city and its monuments - including the Morro Castle - as it was included in the UNESCO world heritage list and declared a World Heritage Site. From this time on international organization sent many funds to restore the historic centre of Havana and the fine military works. The Oficina de l'Historiador de La Ciudad (OHC) directed by Eusebio Leal, he started a programme of restoration for the castle, which took place between the years 1987 and 1993. In 1992 the local authority of the Park of the historic military complex of the Morro and the Cabaña (PCHMC) was established. In 1993, after the conclusion of the restoration work, it was reopened to the public and regularly hosts important events: the Art Biennale in May and the Book Fair in February.

The complex is preserved intact although the state of environmental, material and structural degradation present some emergencies of no small importance. The restoration at the end of the last century, although started with very different intentions, involving the entire area of the Military Historical Park, basically allowed it to be sufficiently usable, almost throughout, for visits by the public. Unfortunately, the restoration was never followed up, and combined with the lack of funds for maintenance, the situation has not improved. Only recently, since 2008, has the CMHM resumed restoration work, both at the Cabaña and the Morro but, however, has only managed to intervene with specific operations targeted to certain areas and lacks a comprehensive plan of the work to be done. The rooms of the castle suffer greatly from the presence of moisture with a high salt concentration, which attacks the surfaces and materials causing widespread erosion of stonework, forming biological patinas, disintegration and detachment of the surface layers such as plaster. In many indoor environments, especially the less ventilated ones, there is the formation of saline concretions in the form of stalactites and stalagmites. The erosion is then accentuated by being highly exposed to strong winds and storm surges produced by cyclones, which cause the waves to violently crash onto the outer curtain wall and even to penetrate the complex. Just think of the conditions in which its inscriptions find themselves, those that attest to the laying of the foundation stone and among the oldest on the island. Their long term conservation is in absolute danger with sea water slowly eroding the relief, especially on the right part, where it is already compromised in many areas. In recent years, the conditions have been getting rapidly worse and yet no remedies for this problem have been put in place.

To this situation can be added the lack of maintenance and safety of the spaces, where machines and bare wires are often found and there is frequently a lack of adequate protection for visitors. Furthermore, the monument and its spaces are poorly appreciated, starting from the lack of connections to the city. From a static point of view emergencies that deserve immediate attention concern the rocky base of the cliff, on which the castle rests, which presents a series of fractures along almost the entire perimeter as shown by a geological study carried out in 1989, which has never been followed up by a consolidation project or specific interventions. One of these fissures, to the side of the Estrella battery and below the Morillo point, has an opening of about one metre that goes inwards and stops before the beginning of the fortress' wall, which for now shows no visible instability. However, the depth of the crack together with the effect of the disintegrating action of sea could lead to serious problems of the complex's stability. Another concern is the condition of the sentry post at the summit of the Santiago bastion, the only part of the complex to keep the original eighteenth-century reconstructions and which so far has resisted damage or collapse, unlike the other three in the complex.

Its wall has some fractures where it connects to the parapet: it can be seen that the fracture passes right through, from inside to outside to the side of the entrance but there is an important problem also

on the other side, while the attachment of the sentry box to the base is not particularly unstable. This situation places the structure in serious danger as although the upper part, formed by the perimeter walls and dome, is firmly attached to the base, it is without - or at least limited in- the necessary horizontal connections, that would ensure an adequate bond to the masonry.



Fig. 3 – Some current emergencies of degradation by various causes: environmental, material and structural deterioration.

This situation can lead to the formation of an ideal joint at the base of the attachment that, under the weight of its own cantilever volume, as well as the horizontal action of the wind and rain produced by cyclones, could overturn the element itself, and lead to its collapse. The situation calls for urgent action, not just to safeguard a valuable element of the fortress, uniquely original in its kind, but also to avert serious injury to people. Finally, the presence of some fractures in the vaulted brick tunnels of the central building raise concerns for their size and because the problem has not yet been analysed with due attention.

The Fortress of San Fernando in Cartagena de Indias

The historical center of Cartagena de Indias and its fortresses are recognized by UNESCO as Historical and Cultural Patrimony of Humanity. In this context San Fernando de Bocachica is surely one of the most important historical witnesses of the city. Nevertheless, being outside of the most known tourist routes, the fort is isolated and in bad state of maintenance.



Fig. 4 – The location of San Fernando fortress in the Cartagena's bay.

Their physical conditions evidenced the need for an early restoration; Many injuries are easily visible. The construction is located only half an hour from the most elegant neighborhoods and downtown, on a typical and beautiful Caribbean island; However, the surroundings are inhabited by people with very low resources and in general a sense of neglect and neglect is perceived. The Fort of San Fernando de Bocachica is located on the banks of the Strait of Bocachica, on the island of Tierrabomba, near the village of Bocachica.



Fig. 5 – The San Fernando Fortress.

The strait mentioned is currently the only navigable access to the city and the port, as the Strait of Bocagrande is wider but its depth does not allow navigation. In addition, in the bottom of this arm of the sea are old remains of a wall of the XVII century, built by the engineer D. Antonio De Arévalo to block access to the boats. Opposite San Fernando, on the other side of the strait, is the battery of San José. Both constructions are affected by the strong swell due to the passage of large ships and the dredging carried out in the channel. San Fernando was built under the direction of the engineer D. Antonio De Arévalo, between 1753 and 1760, to replace the one of San Luis, destroyed by the English armies of Vernon in the middle of the eighteenth century.

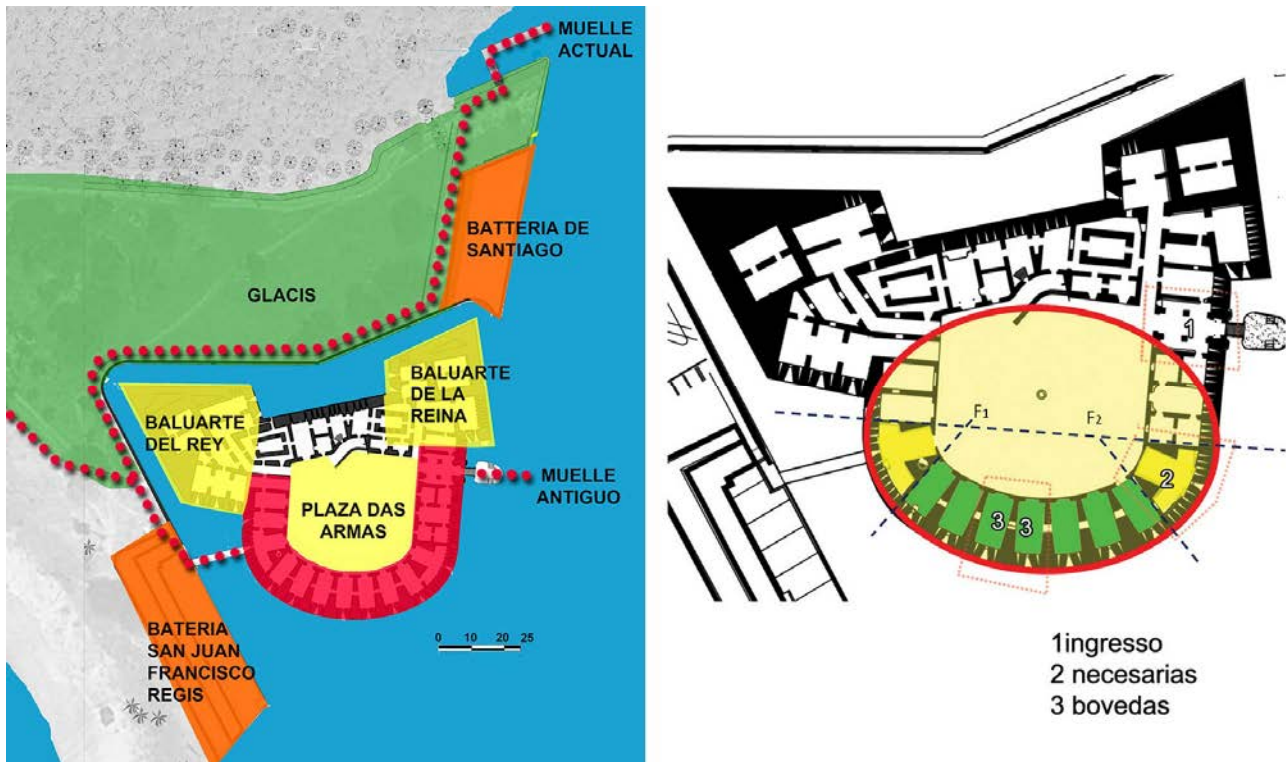


Fig. 6 - Functional distribution and elliptical shape.

San Fernando is never attacked; With the passing of the years it is abandoned and falls into oblivion until it is left in a very poor state of conservation. In 1958 it is included by UNESCO in the list of the Historical Heritages of Humanity. With this recognition begins some projects to the renewal of San Fernando. San Fernando is formed by a central body in the shape of horseshoe with the curved part towards the sea. In the part towards the mainland (north), this ends with two bastions, the Baluarte del Rey and the Baluarte de la Reina. The fort covers a surface of about 5700 square meters; The perimeter walls have a height of between 8 and 10 meters. The construction is surrounded by a damp moat (today largely dry). Behind this, towards the mainland, we find a glacis, a soft and clear artificial slope easy to control in case of attack.

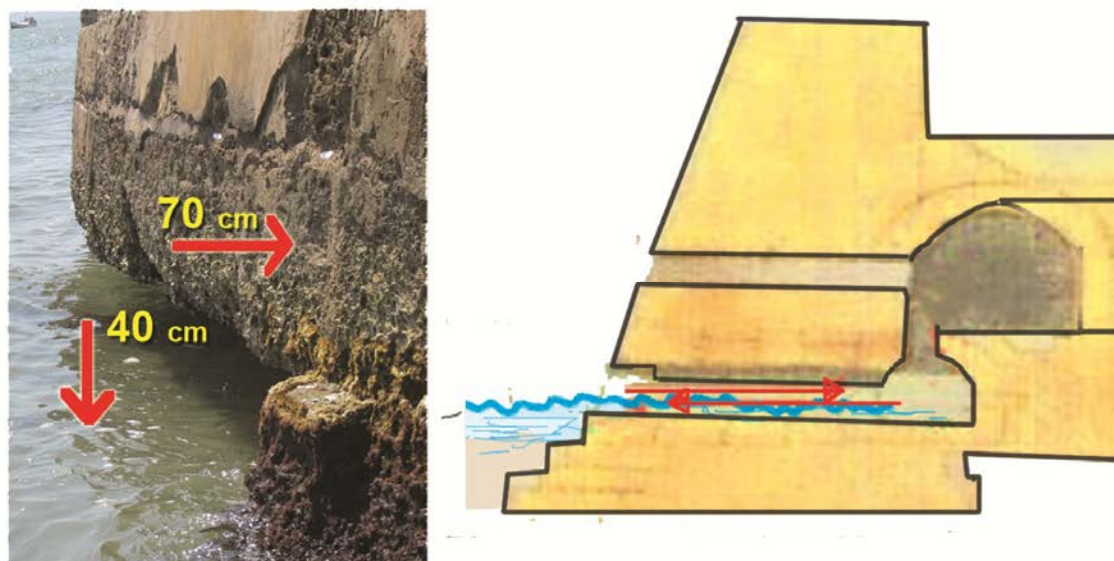


Fig. 7 - Erosions, degradation and structural instability

Formerly the fort had two entrances, one through a bridge from the mainland, another across the sea, where still today the old pier is seen. The building is organized around a large central square (about 40 by 40 meters) in a U-shape from where the rooms are accessed. All the premises of the castle are covered with vaults of all kinds and sizes; Are visible semicircular arches, ogival arches, gothic-otter arches and more. With respect to the particular curve geometry of the fort, in all the bibliography analyzed the authors is expressed with the word "the form of horseshoe". However, after having carefully analyzed the plant of the fortress, we have discovered that the square does not have a generic shape to "horseshoe" but a very precise form of ellipse. The Fort of San Fernando has a degradation of materials, especially in the outer curved surface to the sea. Here the constant waves caused by secular passage of ships into the canal caused the erosion of the underwater foundation zone. As a result, a sliding phenomenon of the base of the outer wall towards the sea began, causing the opening of cracks in the floor of the corresponding vaulted rooms. These rooms have a rectangular plan. In order to obtain the curvilinear plant, the builders played with the wall thickness, which did not appear to be of constant thickness, but increased in the outer direction. The game of vaults thrustness made so that they do not eliminate each other but generate a push component outward that does not contribute to the stability of the body. The urgency of restoration and consolidation is at the attention of the Ministry of Culture of Colombia, within a global process of re-socialization of the entire Cartagena Bay, with the nearby peninsula of Baru and the island of Rosario that are tourist destinations of great importance.

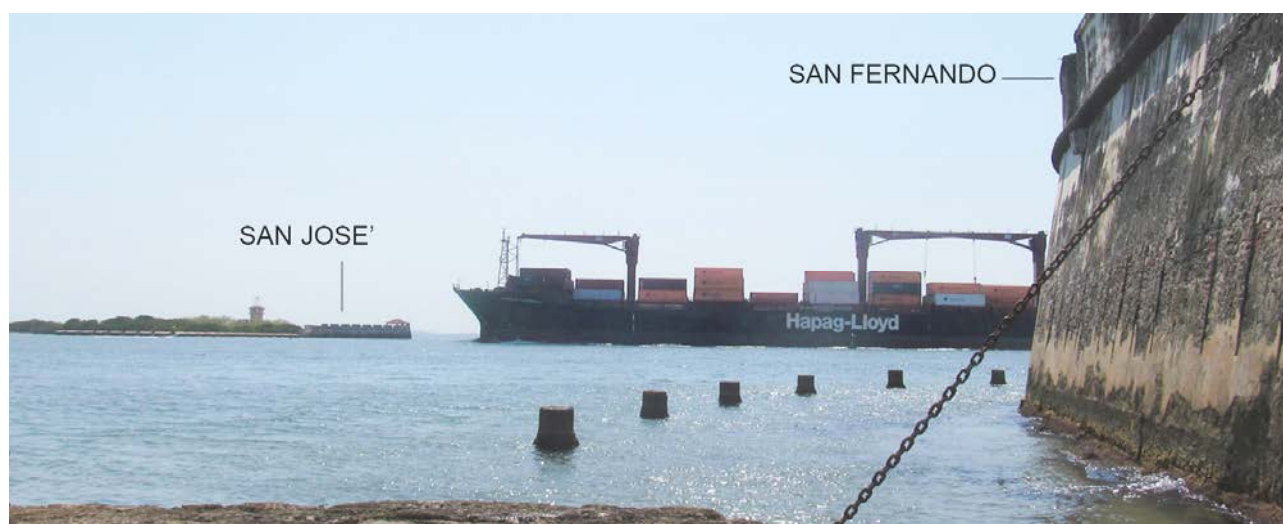


Fig. 8 - The San Fernando fortress and the sea.

Conclusion

To preserve and transform military heritage requires to know it. Even from the environmental and social point of view. The Morro de La Habana and the Fort of San Fernando de Bocachica in Cartagena de Indias cases are two emblematic examples (but there are many in Latin America) of an attitude of the institutions, which are, in various respects, responsible for the preservation of the built heritage, at best judged "late". If once again in the case of La Habana, the responsibility for non-intervention is due to the economic situation and the complicated and extensive bureaucracy involved of the Cuban state, in the case of Colombia it is often attributed to the need for other priorities (see the peace process, widespread violence, social degradation in Cartagena de Indias) the cause of non-intervention. It is the responsibility of all those concerned with fortified heritage who declare themselves in favor of a conversion to its positive values, to engage at every level, even internationally, to create a trend reversal as soon as possible.

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