

JOÃO BARROS MATOS

joaobmatos@uevora.pt  
University of Évora

### ABSTRACT

This paper is part of a PhD research in architecture, carried out at the University of Seville from 2005 to 2013. The research aimed to develop an architectural study of the fortified sets of Mazagan (Morocco) and Ceuta (Spain), in North Africa, and Diu in India. The first bastioned fortifications were built in Africa and Asia by the Portuguese in the decade of the 1540s. We developed a knowledge base that did not yet exist, but that we find essential to the understanding of this heritage and to the future definition of conservation strategies. From a methodological point of view, the research focuses on the field of architectural analysis, as a synthesis that integrates different points corresponding to different knowledge areas, including project and architectural analysis, history of architecture, construction and heritage conservation. Graphic work assumes particular relevance throughout the investigation process.

# FIRST BASTIONED FORTIFICATIONS OF PORTUGAL'S OVERSEAS EXPANSION

## SITING AND RELATIONSHIP WITH THE TERRITORY

At the end of the reign of King Manuel I, the Portuguese crown possessed a vast number of territories spread over half the world and linked by sea – from North Africa to Brazil and India. However, the fortified structures that defended the Portuguese fortresses were still based on

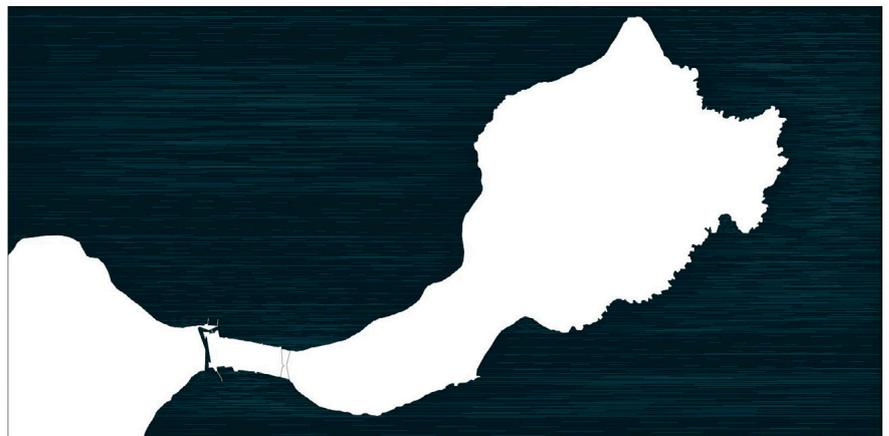


Figure 1 – Map drawn to illustrate the location of the Portuguese fortifications of Mazagan, Ceuta and Diu. Image credit: João Matos

medieval defensive systems and had serious difficulties in coping with the increasing military capacity of Portugal's opponents in a period marked by the rapid evolution of warfare techniques and major changes regarding the form and function of fortifications. In the 1540s, when control of the major strategic points in Portugal's overseas expansion was definitely compromised, the first bastioned fortifications were built in Mazagan (today El Jadida, 1541–42) and Ceuta (1541–49), in North Africa, and Diu (1548–49), in India.

Before the construction of these fortifications, each of the three possessions already had a consolidated set of defensive structures. Mazagan was protected by the Manueline castle built in 1514; Ceuta had a complete set of walls, built largely by the Muslims, later transformed and updated by the Portuguese; and Diu was defended by the fortification built in 1535, which was rebuilt and reinforced in the period between the sieges of 1538 and 1546.

Each one of the bastioned fortifications built in Mazagan, Ceuta and Diu, corresponded to a particular situation and had its own distinct layout, related to the specific geographic conditions and suited to the pre-existing defence structures on site at the time of construction. Despite the differences found between the three fortifications, it is possible to identify a set of common features, particularly as regards choice of site and the relationship with the physical environment. Part of these characteristics are no longer evident in the structures still standing today; however, the interpretation of each set of existing constructions, in parallel with the analysis of the graphic elements of the structures built in the 1540s, allows us to identify some of the more salient common features, among which the following stand out:

- definition of an isolated position in relation to the surrounding territory;
- construction using site features and pre-existing built structures;
- distinction between land front and sea front;
- reinforcement of the system of access from the exterior.

#### **DEFINITION OF AN ISOLATED POSITION IN RELATION TO THE SURROUNDING TERRITORY**

Maritime enclaves – as a mode of territorial occupation in which a defensive perimeter encloses and protects an urban coastal area – have been known to the Portuguese since the conquest of Ceuta. However, the reality imposed by the evolution of artillery, which turned old walled fences into obsolete defensive structures, led to the rethinking of occupation strategies and the need to devise a new concept of fortified town. Coastal fortifications commonly defend a territory or a port against enemies from the sea. In the case of Mazagan, Ceuta and Diu, this logic was turned on its head, through the creation of a defensive system fully facing the land. Designed by those who controlled the war at sea and

wanted to ensure a permanent presence in hostile territory, they are sea fortifications turned landward.

The erection of each of these fortified structures entailed a large territorial operation based on defining an impregnable defensive perimeter. The opening of a wide ditch introduced an abrupt break in the connection with the mainland and created an embedded platform along the coast, surrounded by water and isolated. At the outer edge of this platform a defensive perimeter was built, formed by solid bastioned fronts facing the land, while the fronts facing the sea were composed by plainer curtain walls. Before the 1540s, in regions like Hormuz, Canamor or the first fortress in Diu, the Portuguese had already tested a similar type of siting, although still without the introduction of pentagonal bastions and neglecting a methodical and reciprocal defence system between bastions.

The comparison between the different historical paths of Mazagan, Ceuta and Diu provides an insight into how the relationship of the three fortifications with the surrounding territory evolved in parallel. In Diu, in 1535, the building of the first fortress at the eastern end of the island began with the digging of a sea ditch which circumscribed a plot of land isolated from the mainland, at the edge of which the defensive perimeter was erected. However, the fortification was rudimentary in its nature, with walls, towers and a defensive system based on medieval features. In 1541, the plans for the fortress of Ceuta<sup>1</sup> proposed a similar solution in terms of siting, with the construction of a wide, deep ditch, also used as a maritime channel, ensuring separation between the town and the mainland. The plans introduced the bastioned model and included an improved system of access from the exterior field and from the sea. In the same year, work began on the construction of the bastioned fortress in Mazagan, also fully isolated from the land but in this case with a long ditch that ran along the three land fronts. In Diu, around 1544, in addition to the work to reinforce the land front by introducing robust cylindrical bastions, a new system of connection and access to the exterior field was designed, resembling the plans for the fortress of Ceuta. After the siege of 1546, in front of the ruined land curtains, construction began on the bastioned front with the digging of a new maritime ditch, with the fortress of Ceuta serving as reference.<sup>2</sup> By the end of the 1540s, the three sets of bastioned structures were completed according to the same principles of relationship with the territory.

### CONSTRUCTION USING SITE FEATURES AND PRE-EXISTING BUILT STRUCTURES

Considering the construction effort and the costs involved in a work of this nature and size, the choice of the site and the definition of how the relationship with the surrounding territory was to be established were major decisions in the design process. Since constructions were carried out according to their location in the territory, it was essential that the selected site ensured, from the outset, natural conditions that were favourable to the construction of the fortification. In that sense,

<sup>1</sup> Project by Benedetto da Ravenna in collaboration with Miguel de Arruda.

<sup>2</sup> The person chiefly responsible for the Ceuta influence on the bastion front erected in Diu was João de Castro, who had visited the construction work at Ceuta in 1544.

based on a thorough knowledge of the site and context, it was essential that the design of the fortified system enhanced the specific conditions of the place and, at the same time, considered the incorporation and reuse of pre-existing structures.

In the case of Mazagan, the choice of location and the setting of the fortress were determined by the intention to incorporate the pre-existing Manueline castle, which lies approximately at the geometric centre of the complex. In this case, the location and the scale of the bastioned perimeter required the execution of several highly difficult tasks, such as the construction of a significant part of the complex in the sea and the opening of long ditches in the rock mass.<sup>3</sup> Of the three fortresses, Mazagan was the one where this type of siting involved the greatest construction effort given the scale of the complex and the fact that the physical and geographical characteristics of the site were not favourable.

In Ceuta, on the contrary, the project for the bastion fortress was carried out from the very beginning in such a way as to enhance the peculiar natural conditions of its location. Bastions, curtains and repairs on the bastioned land front were carried out by integrating the ancient walls into the new construction.<sup>4</sup> At the same time, the construction of the ditch/channel made use of the natural depression at the site. A new system of access from the exterior field was established – a side entry protected against assault from land – leading to a reduction in the defensive perimeter and the demolition of an existing urban area. In fact, Ceuta's fortress is a case in point, in that a construction process based mainly on transformation and reuse of the pre-existing site and constructions resulted in a new modern and uniformly built complex.

In Diu, the option to build a bastioned front ahead of the existing walled front resulted from the state of disrepair in which the latter stood following the second siege, and was motivated by the urgency to recover the defensive power of the fortress. In this case, in view of the ruined front, a new ditch was cut out of the rock, and new curtain and bastion ramparts were built directly on the rock mass. After the closing of the new perimeter and once defence of the whole complex was ensured, the old curtains were rebuilt within the perimeter, now in a second line. In Diu, as in Ceuta, the bastion complex took full advantage of a very favourable location, allowing the creation of a large, modern fortification with a relatively controlled construction effort.

#### DISTINCTION BETWEEN LAND FRONT AND SEA FRONT

In the three fortresses there is a clear difference between the defensive capacity of the land fronts – formed by powerful bastioned fronts – and the sea fronts, consisting of narrower curtains where the use of artillery was not considered. Indeed, in this period, the sea fronts of Portuguese fortifications rarely included artillery.<sup>5</sup> In the case of Ceuta and Diu, the sea fronts were largely based on the pre-existing curtains. In the case of Mazagan fortress, where the fortified perimeter was designed and built

<sup>3</sup> During the construction work, João de Castilho, who was responsible for the project, complained in a letter to the king about the difficulties of building in the sea in face of the great autumn storms: *And may God forgive those who knew of the storms of this land of the Northwest, and when this work was undertaken did not utter a word of advice, and may Your Highness believe that the waves of this sea are ten fathoms high.* Letter from João de Castilho to King João III, September 1542; BN, codex 1758, pp. 143–144v (Moreira 2001, 138). Luís de Loureiro, captain of the fortress, in a letter to the King, also mentions the great difficulties he faced in building the Angel bastion (Mazagan) (CENIVAL et al., 30–32).

<sup>4</sup> The text by Benedetto da Ravenna explicitly states how the pre-existing structures should be incorporated into the new building, namely by “jacketing” the curtain wall (Matos 2012, 261–274).

<sup>5</sup> King João III himself, at the time when the plans for the Mazagan fortress were being defined, stated that there was no need to include artillery on the sea front. Cf. letter from King João III to Miguel de Arruda; BN, codex 1758, pp. 7458–7459 (Moreira 2001, 98–100).

as a whole from the outset, there is also an explicit difference between the profile of the land fronts and the sea front, with the latter having a significantly narrower rampart and no artillery.<sup>6</sup> In each of the fortifications, this difference is expressed clearly in the intersection between the sea and land front: with a demi-bastion, consisting of a single flank, facing the land where the artillery power was concentrated, exhibiting a coplanar face with the sea curtain and no gunboat.

Sea curtains worked as watch posts in the control of maritime routes, and played an important role in ensuring good access to the sea and good conditions for the supply of the fortress in periods of siege. Thus, maritime gateways were strategically located to protect against attacks from land and provide vessels with a safe approach and landing.

### REINFORCEMENT OF THE SYSTEM OF ACCESS FROM THE EXTERIOR

In each of the fortifications, access from the exterior field was made through an elaborate system of doors and antechambers, preceded by the other external constructions. Mazagan was the only fortress where access was achieved via the land front, exposed to artillery attack. In this case, the access system was reinforced by the presence of the Governor's Bastion<sup>7</sup> – now demolished – located in the middle of the land front and protected by the side bastions. From the exterior, entry was achieved via a double-leaf drawbridge over the ditch. This provided access to the bastion's interior, with two rooms and three gates that provided a connection to the inner court. Across the bridge and ditch the defensive system was complemented by outworks which included a simple layout of ravelins.

In the case of Ceuta, access to the outer gate from the exterior field was gained from an area protected against the attack of enemy artillery from land and included an advanced section of the wall – now lost – which corresponded to the *albacar* door. From here, access to the interior of the fortress was provided by a drawbridge over the ditch, leading to a gate that, similar to the construction in Mazagan, included two interior rooms and three doors. In the exterior, ahead of the extensive bastion front, the outworks ensured different defensive levels.

In Diu, the construction of the system of access from the outside – which is still standing – preceded the construction of the bastion front by two years. Here again access was achieved via an area protected against enemy artillery, which included a hallway platform in front of the northern curtain wall, surrounded by water and under the protection of the bastions and the sea fort. This platform was connected to the precinct that preceded the fortress gate via a drawbridge. The way the system was linked to the defensive perimeter and the succession of spaces preceding the fortification gate show strong parallels with the plans for the design of Ceuta fortress, which had been proposed to King João III three years earlier. However, it is not possible to confirm whether in that precise moment the Ceuta project, which was also undergoing construction, could have had any direct influence.

<sup>6</sup> All gunboats that exist today on this front correspond to construction work carried out by the Moroccans between the second half of the 19th and early 20th century.

<sup>7</sup> The governor's bastion, in whose form and exceptional typology it is possible to recognise the influence of the entrance bastion to Fortezza da Basso in Florence, by Antonio da Sangallo the Younger (Matos 2012, 421).

The study of these three cases in parallel allows us to identify a specific model of maritime fortification which was adjusted to the needs of Portugal's overseas expansion and had a set of common characteristics, namely as regards siting and the relationship with the surrounding territory. As the first bastioned fortifications built outside Europe on the shores of the Atlantic and the Indian Ocean, each of the three fortresses was to play a pioneering role in disseminating the bastion system globally. However, the rapid pace of change in the form and functioning of fortifications, typical of this period, meant that fortresses built by the Portuguese in the following decade had significantly different characteristics, namely in terms of scale, relationship with the surrounding territory and morphology.

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