

17 DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN

Gjergji ISLAMI, Denada VEIZAJ (Eds.)



DEFENSIVE ARCHITECTURE OF THE MEDITERRANEAN
Vol. XVII

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Editors
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Universiteti Politeknik i Tiranës



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CIP Katalogimi në botim BK Tiranë

Universiteti Politeknik i Tiranës
Defensive architecture of the Mediterranean / Universiteti Politeknik i Tiranës;
ed. Gjergji Islami, Denada Veizaj. - Tiranë : Universiteti Politeknik i Tiranës, 2024.

Vol. 17, 350 f. ; 17 x 24 cm
ISBN 978-9928-4814-0-5

1.Arkitektura 2.Konferenca
72 (062)

Series *Defensive Architecture of the Mediterranean*
General editor: Pablo Rodriguez-Navarro

The papers published in this volume have been peer-reviewed by the Scientific Committee of FORTMED2024_Tirana

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Published with the contribution of the University Politeknik I Tiranës

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Universiteti Politeknik i Tiranës

Sheshi Nënë Tereza 4, 1001, Tirana, Albania

www.upt.al

ISBN 978-9928-4735-8-5 (electronic version)

ISBN 978-9928-4814-0-5 (vol. 17)

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ISBN: 978-84-1396-243-6 (two-volume collection)

ISBN: 978-84-1396-245-0 edUPV Ref. 6769 (electronic version)

ISSN: 2792-5633 (Series *Defensive Architecture of the Mediterranean*)

PROCEEDINGS of the International Conference on Fortifications of the Mediterranean Coast FORTMED 2024
Tirana, 18, 19 and 20 April 2024

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The Castle in Paphos, a fascinating, iconic, neglected, abused remain of a layered fortification

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Abstract

The Castle of Cyprus is quite symbolic in between the destinies of restoration, reuse or decay that happen to almost any past fortification: it was built in defence of the city's harbour in the XIIIth century by the Lusignan to replace the Byzantines fortress in 1222. The Venetians destroyed the castle in 1570 and the Ottomans rebuilt it. In time it was used as a fortress, as a prison and later as a salt warehouse. Architecturally, the main part of the castle consists of a large square tower with an enclosed courtyard. Its layout consists of a central hall surrounded by smaller rooms. Out of the main building, an extended system of ruins testifies the past presence of a large fortification of the whole harbour. The castle is now used as a museum, a touristic attraction and for cultural events. The transformation of the port, enlarged with new artificial cliffs alters the context of the site. Using photogrammetry and interpreting the traces left in the masonry the present research will present an architectural evaluation of the various phases of the Castle trying to give an informative structure to this "maybe too much iconic" castle.

Keywords: Cyprus, Photogrammetry, Urban Transformation, Fortification, Historical Reuses.

1. Introduction

The Destiny of historical fortifications is clear: restoration, reuse or decay, in any case, they arrive in our present time without their original functions. Their complexity is often only partially perceived by most of the visitors. The case of the Castle of Cyprus is quite emblematic of this series of events. The parts that arrived in our times may give the impression of a small fortification. Still, the system of walls, now reduced to isolated fragments witnessed a larger extension of the overall layout of the fortress in its maximum expansion. In this sense, the present restoration strategy tends to isolate and put in evidence the main and original building, while the previous cliffs are completely altered in their depth and various interventions and reuses seem to "move" to other ages the other remains of the original settlement. The overall impression, at first sight, is all coming from the "castle", which is worthy and has more than one valuable element and characteristic, while the original general defensive system appears not easily readable.

2. The story so far

The castle is located in defence of the city's harbour, standing over the ancient breakwater on the western side of the harbour of Nea Paphos, which is part of the coastal defence system of Cyprus. The position and the articulated events associated with military and political control of the island, as well as natural disasters, led to a certain number of transformations over time. (Ktori, 2018). It was built in the XIIIth century by the Lusignan to replace the Byzantine fortress after it had been severely damaged by a devastating earthquake in 1222 (Baker, 2023). The building at that time may be considered a Frankish tower in a Venetian enclosure. It was part of a system of two towers which were connected by a wall. The Genoese occupied them in 1373, and raised their walls, enhancing the defensive structures (Themistokleous et al., 2007) They also shaped the moat of the castle by cutting off part of the breakwater that connected the

coastal tower to the land. Around 1391, King James I ordered the construction of a castle and some outlying strongholds to defend the city. (De Mas Latrie, 1891). During 1461 the castle of Paphos was given to officers of King James II, then to Queen Charlotte when she returned from Rhodes, and finally to the King once more. (De Mas Latrie, 1886).



Fig. 1- The Paphos Castle, view from the harbour, June 2023 (photo by the Authors).

Lusignan confirms (Father Stephen, 1580), that in Paphos there were "two very strong castles by the sea, whose walls were constantly washed by the waves; the kings of the Lusignan family had provided them with everything necessary for their defence, but since the Venetians became lords and masters of the island, they have completely demolished them and razed them to the ground (Hunt, 1987).

According to the German traveller Dietrich von Schachten, who visited Cyprus in July 1491, one of the two towers near the sea was destroyed by an earthquake two months before he arrived in Cyprus. This earthquake occurred on 24/25 April 1491 A.D. and marked the beginning of the abandonment of the eastern harbour tower. The Czech traveller Oldrich Préfát (1546 A.D.) reports only one square tower in the port of Paphos. It is very likely that the damage suffered by the eastern tower, together with the Venetians'

lack of interest in the fortress of Paphos, led to its further destruction (Aristeidou, 1994).



Fig. 2- The Paphos Castle, interior view of the main court, June 2023 (photo by the Authors).

The Venetians destroyed the castle in 1570, shortly before the Ottomans' conquest of the island. At the moment of their destruction, one of the two towers, the eastern one, had already been in ruins since the end of the XVth century and was further damaged by a new earthquake before its demolition. At this point, when the defence of the island was entering an extremely dramatic phase for the Venetians, they decided to blow up both towers, opting for the defence of the Famagusta-Lefkosia-Kyrenia axis, to deprive the enemy of the possibility of using the fortifications left behind. The Ottomans rebuilt the western tower into the present castle before the end of the XVIth century, in 1592, extending the previous architecture.

The date is attested by the inscription on the large marble slab by Ahmet Pasha (1589-1593) (Lysandrou et al., 2018) placed above the main entrance of the castle. Over time, it was used as a fortress and also as a prison and later as a salt warehouse. The ruins of the eastern tower of the Frankish settlement are still visible at a distance of about fifty metres to the East of the castle. Architecturally, the main part of the castle consists of a large square tower with an enclosed

courtyard in the centre. The ground floor consists of a central hall with small rooms on each of the two large sides. The small rooms were used as prisons during the Ottoman administration. On the upper floor, the main room was used as a mosque and the other rooms served as accommodation for the small Ottoman garrison. Twelve battlements opened up on the roof of the castle to accommodate a reasonable number of cannons. The cannons were removed from the castle during the Ottoman administration in 1878.

Outside the main building, an extensive system of ruins testifies to the former existence of the prior existence of a large fortification of the entire harbour (Fig. 3). With the beginning of the British occupation, the castle lost its military function and was used by the colonial government as a salt depot until it was declared a historical monument in 1935. Since then, it has been maintained by the Department of Antiquities and is considered one of the landmarks of the Paphos district.



Fig. 3- Ruins of fortifications in the nearby of the Castle, June 2023 (photo by the Authors).

The earthquake of 1953 caused large cracks in the walls of the castle. The cracks that came into contact with rainwater were initially filled in as a temporary remedy described. By 1956, all the damage caused by the earthquake had been repaired. During 1968 and 1969, a breakwater was built in the south-western part of the castle to

protect the heavily weathered foundations. (Lysandrou et al., 2018) The castle was intensively repaired after the bombing in 1974 (Karageorghis, 1977).

Over time, the castle has taken on a certain iconic aspect and has become an object of interest and a tourist attraction, (Ktori, 2018) used for a wide variety of cultural events and exhibitions. It was inscribed on the UNESCO World Heritage List in 1980, along with the entire archaeological site of Paphos and other monuments in the region (Lysandrou et al., 2018). The complex architectural history of the castle is not easily readable in the present setup of this fortification. The transformation of the port, which has been extended with new artificial cliffs alters the context of the site and visitors can directly explore three fronts only.

3. The present scenario

The Castle appears as a visible and clear landmark at the end of the public spaces of the harbour (Fig. 1), it is surrounded by restaurants and services for tourists and locals, and it helps in easy orientation in the different directions of this area. These buildings were erected during the British colonisation of the island.



Fig. 4- The Paphos Castle, view of the area (Microsoft Bing, 2023).

These large, stone-built bonded warehouses surrounding the fortress were used to store imported or local products. The castle stands isolated along the sea dam, with a series of bold ruins of fortifications on the left and a large artificial pool on the right. At the edge of the pool, there is a courtyard that has been re-landscaped for a small urban park with services, which, to be honest, does not look very promising. At the back of the castle, there is the new large artificial cliff, which is not easily accessible and has various blocks placed to reduce the possibility of

climbing the wall and moving towards the sea or around the castle. The large, new cliff pushes the waterfront at about 20 metres from the castle and moving in between the stones is possible to reach the side artificial pool and courtyard. To the south, the archaeological area gradually begins, with mixed remains of fortifications and older constructions. The moat extends to the right and ends in a modern, elevated, small theatre. On the other side, 50 metres to the left, we see the ruins of the second mediaeval tower in the sea. The access to the castle is via a long stone ramp with wooden parapets, built "in style" and suitable for all types of visitors. The main door of the entrance is characterised by a marble slate placed during the Ottoman reconstruction with dimensions of 150 x 40 cm and by two vertical wooden elements with grilles. On this slate it is written "By divine grace, the honourable Ahmed Pasha Hafiz of the true Koran built the fortress of Paphos and left a good religious work, namely this very solidly constructed fortress. May God bless its owner, said Atalis. 1592" (Cyprus Tourism Organization, 2023, Accessed: 05/11/2023).



Fig. 5- The marble slate over the main entrance of the Castle, June 2023 (photo by the Authors).

The ground floor entrance is now equipped with various panels and screens illustrating the history of the castle and the surrounding area.

The gatehouse and ticket office are probably made of aluminium and glass is small, showing a modest architectural effort, but draws attention to the central area of the entrance, as the ticket is only required to access the upper floor and the terrace, while any visitor can move freely on the ground floor.

The rooms are spacious and simple, mostly covered by barrel vaults with pin arches. The central intersection of the two passages is covered with a cross vault with pin arches. On either side was, a courtyard opens to the terrace, which is now covered with metal grids. Accessing the terrace on the upper floor takes the climbing of the old stone staircase that offers a beautiful view of the harbour, the sea, and the surrounding areas. Observing the remains of the wall along the sea dam from there gives a better overview of the entire former complex, which shows that the castle was a kind of hinge for the extended fortification of the harbour. The terrace offers a dominant control sight over the sea, and it is recovered and has been made safer by the use of small parapets made of simple iron bars.

The stratification of the building phases is quite readable, with the original main tower being easily recognisable even from the inside thanks to the restorative decision to preserve all the masonry. The same applies to the expansions from the mediaeval phases. The older wall fragment is completely integrated into the Ottoman intervention. This last phase led to the consolidation and reconstruction of various parts and the extension of the first floor, the terrace and the three upper rooms.

4. Quick documentation: using photogrammetry creating a proper base for interpreting the masonry

An essential, but strongly significant building like the Paphos Castle is worth proper documentation, a high-resolution photogrammetry for all the external and internal walls may serve as a valid interpretative tool and a valuable preservation and maintenance instrument.

The present state in the evolution of the photogrammetric tools put them in an extremely valuable condition in front of the need of digitalizing reality (Remondino, 2006). The quality of the achievable results makes photogrammetry a valid alternative to other survey methods (Rodríguez-Navarro, 2012).



Fig. 6- The orthophotos obtained from the photogrammetry in June 2023 (photogrammetry and processing by the Authors).

Thus, for the Paphos Castle a complete and highly detailed photogrammetry seems yet missing from any previous study if not nevertheless the quite simple photogrammetric subject this building is. Previous interventions just published massive or low-resolution models from this build heritage. To create a suitable basis for the investigation of the exterior walls, it was decided to take a complete photogrammetry on-site using the tools available at the time of a tourist visit. A specific campaign was preferred to other “indirect” approaches, like crowd sourcing, which are a valid alternative, but may also show significant limitations (Mancuso & Pasquali, 2016). So, the camera of the OnePlus 8 pro smartphone (now a quite surpassed model, while the present OnePlus counts version 11) became the tool for capturing the whole external front of the castle, using its main camera, based on the Sony IMX689 sensor. The camera was set at its higher resolution, 48 Megapixels, and the lens was set on standard mode (equivalent to a 24 mm in full frame format). The pictures were taken using the

standard camera software from the Android OS (Google Android release 13 and camera software release 5.9) the camera was kept vertical, and the shooting mode was set in “pro” mode to allow the manual setting of all the main features. While the day was a little cloudy, with bright and soft light, it was possible to set the ISO speed blocked to 100 Asa and the shooting speed to automatic, to guarantee the best reduction of the sensor noise and stable quality of the images, avoiding any possible motion blur effect. The short focal length of the lens produced a generous depth of field, keeping well in focus all the masonry, no matter the point of view chosen for the shot, most of the shots were taken with a fully frontal view over the masonry. The overlap between each shot was about one-quarter of the frame, even more when moving around the corners. The general planning for this photogrammetry was done considering processing the whole castle in a single operation, not divided into single fronts, so each passage between one front and the following required a specific series of shots to guarantee a proper

connection with no solution in the continuity of the images. The series of shots followed the walls in a clockwise circle, moving up and down along the walls and the variations of the cliffs and the present shape of the terrain. At the end of the path, the last shots were taken with a generous overlap on the early ones. In this way 439 shots with a resolution of 6000x8000 pixels were taken all around the castle, moving along the main front of the harbour, entering the passage and getting close to the entrance, then moving again along the walls, surpassing the left corner, then climbing the barrier of blocks isolating the new cliff and then changing from block to block in the backside until reaching the pool and then taking a path along its border until meeting again the right corner of the castle. The whole photographic dataset was then processed using Reality Capture (RC) from Epic Games Capturing Reality, which perfectly operated the full reconstruction of the whole model using SfM/IM procedures and the classic following processing based on mesh creation, optimization, and texturing.



Fig. 7- A detail from the photogrammetry of the north-eastern front (the Authors).

The final result is a full mesh describing the whole external masonry surface, made of 800 million triangles capable of producing optimised orthophotos up to 60.000x14.000 pixels (840 Megapixels) for the longer sides. The production of four orthophotos brought to a first

downsampling (directly applied in RC) with the main size reduced to 32.000 pixels making the resulting image more compliant with standard software and more manageable on standard computers. The resulting frontal views are extremely detailed in the lower part of the walls and show only a few sparse artefacts. The effective resolution has pixels of one millimetres at the real size. In the upper part, the entire front of the terrace is more problematic due to the thin metal fences and the low visibility of the inner parts from the ground. Overall, the representation of the main fronts was excellent and while taken with a rapid and pocket-sized tool like a smartphone, it was even more satisfying. About processing, it is worth mentioning that various software tools currently offer direct capture from smartphones, using APP solutions to directly create a textured 3D model, thus, in this case, it was highly preferred to operate in a more "traditional" way, taking the shots and processing them later on, so to fully exploit the resolution of the camera and allowing the best possible quality in the final output.



Fig. 8- A detail from the photogrammetry of the north-western front (the Authors).

5. About the walls

The high-resolution graphic map obtained from photogrammetry allows us to read and interpret the stratigraphy of the masonry by distinguishing the different construction phases, the restoration interventions and all the specific elements that characterise the castle. Also, the state of decay is well depicted, with all the main alterations of the stones easily recognizable, presenting the principal spots, cracks and consumption of the surfaces. This level of detail allows to operate a direct reading even from a distance. The captured system of fronts is then a proper base for reading and understanding the castle even a second time after the visit. The overall aspect of the masonry testifies to a certain uniform use of the materials in single interventions, the past restorations re-integrated large surfaces consumed by the salty sea, by the wind and by the weather, but the result, once again quite eroded by time and agents, appears in good continuity with the older parts. Keeping the use of the same material, probably coming from the same quarry or from the immediate nearby, made possible such a result. The deterioration of the façades appears to be under control overall, with no significant cracks or detachments. The most evident pathology is the patina and consumption caused by the water following the surfaces, which is conveyed by the shape of the building itself, with large paths, where the stone blocks fade into greyish colours. This set of orthophotos is also an efficient documentation of the state of the building in Spring 2023, documenting how a long series of transformations brought in the end to a coherent result, which has an iconic value and at the same time represents a clear landmark in the area.

The full set of the orthophoto is available from the QR code (Fig. 9), in case of use, it is warmly requested to cite the source as specified in the text file included in the archive and the metadata of the images (Verdiani, Charalambous, 2023). Anyone interested in using the original shots or the photogrammetry project is invited to write to the authors for receiving a link to the available original materials.

6. About the future

The present of the castle is clear, left any military, prison, or warehouse uses, it is now an interesting tourist visit, giving a double view, one over the harbour of Paphos, with all its permanent or

temporary settlements, and one towards the past of the fortified Mediterranean. The recent new setup of the cliffs on one side protects the castle from the direct influence of the sea, but at the same time alters its relationship to the original organization of the fortress. The reflection between preserving the "item" or preserving the context should be quite complex and difficult to reach proper solutions. All the interventions around the castle seem to consider it a valuable element part of scenography, where it can turn in colours using LED lighting, appears like the background of a music or dance show and is mostly used as a terrace for taking a look at the landscape. The common destiny of many fortifications and built heritage elements that correctly pass from active, to abandoned and then to recovered items, in the form of some "retired" built monuments, benefiting from their historical value and visited and sometimes admired by visitors. Generally, while the castle itself looks legible and has all the potential for getting complete and efficient access with the completion of a few architectural solutions, the rich system of ruins along the pier would merit a better approach to restoration and furnishing. Appropriate enhancement would improve the readability of the entire system, which, albeit following an articulated sequence of phases, is significant as a whole rather than as a single emerging part.



Fig. 9- The QR code for accessing the shared orthophotos of the Paphos Castle (the Authors).

7. Conclusions

The present research attempts to present an architectural reading of the various phases of the castle to provide an informative structure to this "perhaps overly iconic" castle. The present setup tends to valorise the castle as a single

entity, while the fortification system, which developed over a long time looks vanishing in fragments and partial ruins. A possible virtual recreation of the hypothetical original aspect of the whole area could efficiently take place in the context of the exhibition and in the museum use of the main building. This may help in bringing closer and fascinating the visitors. For achieving this result, contemporary technologies can be used, in particular VR and AR solutions (Guidi

G. et al. 2015), now increasingly usual in the common use of personal devices. Traditional and digitally printed maquettes, VR environments and AR solutions could be of significant help in enhancing this building, establishing an efficient learning, and understanding bridge between the various past events and the present. It is a valuable challenge that will hopefully take place in the future of this castle.

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