

CODE 88**TIDE MILLS IN FARO, PORTUGAL
PROPOSAL OF A PEDESTRIAN ROUTE****Gonçalves, Marta Marçal¹**

1: University of Algarve, Higher Institute of Engineering, Civil Engineering Department, CEAACP- UAlg
e-mail: mgoncal@ualg.pt, web: <https://orcid.org/0000-0002-0887-7734>

ABSTRACT

With the Algarve having a predominantly Mediterranean climate, the invitation to make pedestrian walks is something with which Nature itself collaborates. Proposing new pedestrian paths in the city of Faro, based on cultural heritage, is something that is obviously part of this territory. The reasons for writing this paper relate to the issue of valuing vernacular heritage that is not yet recognized as cultural heritage by most people and its preservation for future memory. The research was based on bibliographical, webgraphic and field surveys and the framework of this proposal is pedestrian cultural tourism, which is a sustainable way of doing tourism and knowing the cities. The purpose of this paper is to draw attention to a heritage that goes unnoticed by most people and that has a tourist potential that can be very important, especially in the Algarve region (southern Portugal), of which the city of Faro is the capital, as it is a highly touristic region. During the development of the research was identified the location of several tide mills in the city of Faro, although most are in ruins. However, these places and ruins are part of the collective memory and deserve to be disclosed and valued, showing tourist potential. The novelty of this work are the objects of study: the tide mills of the city of Faro. In this city, the vast majority of this vernacular heritage goes completely unnoticed, especially for those who do not live in the city. Drawing attention to these elements, the competent authorities are expected to be more committed to their preservation and enhancement.

KEYWORDS: Vernacular heritage; Cultural tourism; Heritage preservation; Collective memory; Algarve.

1. INTRODUCTION

The tide mills fell into disuse and, like all vernacular heritage when it lost its usefulness, were eventually abandoned, assigned new functions, or are in ruins or have disappeared. Currently, the remaining ones are at serious risk of disappearing, namely those from the city of Faro, the district capital of the Algarve in southern Portugal. In the Algarve the tourism sector is what contributes most to the region's revenues, but in recent years the demand for cultural tourism has been increasing. In this sense, this proposal, although being a first approach to the subject, is still beginning to be researched, is current and shows potential. The scope of the article is the cultural heritage as an important differentiating factor of the global city and the cultural icons as promoters of pedestrianism. The proposed pedestrian path aims to provide a tour near the city of Faro under a different point of view. Thus, it will be a promoter of walking and become a cultural icon.

A pedestrian circuit defined by the location of the old tide mills in Faro is proposed and we intend to give knowledge of the buildings that constituted them, as well as the landscape where they are included. This proposal, based on the cultural heritage and the discovery of the natural heritage, is sustainable, because it has a base: (a) economic, once it lies in the area of Faro, where there is more trade and at the same time, it encourages cultural tourism; (b) environmental, since the landscape of Ria Formosa is a

natural element and since one of the goals is the promotion of walking, which constitutes a non-polluting travel mode; (c) social, since the collective memory about tide mills still exists, and, being a pedestrian pathway, it promotes interactivity between people; (d) cultural, because it relates to vernacular cultural heritage buildings, contributing to its preservation and dissemination. These goals have been achieved in this proposal because it conceives a circuit defined by the location of some of the ancient tide mills that exist in the Eastern part of the city of Faro, thus enabling the pedestrians to get acquainted with the milling culture of this town, the existing and ruins of the tide mills, as well as the landscape where they are located.

To prepare this paper, an unpublished academic work, presented by Filipe Cunha in the subject of Architectural and Cultural Heritage, Specialization in Sustainable Cities in the University of Algarve, served as a starting-point. The research was based on bibliographical, webgraphic and field surveys and the framework of this proposal is pedestrian cultural tourism, which is a sustainable way of doing tourism and knowing the cities. The reasons for writing this paper relate to the issue of valuing vernacular heritage that is not yet recognized as cultural heritage by most people and its preservation for future memory. The purpose of this paper is to draw attention to a heritage that goes unnoticed by most people and that has a tourist potential that can be very important, especially in the Algarve region as it is a highly touristic region.

These mills had a lot of potential because they used free energy, but with the appearance of fossil energies and later electricity, these mills became obsolete because they were not as efficient as those which used the new energies. However, tidal energy is used again, and there are already power plants that take advantage of this driving force, such as in the area of Saint-Malo in France [1].

The novelty of this work are the objects of study: the tide mills of the Easter part of the city of Faro and which differs from the work of Filipe Cunha, which covers all the mills still existing in Faro. In this city, the vast majority of this vernacular heritage goes completely unnoticed, especially for those who do not live in the city. Drawing attention to these elements, the competent authorities are expected to be more committed to their preservation and enhancement. During the development of the research the location of several tide mills was identified, although most are in ruins or are totally lost. However, these places and ruins are part of the collective memory and deserve to be disclosed and valued, showing tourist potential.

2. FRAMEWORK: THE CITY OF FARO, THE RIA FORMOSA AND THE TIDE MILLS

Faro is a Portuguese city located in the south of the country and is the capital of the Algarve region (Figure 1). The Algarve, today known for its beaches, turned from one of the poorest regions of Europe into the second richest in Portugal, due to the tourist industry. The tourism sector is the biggest booster of the local economy, so the proposal presented in this article has relevance and utility. The first reference to Faro dates back to the 4th century BC, about the time of Phoenician colonization of the Western Mediterranean. It was designated by *Ossónoba* and constituted one of the most important urban centers in the South of Portugal, playing the role of a trading post for agricultural products, fish and minerals [2]. After the Roman and Visigoth domination – from 2nd century BC until 8th century AC – Faro was taken by the Arabs in 713. In the 9th century it was the capital of an independent Principality and was fortified with a first line of walls. The name of *Ossónoba* was replaced by that of *Santa Maria do Ocidente*, designation that would last until the 11th century, when the name was changed to *Santa Maria Ibn Harun*, a name which evolved into *Harune* [2]. With the foundation of Portugal (1143), the reconquest of the territories occupied by the Arabs began and Faro was conquered during the reign of Afonso III in 1249. It was then called *Santa Maria de Faaron* or *Santa Maria de Faaram*, name that evolved for the current assignment: Faro [2]. Due to its geographical position, its safe harbour, salt trade and the exploitation of agricultural products from the interior territory, Faro became a prosperous city in the following centuries [2]. With the Portuguese Expansion and Discoveries (1400-1520), these trades increased and contributed to the city's commercial flourishing. In 1499, during the reign of King Manuel I, drastic changes in the morphology of the city took place, having been created several

equipments. Faro was elevated to a city in 1540 by King João III, and in 1577 the residence of the bishop was transferred from Silves to Faro [2].



Figure 1: Location of Portugal, the Algarve region and Faro (left: Wikipedia, Portugal no Mundo, 2014; right: Wikipedia, Faro, 2014).

In 1596 the city was sacked and burned by the British troops led by the Count of Essex, having inflicted enormous damages to property and materials. During the 17th and 18th centuries the city expanded with a new defensive line consisting of a ring of walls built during the Restoration War (1640-1668) [2]. In the 1st November, 1755, there was the Great Earthquake that devastated Lisbon and caused catastrophically damage and destruction, especially in the Algarve. In Faro, the defensive walls, the castle with its towers and defensive bulwarks, quarters, prison, the convents of San Francisco and Santa Clara, among others, were ruined or even destroyed [2]. During the 18th century and early 19th century the defensive walls (Cerca Seiscentista), built in 1660 in Vauban style, suffered a progressive degradation, either due to the Earthquake (1755), the Napoleonic wars (1807,1809 and 1810), or the civil war between liberals and absolutists (1828-1834), remaining currently only a small part [3]. Until the 19th century, the city remained within the bounds of what was left of the defensive walls of the 16th century [2]. Its design is still perceived in the division of properties and urban morphology of that part of the city [3]. In the last decades Faro expanded like any other district capital city due to tourism and the University of the Algarve, which are simultaneously factors for the development of the region and centres of attraction for people from out of town and out of the region.

The Ria Formosa is an important lagoon area that includes submerged areas, is located in the Algarve Sotavento (western part of Algarve), covering the municipalities of Faro (about a third of the county consists of the Ria Formosa), Loulé, Olhão, Tavira and Vila Real de Santo António [4]. This lagoon area has a high ecological, scientific, economic and social value. However, due to increasing touristic activities, it has suffered several pressures [4]. This lagoon system was declared a Nature Reserve in 1979 and later, in 1987, was renamed as Natural Park [5], now known as Ria Formosa Natural Park. Much of its area is occupied by the lagoon system which is the most important wetland in southern Portugal and, due to its internationally recognized ecological importance, it is covered by the provisions of the Ramsar and Bern Conventions. It was considered by the Wetlands Directory of the IUCN (International Union for Conservation of Nature) as “a wetland of world interest, belonging the Park itself to the list of Corine Biotopes” [5]. This Park is also part of the Natura 2000 Network and is also considered, in the European context, as an Important Bird Area (IBA) [5]. The tide mills of Faro settled in this park, where there is also agricultural land, salt pans and the limit of the city.

Hydraulic mills have existed since ancient times, with reports that they existed since the beginning of the Christian era, and it was the Greeks and Romans who were responsible for their dissemination in Europe and the Mediterranean. In the year 63 B.C. there is a reference to a hydraulic mill existing in Cabira, current Turkey, in the palace of Mitríades VI [6], which attests to the antiquity of this type of grinding technique. A tide mill is a mill that takes advantage of the driving force that is obtained between the hydraulic potential that the high tide and the low tide originate. For such unevenness to exist, these

mills had a component that was fundamental, the *boiler* (*caldeira*), which are large walled spaces, like a pool, with ponds, which were filled in the high tide, taking advantage of the principle of communicating vessels, closed when full. When the tide was low, the water passed under the mill to drive the millstones because the difference in level between the two tides made the *caldeira* water had enough energy to make the millstones work. Then one had to wait again for the high tide to refill the *caldeira* and empty it again in the low tide (Figure 2). In the area of Faro, the difference between tides is about three meters [7].

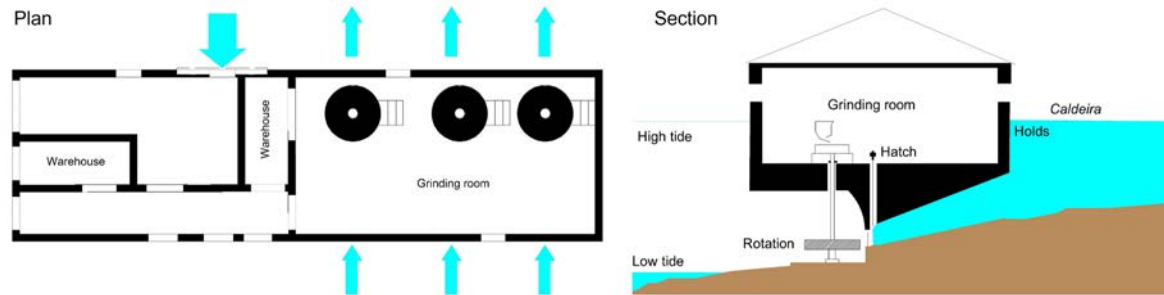


Figure 2: Schematic diagram of the operation of a tide mill. Plan (authors) and section (authors based on [8])

The record of the first tide mills in the Algarve region are from the 12th century, in the region of Castro Marim (eastern) and later in the 14th century, in Tavira (eastern) and Faro. The production of salt and the mills were property of the crown, which shows the economic importance of these structures [9], including also in the Charters of Silves (western), Faro and Tavira that all rights were reserved for the King and his descendants [6]. These rights were later transferred to members of the nobility and clergy. With the Liberal Struggles (1832-34) the mills became the property of the bourgeoisie and, as a result of the emergence of new technologies which were more efficient, these traditional systems devalued eventually being acquired by the miller's own. Some of them were even in operation until the mid-20th century. Subsequently, salt extraction would be more economically attractive, because many of the *caldeiras* of these mills were used for this purpose. On the edge of the city of Faro, where the lagoon of the Ria Formosa is located, this presented a logic of continuity for the agricultural spaces that existed around the city that expanded little by little. Slowly agricultural activities were associated with the usual practices in the Ria: salt production, seafood nurseries, fish farming and cereal milling [9]. All this was possible due to the orography of this site, the availability of vast areas to delimit the respective *caldeiras* and the conditions it presents in relation to safety due to sea swell. As cereal production was close at hand, in agricultural areas, being able to take advantage of the tidal force associated with the need to grind cereals, the existence of tide mills seemed logical, and mills deployed in the surroundings of the main urban agglomerations located in the Ria Formosa. In this way, the mills became fundamental to the local economy, especially when the population growth of the main localities of this territory was felt. In such a way this happened, that, in the beginning of the 19th century, in Faro, the concentration of tide mills was greater than that which was verified in any other area of Portugal, having existed about fourteen mills [6].

3. THE PEDESTRIAN PATH “FARO’S TIDE MILLS”

With the Algarve having a predominantly Mediterranean climate, the invitation to make pedestrian walks is something with which Nature itself collaborates. Proposing new pedestrian paths in the city of Faro, based on cultural heritage, is something that is obviously part of this territory. The proposed path is developed in the eastern part of Faro, because it is where there is currently a greater concentration of the former tide mills (Figure 3). All the maps were elaborated by the authors and based on [10]. In most of the elements that make up this pedestrian path there are only ruins of the old mills or the buildings have already been much changed currently having new functions. When implementing this route, it is proposed to use QR Codes in the places where the mills existed, thus accessing the historical information and images of how the mill structure would be at the time it existed as such. As it is not possible to

access all the places where there were mills in a first phase, either because they had difficult access, or because they were in private property, it was interesting to create walkways that did not disturb life too much in the marsh, facilitating and controlling pedestrian access and allowing the enjoyment of people with reduced mobility. In Table 1 we can see the location and the pictures of the mills that are part of the proposed path.



Figure 3: Pedestrian path proposed under the theme of the tide mills to the city of Faro (authors)














3.1. Palmeira's mill

Located near the mills of Filharoca and A Grelha, currently the former mill was changed and acquired new functions, and is occupied with structures to support a fish farm that uses the old, still noticeable *caldeira* (Table 1, a). The first reference to this mill dates from 1723 and its name relates to the existence of a large palm tree that may have existed in this place. Currently there is still a palm tree next to the premises, although it is not believed to be the original (Table 1, b). Due to the fact that the space was sealed it was not possible to obtain photographs of the place, until the date of preparation of this work.

3.2. Filharoca and A Grelha mills

These two mills are located in a small bay known as "Praia dos Estudantes" (Table 1). Currently and with great difficulty, we can still glimpse some remnants of these mills. The date of the first reference to the Filharoca mill is 1753 and until the end of the 19th century it had several owners and designations. Its current name comes from the 20th century and comes from a family of millers, who was its owner, the Filharoca and who kept it in operation until 1920 [6]. Currently the area occupied by the *caldeira* and the mill is grounded and is partially occupied by precarious buildings (Table 1, a). The mill of A Grelha was owned by Henrique Lopes (in 1723) and in the mid-20th century by António Grelha [6]. There are practically no traces of this mill, being very difficult to locate its foundations. The view of the Ria Formosa is very beautiful and with potential (Table 1, b).

Table 1: Location and pictures of the mills (authors)

 <p>a</p>	 <p>b</p>	<p>Palmeira's mill. a) location; b) you can see a palm tree far away, where would be the location of the Palmeira's mill. In the foreground, the area where the Filharoca mill would be, where the precarious buildings are seen, that currently occupy part of the area where the <i>caldeira</i> and the mill were (authors)</p>
 <p>a</p>	 <p>b</p>	<p>Filharoca (A) and A Grelha (B) mills. a) location; b) view of the Ria Formosa in the area of this mills (authors)</p>
 <p>a</p>	 <p>b</p>	<p>Francisca Grelha's mill. a) location; b) current appearance of the older mill (authors)</p>
 <p>a</p>	 <p>b</p>  <p>c</p>	<p>Mills of Manuel Lázaro (A), Assentista or Manuel Rita (B) and Ponte Grande (C). a) location; b) current appearance of existing buildings on the site of the old mill of Manuel Lázaro; c) the traces of the mill of the Assentista (authors)</p>
 <p>a</p>	 <p>b</p>	<p>Trindade's mill and São Francisco mill. a) location of the Trindade's mill (A) and São Francisco mill (B). On the left can we see the <i>caldeira</i> that this mill had in common with the mill of San Francisco, whose relative location can be appreciated; b) north view of Trindade's mill (authors)</p>
 <p>a</p>	 <p>b</p>	<p>São Francisco mill. a) view from north and east; b) view from south (authors)</p>

3.3. Francisca Grelha's mill

In 1723 it was owned by Pascoal Gomes and later belonged to several owners. In 1918 Francisca Palmira Grelha inherited this mill from her husband, hence its name. It is located near the area of Bom João, was in operation until 1968, being, at that time, the only mill to operate in the region [6] (Table 1, a). It has now been converted and in its facilities, very mischaracterized, a bivalve purification center is in

operation, which can be visited. You can still see the arches through which the water passed to move the millstones (Table 1, b). It is no longer possible to understand where the mill *caldeira* would be, although we have obtained the oral information that the *caldeira* would have been grounded and located north of the mill, which can be confirmed by the existence of the arches at the base of the mill.

3.4. Manuel Lázaro's, Assentista's or Manuel Rita's and Ponte Grande's mills

These three mills are very close to each other, so the place is known as Esteiro dos Moinhos (Mills Banks). They are located near the access to the commercial pier of Faro (Table 1, a). The mill of Manuel Lázaro owes its name to one of its owners in the late 19th century, and its origins have not been yet identified [6]. Currently the place where this mill would be is occupied by buildings supporting fishermen and shellfish gatherers (Table 1, b) but it is still possible to see what would be the old *caldeira*. The Mill of Assentista, also called Manuel Rita has as its first reference the date 1723 and was one of the smallest existing mills on the city limits of Faro. Later, until the end of the 18th century, it was owned by Álvaro Pestana and his heirs. After the owner was Manuel Rita, who was a miller, it was acquired by António Neves Pires in 1953 to Rita's descendants [6]. Currently there are only a few traces of this mill, but still can be seen the location and size of the old *caldeira* (Table 1, c). The Ponte Grande's mill has this name since the 18th century and this comes from a bridge through which it was accessed [6]. It may have had a considerable size, but it was not possible to prove this because there is no access to its location any more.

3.5. Trindade's mill

It is located near the São Francisco mill, near Largo de São Francisco, the Convent of São Francisco and the "Vila Adentro", the walled city (Table 1, a), A). In 1718 the first record of this mill appears, which has in common part of its *caldeira* with the *caldeira* of the mill of San Francisco. Despite having been in ruins for several years, it appears in a plant designed as New Mill in 1870. In 1933 its *caldeira* was transformed into salt pans [6]. Currently it is in ruins, with some parts still remaining (Table 1, b).

3.6. São Francisco's mill

The São Francisco mill is located near the city of Faro, its São Francisco Square and São Francisco Convent. We arrive at what remains of this old mill walking through old salt pans where several species of flora and fauna proliferate. From here part of the city of Faro and the walls that define the "Vila Adentro" can be seen. It is believed that this will be one of the oldest mills in the city, having reference to this mill in the 17th century. In 1932, no longer in operation, its *caldeira* was converted into salt pans (Table 1, a) in Trindade's mill) and its buildings into warehouses [6]. Currently it is abandoned, but you can still see, at low tide, the arches that gave way to the water of the ria, under the buildings (Table 1, São Francisco mill).

4. FINAL CONSIDERATIONS

In the city of Faro, between the 18th and 19th centuries, the number of working tide mills was significant, so this heritage should be evidenced since it is part of the local identity and makes the bridge between the city and the Ria Formosa, or otherwise, it bridges the gap between cultural and environmental heritage. Although most of these mills are in ruins or have even disappeared, this path can be a new tourist and cultural proposal to add to the existing ones in Faro, having as structuring element the relationship between the city and the Ria Formosa. For all the reasons presented, the tide mills of Faro deserve to be valued and maintained their memory, that is part of the way of life of the city and its collective memory. As future developments, it is hoped to expand this study to other mills still existing in Faro and also in the Algarve and try to implement this path into the city's tourist offer, what could be an opportunity to rebuild these heritage elements.

5. BIBLIOGRAPHY

[1] EDF. *L'usine marémotrice de la Rence* <https://www.edf.fr/usine-maremotrice-rence/presentation> (accessed: August 2023).

- [2] Faro, Câmara Municipal de. *Das origens à atualidade*. <https://www.cm-faro.pt/pt/menu/78/faro-na-historia.aspx> (accessed: July 2023).
- [3] Paula, RM. e Paula, F. Faro, evolução urbana e património. Faro: Câmara Municipal de Faro, 1993.
- [4] Florestas, Instituto da Conservação da Natureza e das. *Parque Natural da Ria Formosa*. <https://www.icnf.pt/conservacao/rmapareasprotegidas/parquesnaturais/pnriaformosa> (accessed: July 2023).
- [5] A importância da Ria Formosa para as aves. *Natura Algarve*. <https://www.natura-algarve.com/blog/2015/02/27/a-importancia-da-ria-formosa-para-as-aves/> (accessed: July 2023).
- [6] Santos, LFR. Os moinhos de maré da Ria Formosa. Parque Natural da Ria Formosa, 1992.
- [7] Marinha Portugal. Hidrográfico. *Instituto Hidrográfico*. <https://www.hidrografico.pt/> (accessed: August 2023).
- [8] GURUPEZ. *Os 'Grelha' e a Praia dos Estudantes*. <http://gurupez.blogspot.com/2012/02/os-grelha-e-praia-dos-estudantes.html> (accessed: october 2023).
- [9] Barão, M. Os sistemas produtivos da propriedade do Moinho dos Penteados: a moagem de cereais com águas de origens distintas e a produção de sal. *Anais do Município de Faro, Volume XLII*. Faro: Município de Faro, 2020.
- [10] Faro, CM. *Mapas de Faro* <http://mapas.cm-faro.pt/> (accessed: July 2023).