

## When an isolated building becomes a guideline for the urban pattern.

### The case of “Torre nostra” in Torreblanca, Castellón, Spain

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**Abstract:** The defence of the Valencian coast (s. XVI-XVII) by building towers visually connected is part of a specific and well-planned defensive network, similar to other countries. Starting from the XIX century, the gradual resolution of this menace has reduced or cancelled the need for many of these fortifications and people start to consider them in different ways, sometimes demolishing them, sometimes using them for housing or other urban use. The case study presented here, the so called “Torre nostra” (“our tower”) in Torreblanca, shows the peculiar aspect of being included as a part of a block of houses facing the sea. The environment around the tower has seen significant changes, the seaside extended, the tower transformed by its new users. After a robust restoration operated in the past years the tower shows now itself as probably it was in its original condition if not for its totally decontextualized condition and the “not so easy” connection to the contiguous houses. In the research carried out within the TOVIVA project<sup>1</sup>, this tower has been digitally drawn by 3D laser scanner and ground and aerial photogrammetry (using a drone). This contribution will present the main characteristics of the documentation work and the processing of the data aimed to reread the original context of the tower and how to present it to local inhabitants, visitors and tourists bringing back suggestions about the original role and features of the tower in its original territorial and historical environment. At the same time, the significant role of the tower as determinant element in the urban plot will be underlined.

**Keywords:** Coastal towers; digital survey; urban pattern; Mediterranean; military architecture

### Introduction

The Torre nostra tower, located on the coast 3 kilometres away from Torreblanca, is part of the defence and watchtowers network of the Valencian coastline erected between the sixteenth and seventeenth century to protect the coast from attacks by Turkish and Berber pirates arriving through the Mediterranean Sea.

Under the reign of Philip II, defence of the coast of the Kingdom of Valencia, as a whole, was faced for the first time. For this purpose, a delegation headed by engineer Juan Bautista Antonelli and the viceroy of Valencia D. Vespasian Gonzaga, travelled along the coast determining which existing towers should be

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conserved and/or adapted to new requirements and which towers should be newly constructed. Thus, the typology of the tower fits the contour of the coastline and its surroundings' defensive needs; as a result, there is not a single model tower, being able to find various types.

From the eighteenth century on, the threat of piracy was reduced and coastal towers lost their defensive function being given different uses: some were abandoned, others were used as housing, others still were integrated into urban centers and others simply disappeared.

The New Torreblanca Tower, known today as Torrenostrá, was affected by several of these factors. On the one hand, urban development around the tower happening at a time when there was no land use regulations in force, resulted in the adjoining of several dwellings to its structure, integrating the tower into a block of buildings situated along the coast. Furthermore, its use as housing significantly altered its morphology, especially externally, rendering a fully transformed tower at the beginning of the twenty-first century, difficult to compare with the rest of towers. Between 2005 and 2006, the tower was restored, allowing the town of Torreblanca to recover this landmark building that had served for centuries in the history of the town and gave origin to the Torrenostrá settlement. Since its restoration, the tower can be visited both during the summer and winter seasons, the latter having previously filled a request at the town hall.



Fig. 1 – Torrenostrá's tower shows the peculiar aspect of being included as a part of a block of houses facing the sea. View of the tower from the drone (Copyright: Rodríguez-Navarro, P., 2015)

Nonetheless, although the tower has today recovered its original appearance, it remains completely decontextualized, located within a very different urban fabric to the original for which it was built, making it difficult to understand its role, remaining hidden in this plot such important elements as the original gateway, or even distorting the level of access. For this reason, one of the set objectives into the TOVIVA project is to obtain three-dimensional models of the Valencian coastline defence and watchtowers, which allow us to interpret and display them in their purest form.

## Description of the tower

The Torrenostrá watchtower belongs to the municipality of Torreblanca, and is situated on the coast in a small urban center named after it. The Torrenostrá settlement is bounded on the south by the Prat de Cabanes Nature Reserve and, on the north, by the Northern Torreblanca Beach. The first documentary reference to the tower appears in the 1673 Ordinances (BOIRA, 2007). Its geographical location makes it visually adjoin the watchtowers of Cap i Corb, at Alcala de Xivert, on the north, and La Sal Tower, at Cabanes, on the south.

The tower was originally isolated and has a square floor plan with 8.70 m on the outer side and 4.45 m on the inner side, resulting in walls 2,27 m thick. It has a total height of 9 m, which allows a three level layout topped by a flat roof that were built there, even going surprisingly unnoticed.



Fig. 2 – Interior view. (Copyright: Giraudeau, S. & Leonardi, A., 2015)

Each floor is composed of a single room at all three levels, topped each by a half barrel vault. Vaults do not follow all the same direction, being the ones at the first and second level placed in one direction, while the one on the third floor is situated in a perpendicular direction. Communication between floors is attained through a spiral staircase with a central turnip located in the southwest corner and running embedded in the wall.

At the bottom of the east and west façades, a sloped basis can be observed with a sharp steepness, being difficult to ensure if it matches the original structure of the wall. From this base, walls rise vertically, being executed with reinforced masonry stones in corners and superiorly topped with a stone cornice. The other two façades are attached to the adjoining buildings.

On the walls, a series of small loopholes finished with stones and masonry are observed. It highlights a lintelled window blinded by the partition wall currently located on the second floor, above the original access door located below the sidewalk level, and today also blinded.

As a result of the 2006 intervention, it has a flat roof enclosed by a perimeter parapet topped by four cylindrical turrets at the corners. Also, a rectangular machicolation was reconstructed on the original entrance, located on the south facade.

### Origin and development of the urban environment Torrenostra

During the sixteenth century, the population of Torreblanca grew significantly as a result of the granting of the Town Charter by the Bishop of Tortosa. In the late eighteenth and early nineteenth centuries, the pirate threat disappeared, leaving the tower unattended. It is from this point that the core of Torrenostra began to consolidate as a fishing village, coming to fish in its waters up to 120 fishing boats under the protection of the tower. In 1896, Torreblanca requested the central government permits to build a dock in order to facilitate the export of oranges, creating new expectations about the area. Added to that, the appearance of the first ice factories contributed to the success of the fishing activity.

In those years, the tower became private property, suffering numerous interventions that made it lose its original appearance. The gateway was opened to the new street situated next to the east façade and the old entrance was obstructed by the construction of housing attached to the south façade. The top crowning of the cover disappeared for unknown reasons and an opening in the east façade, at the level of the first floor, led to a balcony of new construction. The tower then turned into yet another of the houses out of the many that were built there, even going surprisingly unnoticed.



Fig. 3 – a), b), c), Fishing village, seafront limited (Copyright: www.todocoleccion.net) and front view, Torrenostra 's tower, sixteenth century. Copyright: (Boira, J.V., 2007). d), e) f),Restauration and current state, twentieth century (Copyright: Giraudeau, S. & Leonardi, A., 2015)

Slowly and with the passage of time, the typical fishermen's houses, with a ground floor and one or two bays, were built attached to the east façade of the tower in straight alignment with it, which would extend along the seafront limited at that time by a retaining wall that was built to curb the power of the sea water. This is the origin of the current Torrenosta's seafront area.

Finally, permission to build the dock did not arrive, breaking hopes of a population growth, one that migrated to more prosperous neighbouring areas, such as Peñíscola, endowed with important piers, and leaving Torrenosta as a second home for where many families spent their holiday periods.

Since 1960, the growth of sun and sand tourism gave rise to a resurgence of interest in this place, soon becoming a tourist center and holiday resort. The emerging of apartment blocks and new dwellings replaced the old fishermen houses. The old retaining wall was transformed, thanks to the construction of breakwaters, into a wide sandy beach, which needs to be regenerated at certain intervals.

The urban development suffered by Torrenosta in the following years, as it happened in other coastal towns, was spontaneous, due to the absence of urban planning, which were derogated in time. Finally, in 1984, the land-use planning of Torreblanca was approved, which came to regulate the growth and urban development of Torrenosta (LOPEZ OLIVARES, 2002), though it did not provide for the recovery of the tower's original environment. As for the tower, it was declared of Cultural Interest by the Area of Architectural and Environmental Heritage of the Education, Culture, Research and Sports of the Generalitat Valenciana local Government in February 2002, being assigned the BIC 12.05.117-006 catalogue code.

### **Recovery of the virtual environment of the tower**

Lack of protection of the tower and its surroundings over the years resulted in the adjoining of urban structures on the north and south walls, losing its original context. In order to have it recover its prominence and present it in a setting closer to the original one, in April 2015, a group of professors and researchers from the Heritage Restoration Institute of the Polytechnic University of Valencia and the Dipartimento di Architettura at the Università degli Studi di Firenze, conducted a graphic elevation campaign with the aim of digitizing the inner and outer surfaces of the tower, employing different elevation methodologies, such as 3D laser scanning or terrestrial and aerial photogrammetry (drone).

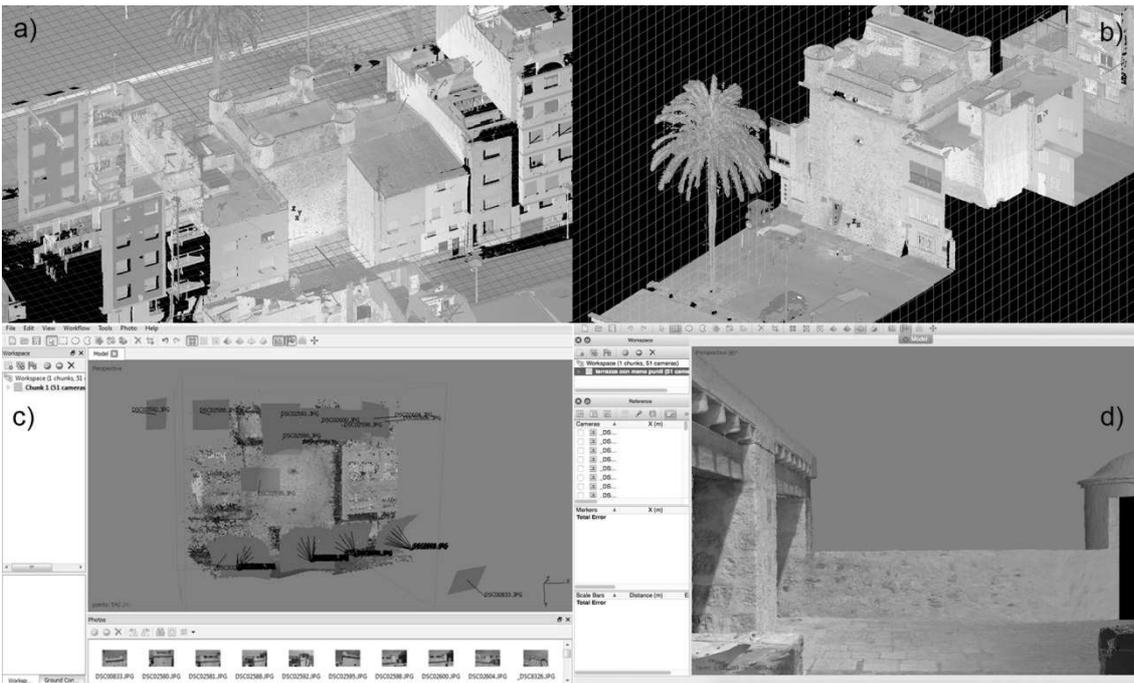


Fig. 4 – a) Leica Cyclone's screenshot with the section plan in red, b) Leica Cyclone's screenshot with a section view, c) Agisoft Photoscan's screenshot process, d) Agisoft Photoscan's screenshot: detail of the roof, mesh and texture. (Copyright: Giraudeau, S. & Leonardi, A., 2015)

For data collection, the following equipment was used:

- Z + F - IMAGER 5006h 3D laser scanner to obtain point clouds.
- Nikon D800 Reflex camera for terrestrial photogrammetry.
- Quadcopter Dronequad manufactured by Dronetools, equipped with a Sony RX100 II camera, with a 20.2 MP resolution, a 13.2 x 8.8 mm. CMOS sensor and Zeiss F1.8 lens with 28-100 mm focal length for aerial photogrammetry.

The elevation campaign, which included graphic elevation of other towers of similar characteristics, lasted 11 days, devoting one to this particular tower. A total of 11 people participated in the field work, distributed into different groups.

To link the point clouds taken with the laser scanner, the use of targets was of great help, the greatest difficulty being to link the data from the different indoor plants, due to the small size of the stairs as the only connecting element between floors.

The use of the drone to perform the work of outside uprising provided images impossible to obtain otherwise. Through aerial shots, we could get pictures from viewpoints unobtainable in any other way. The study methodology also included constructive reading of its current state, identifying its elements and construction systems, though testing or sampling could not be performed.

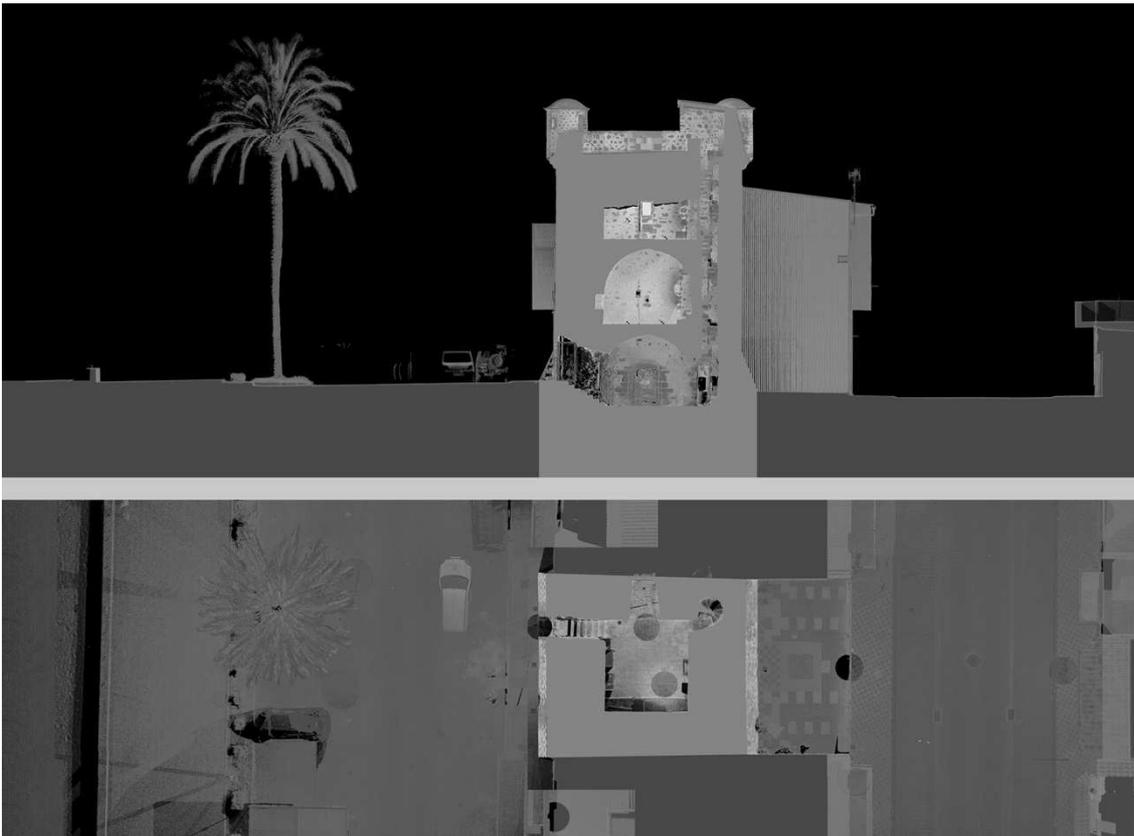


Fig 5 – Plan of the tower produced by Leica Cyclone

After processing all field data and perform the subsequent dihedral planes and three-dimensional models, we have virtually recovered the original image of the tower, even regaining its original entrance, of which there were some remains inside.

Once obtained the three-dimensional model, the tower can be included in an appropriate environment, generating virtual images that allow showing the local population and potential visitors or tourists, the original sense of the tower and its defensive function.

## Conclusions

The present work has allowed concluding that the blind passage located inside, on the south façade of the ground floor, corresponds to the old entrance to the tower, which was closed due to the presence of surrounding buildings. The new entrance to the tower located at present falling to the street facing the sea, shows the level difference between this and the original entry, as seen in the vertical section, elevation matching the street facing its façade.

Throughout this study, we have observed that although the photos before intervention show that it was quite degraded and affected by improper constructions—as openings and balconies—, after the intervention, elements of great interest are noted, though not devoid of a critical reading regarding their authenticity. Finally, the use of virtual images allows the newcomer to approximate to these elements of the past, difficult to see otherwise, especially if they are in advanced stages of deterioration or integrated into urban environments, as in the case of Torrenostra. In this respect, the speed and ease of the data gathering and

processing procedure, as well as the quality of the results obtained, corroborate the rise that these methods are currently taking, also endowed with great precision and economy of means.

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