

# HISTORY AND ARCHITECTURAL CHARACTERISTICS OF THE IRON BANDSTANDS IN BELÉM, PARÁ

*HISTÓRIA E CARACTERÍSTICAS ARQUITETÔNICAS DOS CORETOS DE FERRO EM BELÉM, PARÁ*

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## Abstract

From the late 19th to the beginning of the 20th century, Belém - Pará, northern Brazil - underwent a comprehensive urban and architectural renovation. The transformations in these Amazonian lands, the rubber cycle's outcomes, included the construction and renovation of squares which were remarkably equipped with prefabricated iron bandstands imported from diverse European countries. Several buildings have remained in the city's landscape but have been little researched and documented. Meanwhile, they suffer from weathering (mostly corrosion) and inappropriate anthropic actions allied to the absence of proper maintenance, gradually losing their features and pieces. As these facts are a significant challenge to their conservation, this paper aims to document Belém's eight remaining iron bandstands by investigating their historical trajectories and architectural characteristics as preservation subsidies. The methodological approach was divided into two phases: 1) historical and iconographic study; 2) architectural documentation and analysis. The research's products consisted of two-dimensional drawings, registration forms, and a comparative analysis of the buildings assembled within Belém's historical center. The process allowed the detailing of their backgrounds, origins, and dating. It produced consistent graphic documentation whose interpretation highlighted various architectural and technical solutions due to the uniqueness of each structure. This data advances the knowledge about this kind of building in heritage conservation and construction history, grounding the conclusion that industrialization processes do not define them as homogenous structures.

**Keywords:** music pavilion, harmonic pavilion, industrial heritage, iron architecture, street furniture.

## Authors' contribution:

**TTSO:** conceptualization, data curation, investigation, methodology, project management, validation, visualization, writing - original draft, writing - revision and editing. **FOP:** conceptualization, data curation, investigation, methodology, supervision, validation, writing - review and editing.

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## Resumo

*Do final do século XIX ao início do século XX, Belém - Pará, norte do Brasil - passou por uma ampla remodelação urbana e arquitetônica. As transformações ocorridas nessas terras amazônicas, resultados do ciclo da borracha, incluíram a construção e reforma de praças que foram notavelmente equipadas com coretos de ferro pré-fabricados importados de diversos países Europeus. Vários desses edifícios permaneceram na paisagem da cidade, contudo têm sido pouco pesquisados e documentados. Enquanto isso, eles sofrem com as ações do intemperismo (principalmente corrosão) e antrópicas inadequadas aliadas à ausência de devida manutenção, perdendo gradualmente suas particularidades e peças. Sendo estes fatos um grande desafio para a sua preservação, este artigo objetiva documentar os oito coretos de ferro remanescentes de Belém por meio da investigação das suas trajetórias históricas e características arquitetônicas como subsídio de conservação. A abordagem metodológica foi dividida em duas fases: 1) pesquisa histórica e iconográfica; 2) documentação e análise arquitetônica. Os produtos dessa pesquisa consistiram em desenhos bidimensionais, fichas de documentação e na análise comparativa dos coretos situados no centro histórico de Belém. O processo possibilitou o detalhamento de seus contextos, origens e datação. Produziu também documentação gráfica consistente cuja interpretação destacou uma variedade de soluções arquitetônicas e técnicas devido a singularidade de cada estrutura. Esses dados avançam o conhecimento acerca desse tipo de edificação nos campos da preservação do patrimônio e da história da construção, fundamentando a conclusão de que os processos de industrialização não as definem como estruturas homogêneas.*

**Palavras-chave:** pavilhão de música, pavilhão harmônico, patrimônio industrial, arquitetura do ferro, mobiliário urbano.

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## **Introduction**

Iron has been widely used for architectural purposes in many manners. Its application throughout the centuries, specifically cast iron, was a gradual nonlinear process (SILVA, 1986) that evolved into a building technique called “iron architecture”. According to Higgs (1970) and Silva (1986), it concerns the construction of buildings mostly made of iron, in structural and other constructive aspects, and in which the material is applied as the primary vehicle of aesthetic expression.

Iron architecture’s origins can be traced back to Europe in the 18th century, amidst the Industrial Revolution, scientific and technical breakthroughs, metallurgical innovations, and drastic changes in the social scene. From that moment, there was a large production of iron (PERVSNER, 1995) which became more affordable than traditional building materials (DOBRASZCZYK, 2012). It was largely explored in the construction industry, mainly and firstly used in new architectural programs, like factories and railway stations, but eventually reinterpreted already known types as markets, chalets, and bandstands (SILVA, 1986; PEVSNER, 2001).

Before the industrial era, bandstands - also called music or harmonic pavilions - were already familiar structures. They date back to ancient periods and have received the influence of several civilizations and multiple uses over time. However, in the mid-19th century, cast iron was broadly incorporated as the building material and means of stylistic creativity for this kind of construction - an effect of the iron architecture’s success (RACALBUTO, 2005).

The popularization of iron bandstands was also due to the improvements that modern urban sites required at that moment. The cities needed a group of elements called “street furniture” to solve hygiene, safety, comfort, and entertainment issues. Cast iron was suitable for their fabrication as it presented many qualities, such as good castability and possibilities of sizeable agile production and distribution. Bandstands became necessary city structures, primarily because of the significance given to public gardens and parks - where they were destined - in some European countries (SOFFRITTI et al., 2020).

The usage of iron was widespread worldwide and soon reached Brazil, a South American country that imported an extensive range of metallic products, including buildings entirely made of this material. Among Brazil’s cities, Belém, located in the State of Pará, in the Amazon, holds the largest and most valuable iron architecture collection from the 19th and 20th centuries (SILVA, 1986). Along with large structures such as markets, water tanks, and other types of buildings, many iron bandstands were distributed in Belém’s squares.

Those structures arrived from the final years of the 19th century to the beginning of the 20th century. The period, also known as Belle Époque, was strongly characterized by the influence of European culture (predominantly French) on Belém. It was also associated with the establishment of companies and financial institutions, mainly English, and its plentiful capital in the city. Thus, foreign town planning and hygiene principles were adopted and valued for representing progress and civilization. The desired city’s modernization was possible through the thriving economy based on the exportation of latex (KÜHL, 1998; SARGES, 2010; COELHO, 2016).

The rubber cycle’s profits promoted an intense investment in urban planning (SARGES, 2010), predominantly developed by the government and great business owners (COELHO, 2016). In this context, the municipal administration of Antônio Lemos (1897 - 1910) was crucial since he prioritized city renovations, especially in Belém’s central areas.

He particularly emphasized gardens and squares embellishments that became sumptuous with the imported iron bandstands (SARGES, 2010).

Like many metallurgical products, they were purchased from European foundries through catalogs (SOARES, 2009). These printed illustrated pages were important sale instruments and one of the determinant factors for the intercontinental distribution of iron products, as they allowed ample reach and provided a vast number of product designs to be selected (COSTA, 2001). According to Silva (1986) and Soares (2009), the buildings brought to Pará's capital have diverse countries of origin.

Even though some iron bandstands have been lost, eight remain in Belém's urban areas. The remnant buildings are assembled in three different historical center and surrounding neighborhoods - Reduto, Campina, and Batista Campos - and are differentiated by their corresponding square or specific names (Figure 1). Their locations are: 1) In República's Square: Euterpe Music Pavilion (EP) and Santa Helena Magno Music Pavilion (SHMP); 2) In Batista Campos Square: Primeiro de Dezembro Music Pavilion (PDP), Batista Campos Square Bandstands 1, 2, 3 and 4 - BCB1, BCB2, BCB3, BCB4; 3) and in General Magalhães Square, the same name bandstand (GMB) (Figure 2). Other bandstands were located in different neighborhoods, such as Nazaré, but are no longer part of the city landscape as they were disassembled.

Figure 1 - Schematic map of the bandstands' locations in Belém and their names



Source: the authors.

**Figure 2 - A closer look at the bandstands**



Source: the authors.

Although appreciated as cultural heritage by local people, the bandstands do not have individual legal protection at any level. They are covered by legislation only for proximity, insertion, or as part of other listed sites - that is, a part of the squares' complexes and the surrounding protected historical center area. This shows part of the acknowledgment difficulties that affect industrialization buildings (KÜHL, 2008), a situation aggravated by the gap in knowledge coming from thorough research or documentation.

Deterioration resulting from local weathering action, anthropic activities, and lack of proper maintenance is also a prominent part of the bandstands' problems (Figure 3). They often reach such poor conservation stages that incisive treatments are applied and result in extensive material loss. Those issues create preservation problems that have become a threat to Belém's iron bandstands as cultural heritage. This scenario could be, once again, mitigated if reliable data of all kinds were available to improve the performance of preservation, conservation, and practical restoration operations.

**Figure 3 - The deterioration of Belém's iron bandstands**



Notes: 1 and 2 - Weathering action - high deterioration and corrosion levels (left and center). 3 - Anthropic action - element displacement (right)

Source: the authors.

This research aims to document Belém's iron bandstands, those located in its historical center and surrounding areas, through a study covering historical and architectural aspects. Documentation is often the initial and most significant step toward preserving and understanding heritage buildings (KHALIL; STRAVORAVDIS; BACKES, 2021). It is also a form of acknowledging the features and different values of the bandstands as part of

the built industrial heritage (KÜHL, 2008), and this work seeks to approach their historical, artistic, architectural, and technological characteristics.

## **Materials and methods**

By methodological requirement, documentation of heritage buildings must come before actual intervention - being, then, of essential importance to memory preservation and a crucial instrument in the decision-making of practical actions (OLIVEIRA, 2008). There are several documentation areas and, consequently, a range of data acquisition tools, but the process consists of capturing information and interpreting it. This work deals with two categories: historical data, aiming to understand their historical context; geometry, with the purpose of recording, surveying, and learning about their shapes and characteristics (KHALIL; STRAVORAVDIS; BACKES, 2021).

Based on those premises, the investigation of Belém's iron bandstands is descriptive, characterizing their independent variables (VOLPATO, 2011). It considered the buildings within the historical center and surroundings - covering the districts Cidade Velha, Campina, Batista Campos, Reduto, and Nazaré (Figure 1) - and was divided into two phases: 1) historical and iconographic study; 2) architectural documentation and analysis. The methodological sequence and data capture sources adopted agree with what Oliveira (2008) and Khalil, Stravoravdis and Backes (2021) proposed.

The historical and iconographic study was conducted by reviewing distinct record types. The period initially adopted considered that the years from 1880 to 1910 covered most of the iron building imports in Belém. Therefore, foundry catalogs, city albums' photographs, newspapers, and official documents/reports were initially consulted following this time range - although, throughout the search, this timeline has expanded.

The architectural documentation started with surveying the eight bandstands still in Belém's public areas. The three locations are 1) República's Square with Euterpe Music Pavilion (EP) and Santa Helena Magno Music Pavilion (SHMP); 2) Batista Campos Square with Primeiro de Dezembro Music Pavilion (PDP) and Batista Campos Square Bandstands 1, 2, 3 and 4 - BCB1, BCB2, BCB3, BCB4; 3) General Magalhães Square with a corresponding name bandstand (GMB) (Figure 1).

This procedure was carried out by field research when a detailed photographic record was also conducted in addition to gathering the overall dimensions of those buildings. The data collected was used to create two-dimensional drawings. The instrument used was the software AutoCAD (computer-aided design), where the photographs were inserted to obtain the bandstands' physical information and then develop the graphic products.

Registration forms were developed to organize the information. Each building was recorded on these files, in which the data was filled and systematized in the following sections: photographic register, localization, descriptions (general, environmental, architectural, and constructive), conservation state, and 2D drawings (plans, elevations, and other varied details).

Lastly, the architectural/constructive analysis resulted from the comparative description of the several bandstands' characteristics. Thus, it was divided into their general aspects, referring to their regular composition - base/raised platform, structural components, roof elements, ornamental pieces and motifs, and connections/fixation methods.

## Results and discussion

### *Belém's bandstands historical review*

Before the arrival of the iron bandstands around the mid-19th century, Belém had already been hosting events in other music pavilions built in public spaces. On the pages of the Official Paper of the State of Pará, there are several mentions of religious manifestations and festivities, auctions, celebrations, animals exhibitions, firework shows, and spectacles - including musical, dance, acrobatic, and gymnastics performances - that took place in those buildings (JORNAL DO PARÁ, 1867-1878).

These written records revealed that the structures were commonly associated with churches and a few squares or gardens. On Pará's Paper pages, there are regular announcements and invitations to religious events, such as the St. Rita of Cascia festivity, which happened on the 26th of June 1875 in Saint John Baptist's church:

On the 26th, once the religious activity from the day before is over, the offerings auction will take place on a bandstand next to the church. A martial music band, at intervals, is going to perform beautiful and selected pieces from their repertoire. (JORNAL DO PARÁ, 1875, ed. 143, p. 2)

They were not built to be long-lasting at the time, despite their obvious importance to the population's recreation activities. Their ephemeral character is evidenced by orders of the province administration concerning the construction of bandstands erected for particular occasions and sites and their posterior demolition once their purposes were fulfilled. Although the building method was not specified, in some cases, the construction had to be temporary and made in agile time. Lasting materials and building methods, such as stone, lime, or brick foundations, were prohibited.

[...] to have a pavilion built there dedicated for celebrations to solemnize the act of inaugurating the free navigation of the Amazonas, the commission having to return the said land to the state, after that act, and after dismantling the pavilion that has been built. (JORNAL DO PARÁ, 1867, ed. 112, p. 1)

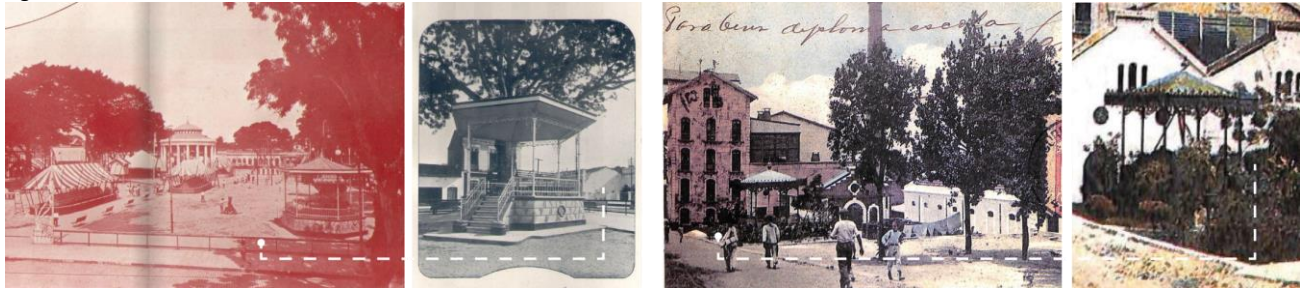
[...] The said pavilion, having to be provisional, must also be quickly built, being the said commission obligated, once concluded the festivities for which it is meant, to dismantle it immediately, and to return to the State the land occupied by it, under the terms of the aforesaid ordinance, it cannot be built on stone and lime or brick foundations, nor in any way offend the trees that are found in that area." (JORNAL DO PARÁ, 1867, ed. 144, p. 1)

Those years show that efforts were already in motion to improve Belém's squares and gardens and supply them with suitable spaces for entertainment. But it was not until the end of that century and the beginning of the next that the iron buildings were brought - amid intense urban renovations in its central area. At the time, the transforming actions were strongly represented by the figure of Antônio Lemos, the city's intendant from 1897 to 1910.

Antônio Lemos carried out most of the renovation measures related to public squares and park construction or improvements, often described in his reports. According to Lemos, those areas were neglected - adding to the city's health and hygiene problems - and needed attention. Therefore, the intendant elaborated embellishment strategies to turn those spaces into magnificent parks and consequently improve people's well-being and recreation (LEMOS, 1902).

Those small buildings were closely related to Belém's reformulation, as seen in reports and city albums. These documents also indicate that some have been lost (Figure 4), like the four music pavilions at the old Nazareth's Square that Lemos ordered to be placed at each corner in 1898 (LEMOS, 1902). They were iron built, as described in documents (ALBUM, 1905) and demolished around the '70s when the location was remodeled (ANDRADE, 2004). Another structure that belonged to Belém, only recognizable through image records, is the Paraense Brewery bandstand - no other available information about it was found.

**Figure 4 - Disassembled bandstands**



Notes: 1 and 2 - Nazareth's Square (left). 3 and 4 - Paraense's Brewery (right). Sources: 1 and 2 – Album (1905) - 3 and 4 – Belém (1998).

Nonetheless, for over a century and to the present day, eight of those bandstands have remained in the urban landscape. The oldest is the Euterpe Music Pavilion at República's Square (Figure 5). It was assembled in 1896 (BELÉM, 1998) during the administration of the Intendant Antônio Joaquim da Silva Rosado, the predecessor of Antônio Lemos (LEMOS, 1902). It was fabricated by Guillot Pelletier, a foundry from Orleans in France, and is the only bandstand that shows its origins through engravings on its pillars' bases. It is also possible to find the model in the foundry's catalog.

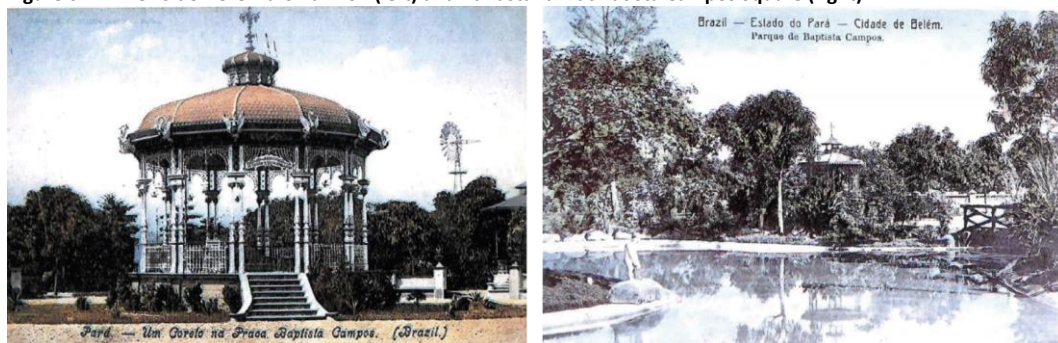
**Figure 5 - Euterpe Pavilion at República's Square**



Source: Belém (1998).

At the beginning of the 19th century, Batista Campos Square underwent a substantial remodeling. Lemos was responsible for ordering the bandstands present at the park in 1903. Between their orders and arrivals in the city, the intendant mentions the purchase of six bandstands from Germany (LEMOS, 1904). However, only five have been established at the place. The largest of them, Primeiro de Dezembro Music Pavilion, was settled at the center of the square. At the same time, the other four were spread around the landscape, being of medium or small dimensions (Figure 6).

**Figure 6 - Primeiro de Dezembro Pavilion (left) and Bandstand 1 at Batista Campos Square (right)**

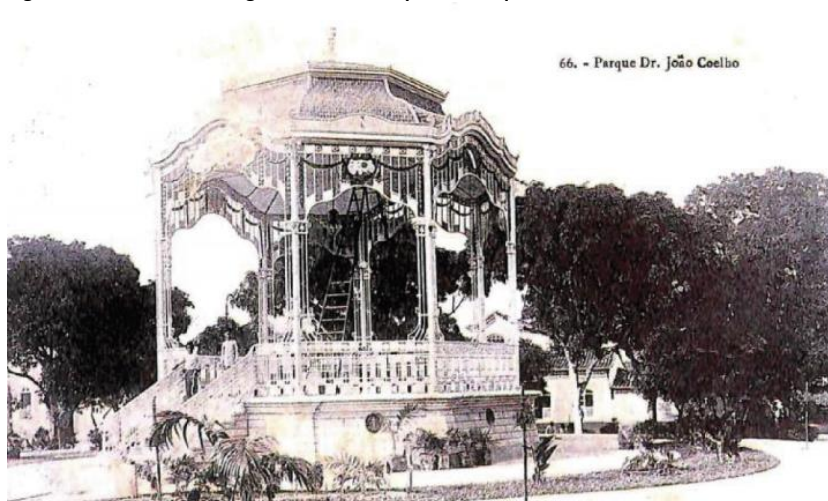


Source: Belém (1998).

The Primeiro de Dezembro Music Pavilion (Figure 6) was inaugurated on November 11th, 1904. It was presented to the population with great admiration, which corresponded the enthusiasm. The occasion was celebrated with a concert by the Municipal Fire Department Band. In the following years, all city's bandstands were very well included in people's lives, with regular concerts on Sunday afternoons and evenings. The performances were also shared with the State Military Regimen Band (LEMOS, 1905; 1906; 1909).

As of 1904, República's Square was another park restructured by Antonio Lemos. For the area, he imported one more bandstand, which has been named Santa Helena Magno Music Pavilion (Figure 7). He mentions it as a building made of iron, brick, and wood. The construction was carried out between 1905 and 1906, possibly finalized around 1907 (LEMOS, 1905; 1906; 1907; 1908). According to Gomes (1995), it was imported from Germany, although no other source supports this information. The origin foundry remains unknown.

**Figure 7 - Santa Helena Magno Pavilion at República's Square**

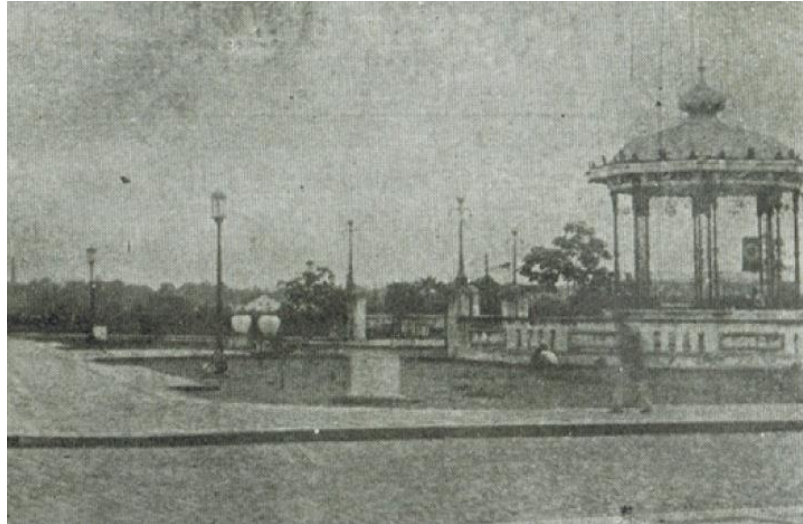


Source: Pará (1998).

A considerable time gap separates the arrival of the General Magalhães (Figure 8) Bandstand from the previous ones (Figure 9). The square, formerly Ilha Moreira, is situated in the Reduto area. This site had previously undergone improper measures to manage the Reduto basin canalization, which resulted in frequent inundations. For this reason, in 1930, the intendant Antônio Facióla started a significant reform that also led to the complete renovation of the space (FACIÓLA, 1930). The building, believed to be of English origins, was not yet mentioned but appeared later in the State album of 1939 (SOARES, 2009; RODRIGUES, 1939).



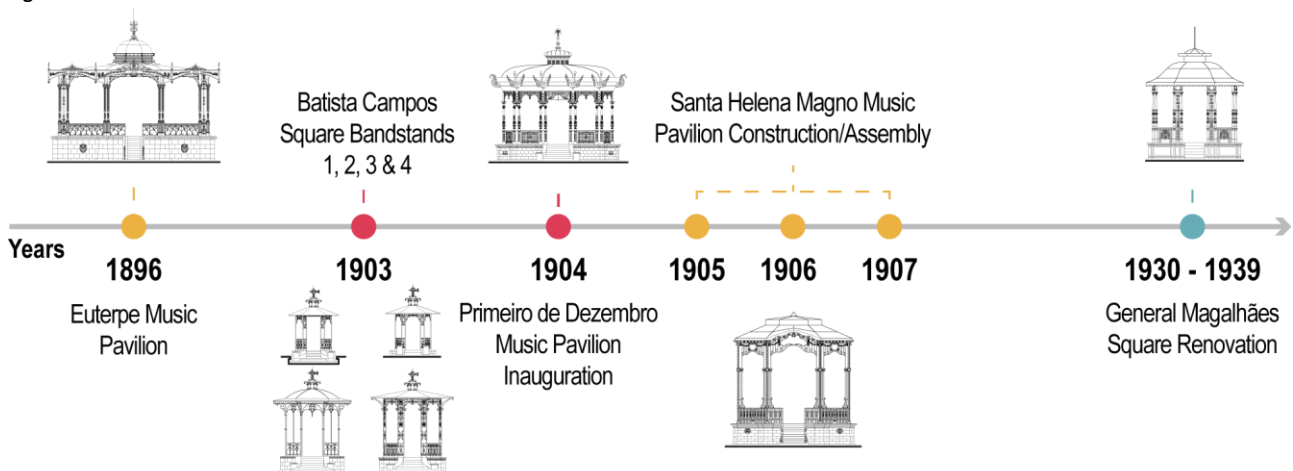
Figure 8 - General Magalhães Bandstand in 1939



Source: Rodrigues (1939).

This historical path demonstrates that the iron bandstands have introduced to Belém the concept of them as lasting buildings. Indeed, their backgrounds as provisory spaces and their permanence to the present day highlight that iron architecture is a construction method meant to be permanent as well. It also shows that the high-level quality expected from prefabricated buildings back in the 19th and 20th centuries (COSTA, 2001) is firmly established through their presence in the city's squares still these days.

Figure 9 - Schematic timeline of the bandstands' arrival in Belém



Source: the authors.

Moreover, a significant chapter of Belém's history has been kept through them, seeing they still are symbols of a remarkable period concerning political, economic, artistic, and cultural contexts. They positively fulfilled their ornamental roles and incorporated much appreciated and aimed European habits, manners, and traditions through their musical utility. Thus, expressed by their unique constructive features or meanings, the iron-built bandstands at their sophisticated squares represent the idealized and prosperous Belém from Belle Époque: modern, civilized, and refined (SARGES, 2010).

Another point, detailed by Racabulto (2005), is the wide variety of uses that bandstands have had while continuously holding their musical character acquired from the 18th century onward. In contrast, Belém's bandstands - which once were places of regular

band concerts - have had this function reduced. They are still inserted into the population's daily life, although mainly destined for other contemporary activities. It is not necessarily a negative change, as it makes them useful spaces and supports them as cultural heritage worth conserving for future generations.

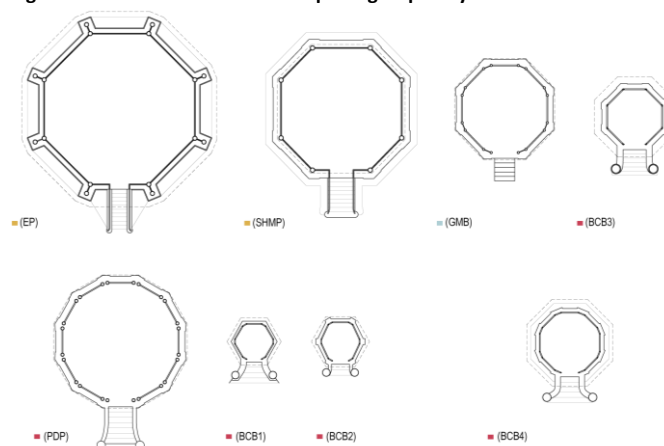
In opposition to their permanence, there were also cases of disassembled bandstands. It brings to attention a matter discussed before: cast iron street furniture can be removed or replaced from urban landscapes when seen as outdated, without reflecting on their cultural heritage values (SOFFRITTI et al., 2020). Even though this question was an undeniable local reality in the past, obsolescence affected way more other local industrial heritage, as continuously happens to the Railway of Bragança installations remnants (ROSA; PALÁCIOS, 2020). The current and more significant concern regards the slow destruction caused by insufficient or absent maintenance more than sudden decay. It can cause irreversible damage to these buildings, so a new attitude towards them is indispensable.

### Architectural analysis

Bandstands have a common composition formed essentially by a raised base or platform and metallic parts, which include structure, roof, railings, and ornaments. It must be emphasized that these parts can also have complementary elements. To comprehend the bandstands' architectural characteristics, it is necessary to understand how these buildings were assembled and identify the similarities and differences among their constructive system.

The platforms of Belém's bandstands are all masonry built. These parts were not importation products. Therefore, they were locally constructed. Their formats reflect, in most of them, the metallic structures' floor plan designs which are polygonal, varying only in the number of sides (Figure 10). Eight-sided polygonal plans are the most common, found in four bandstands. There are also twelve-sided shapes in three of them and a single building with sixteen sides. It is worth mentioning that the Primeiro de Dezembro Pavilion's plan, although polygonal, exceptionally leans towards a circular shape.

**Figure 10 - Illustration of the floor plans grouped by the number of sides**



Notes: 1 - First line - eight sides. 2 - Second line to the left - twelve sides. 3 - Second line to the right - sixteen sides. Source: the authors.

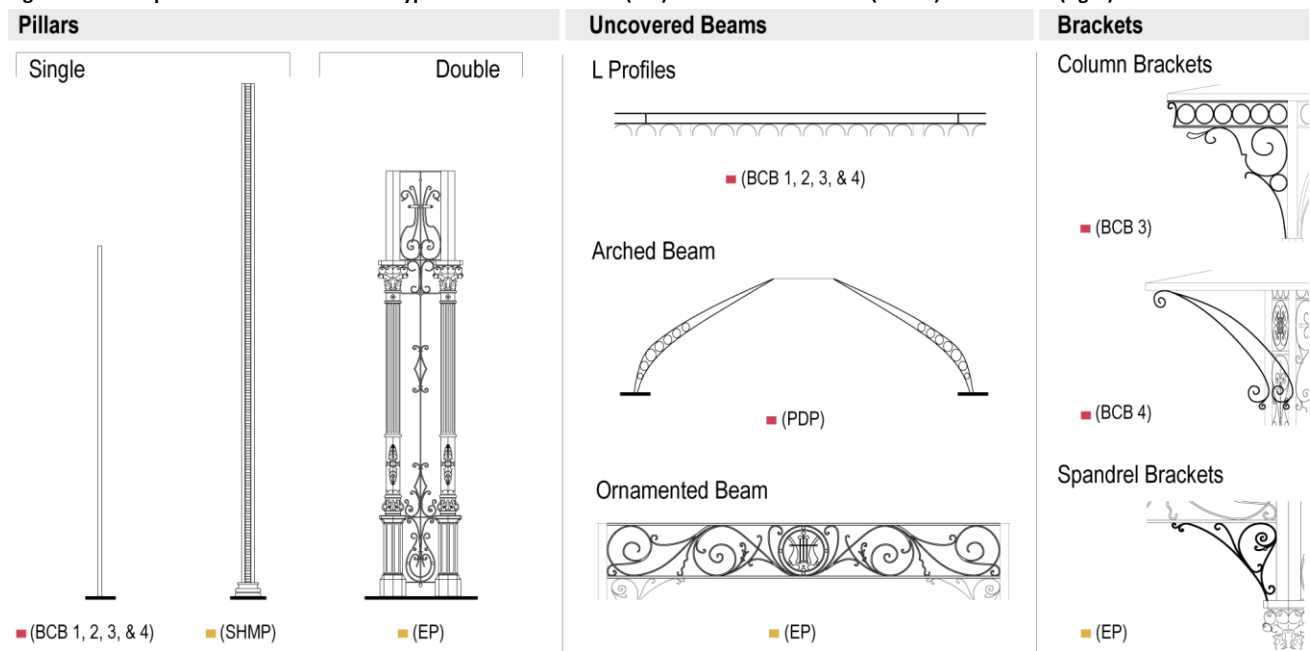
Their bases' floors have in common the application of hydraulic tiles and block textures and/or friezes as adornments. However, there are a few contrasting characteristics. All of them are accessed through straight stairs made of stone and masonry, but only the República's Square buildings have iron stair railings and handrails. The larger structures,

Euterpe, Santa Helena Magno, Primeiro de Dezembro, and General Magalhães, are equipped with functional basements. Consequently, openings, specifically iron gates and oculus windows, are only found in those buildings - except General Magalhães' missing pieces and the oculus window of undetermined utility in Batista Campos Bandstand 4.

The metallic components installed above the platforms comprise a significant part of the structures of the bandstand. The iron components form a group of elements that can be set accordingly to the intended refinement level, either purposeful with some aesthetic appeal or ornamental. In structural terms, this system works through pillars, beams, and brackets - depending on the constructive solution - supporting the subsequent roof.

The pillars come in two regular types: single and double. In the double pillars' case, they are placed next to or in front of the other within a small distance. Their sections are circular, concerning single types, and varied in double pillars. Therefore, the dual vertical supports are more complex, characteristic transferred to their decorative facet. As a result, different scales of artistic effort were observed, covering from plain circular pieces to representations of classical columns - bringing Corinthian capitals and fluted shafts - with or without middle railings (Figure 11).

**Figure 11 - Examples of structural elements types identified 1 - Pillars (left). 2 - Uncovered beams (center). 3 - Brackets (right)**



Notes: 1 - Pillars (left). 2 - Uncovered beams (center). 3 - Brackets (right). Source: the authors.

The beams are placed on the pillars' top and function in plain sight or covered by ceilings. Two bandstands present hidden beams, General Magalhães Bandstand and Santa Helena Magno Pavilion, that could not be observed; the rest are exposed, and iron made. Among the six other buildings occurs three types of beams: simple "L" profiles, seen in the smaller Batista Campos Bandstands (1, 2, 3, and 4); ornamented rectangular beams composed of flat bars and rectangular profiles at the Euterpe Pavilion; Arched cast beams partially hollow through circular holes at Primeiro de Dezembro Pavilion (Figure 11).

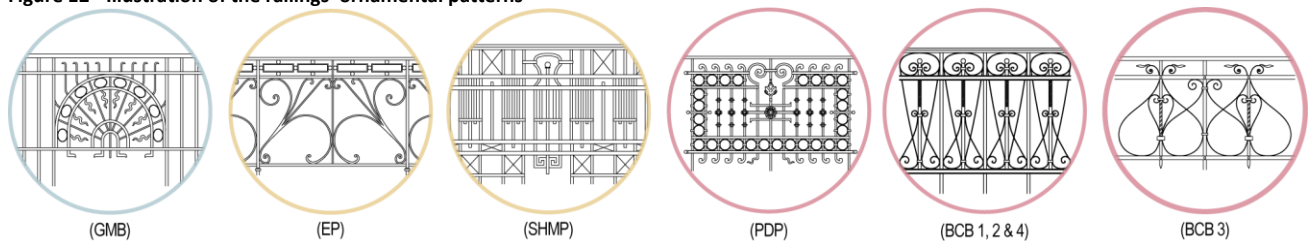
Between Belém's bandstands, brackets are not usual structural components, appearing in just three of the eight buildings. They are classified into column brackets and spandrel brackets (Figure 11). In this case, the first works as eaves support and subdivide into four

models - seen in the Euterpe Pavilion and Batista Campos Bandstands 3 and 4. The latter works as additional support to the beams and is exclusively found at Euterpe Pavilion. Regardless of their role and type, all of them are extremely decorated.

On the other hand, railings and handrails are directly connected to the pillars as they surround their bases' perimeter or stairs. They have an essential function as boundaries for safety reasons and delimitation of the audience and entertainment professionals' areas. Their visual lightness also allows seeing through them without becoming a barrier to the viewers. Nonetheless, those components are highly ornamental as they bring diverse patterns (Figure 12) and/or motifs that repeat only in the smaller bandstands: the 1, 2, and 4 of Batista Campos Square.

They combine rectangular, flat, round, and twisted iron bars with geometrical and organic forms - mostly volutes of varied types - that result in diverse arrangements creating different styles or bringing to attention their similarities. Santa Helena Magno Pavilion stands out with rectangular metallic plates on its railings' pattern, showing style flexibility and slightly altering those elements' ordinary transparency scale.

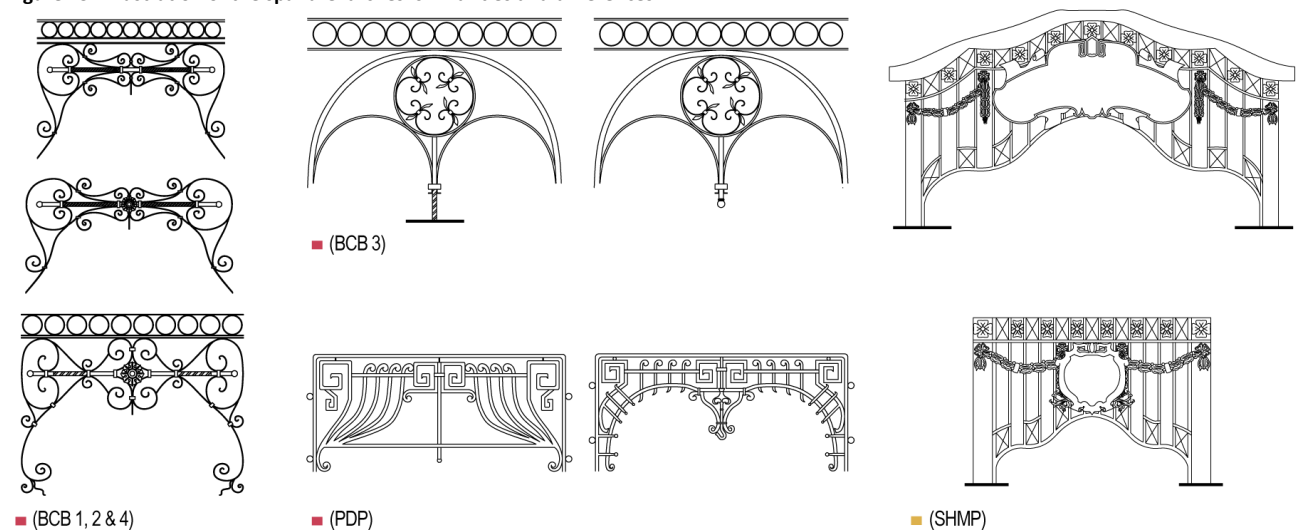
Figure 12 - Illustration of the railings' ornamental patterns



Source: the authors.

Similarly, the spandrel arches (Figure 13), installed between the pillars and under the beams, combine the same embellishment resources. They solely aim for stylistic expression and are given different scales of artistic treatment. In Belém, six bandstands are equipped with those pieces, leaving out only the General Magalhães Bandstand and the Euterpe Pavilion. Their sophistication ranges from simple to intermediate and complex levels. Some bandstands, precisely Batista Campos 1, 2, and 4, also share motifs that ornamentally match almost perfectly.

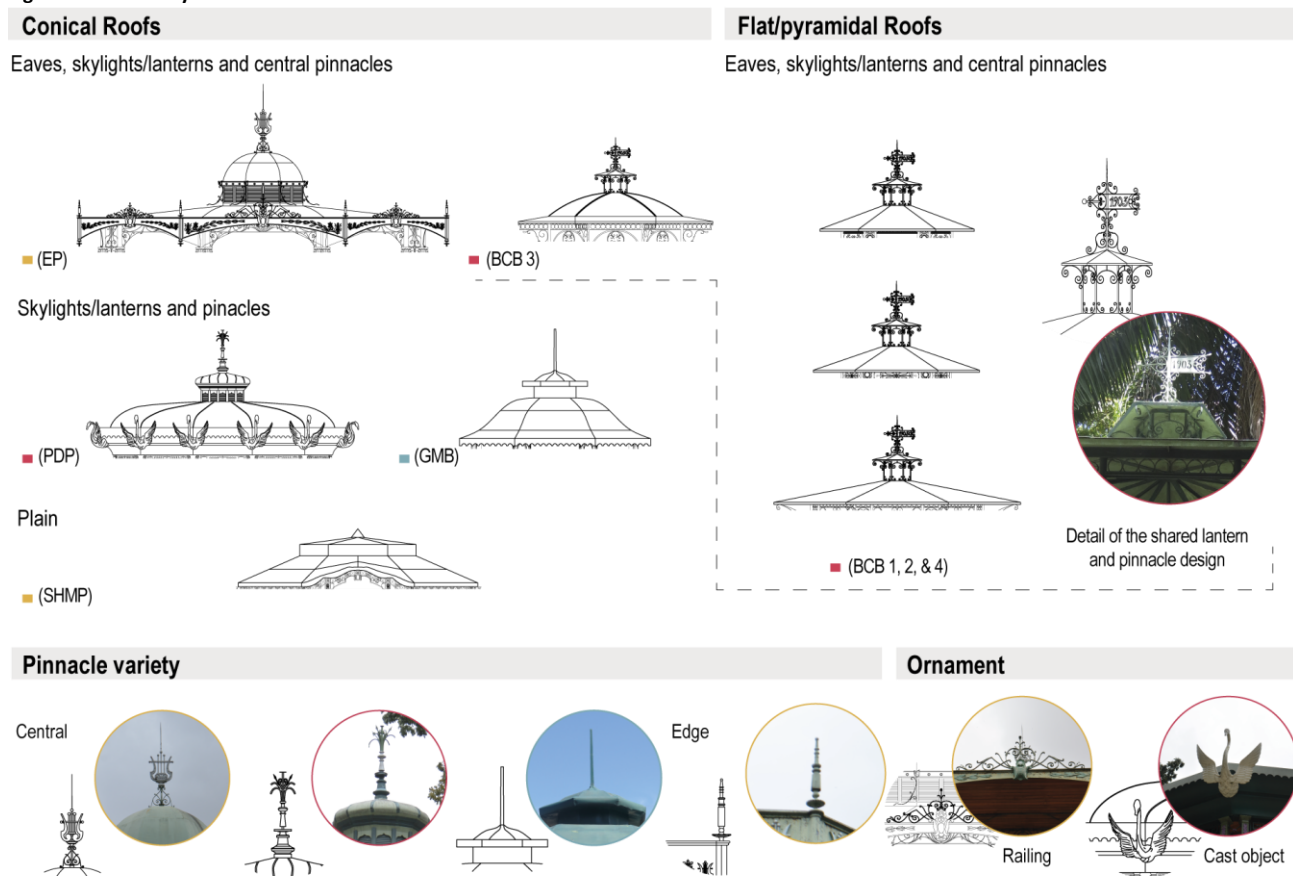
Figure 13 - Illustration of the spandrel arches' similarities and differences



Source: the authors.

The roofs and their complementary parts are placed after the structural frame. They are very distinguishing features but also are more likely to have their essence altered throughout time. Two formats were documented in their current state: flat/pyramidal and conical with six or eight inclined plans (Figure 14). Currently, the roof covering is made of plain metallic sheets on all of them, and, in the larger bandstands - Euterpe, Primeiro de Dezembro, Santa Helena Magno, and General Magalhães - wooden ceilings are installed.

**Figure 14 - Summary of the documented roofs' characteristics**



Source: the authors.

Secondary elements such as roof lanterns (skylights) are not applied only in Santa Helena Magno Pavilion. Besides their common polygonal bases, some types have been recognized regarding their covers' formats: dome, flat, and bulb. Eaves are the usual alternative for weather protection in bandstands, although not unanimous among Belém's cases. The eaves display a noticeable disparity in their architectonic solutions, from plain - demonstrated by Batista Campos bandstands 1, 2, 3, and 4 - to sophisticated - seen on Euterpe Pavilion (Figure 14).

Central pinnacles (Figure 14) have been a part of all studied bandstands, considering that two are missing from Santa Helena Magno Pavilion and General Magalhães Bandstand (mischaracterized). Three types remain in their places, standing out one which is replicated on the smaller bandstands of Batista Campos Square. Edge pinnacles, though, are only seen on Euterpe Pavilion's eaves.

Decorative crestings or railings also come as roof embellishments; unfortunately, some have vanished. The only of this kind left is located on Euterpe Pavilion's eaves. Modeled enrichments are represented solely by the Primeiro de Dezembro Pavilion's swans on

its roof angles. They are a remarkable feature, so it is important to stress that the ones currently placed are additions from recent periods. That said, even if the intention was to resemble the original pieces, they do not match and are not precisely replicas. According to historical photographs, the anterior swans were likely to function as rainwater conductors (Figure 14).

In an overview, each bandstand part presented can be highly detailed. The detailing means there are pieces with utterly aesthetical roles and functional components that are no less artistic. The embellishment resources documented are vast but also recurring in distinct combinations. Consequently, most of these characteristics are shared among the local collection. However, the arrangements, motifs, and visual compositions can highlight the differences and similarities between those structures.

Organic forms are, by far, the most common motif found on those iron components. In this case, various volutes represent them almost totally (Figure 15). Those types are organized in different manners, creating distinct patterns. The only repeating volute pattern appears on bandstands 1, 2, and 4 of Batista Campos bandstands' railings.

Figure 15 - Ornament motifs



Notes: 1 and 2 - Volutes. 3, 4, 5, and 6 – Nature: flowers, swans, vases, leaves, and branches. Source: the authors.

Nature motifs are often used as cast objects using floral and animal themes - fleur-de-lis, lotus flowers, flower vases, branches, leaves, fruits, and swans (Figure 15). Other sorted figures, such as festoons, bows, and coats of arms, are also exclusively found on Santa Helena Magno's spandrel arches (Figure 16). Lastly, musical themes appear in harps - cast pieces and figurative patterns - which prevail in Euterpe Pavilion's pinnacle, beams, eaves, and railings and are less frequent in Santa Helena Magno's oculus windows (Figure 16).

Figure 16 - Ornament motifs



Notes: 1, 2, 3, and 4 – Musical: harps. 5, 6, and 7 – Sorted: coats of arms, festoons, and bows. Source: the authors.

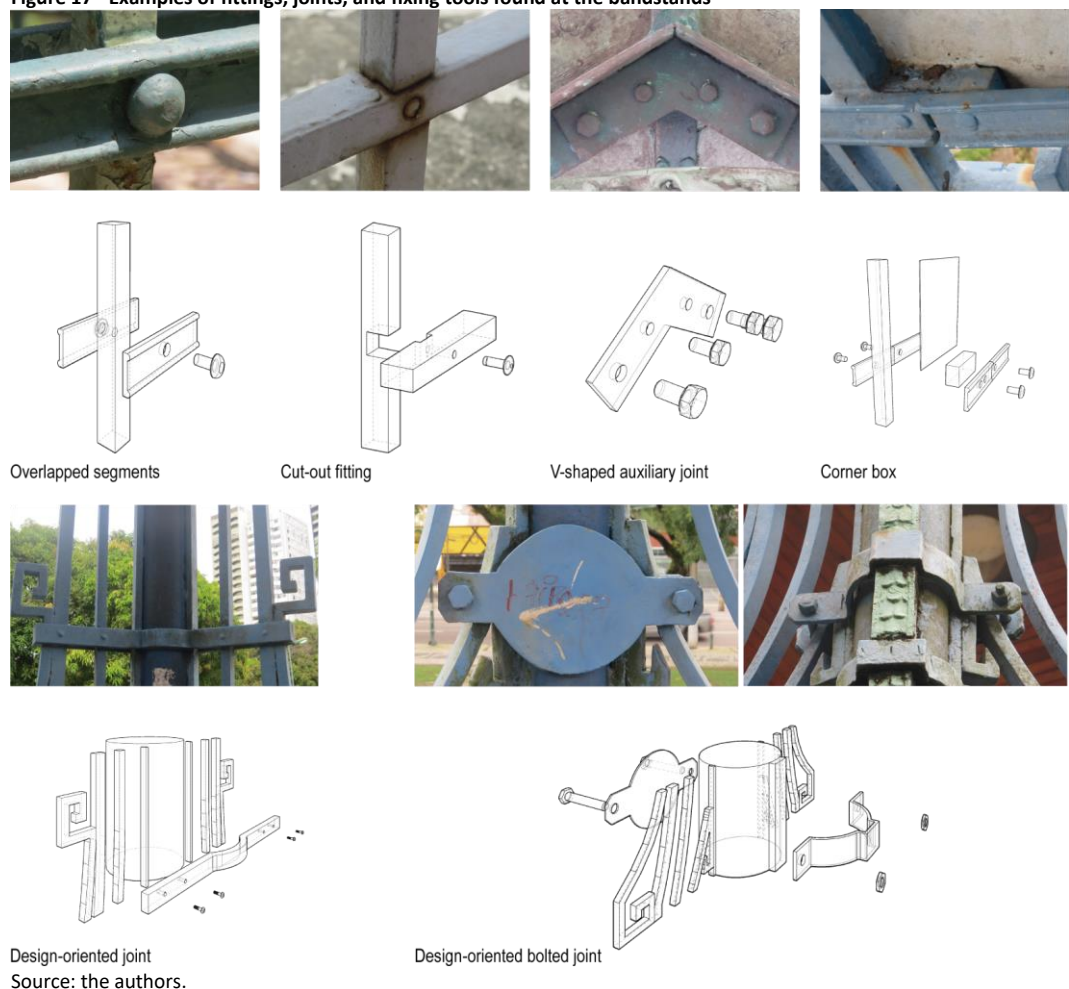
Another relevant point to consider about iron buildings' construction, like the bandstands, is the difference between them and the traditional methods. Those structures essentially comprise prefabricated components to be assembled in an indeterminate space. Consequently, an array of characteristics and details emerge from this innovative way of construction concerning the parts' connections.

In this group of music pavilions, the articulation between the parts is made mainly through fixing tools: rivets, bolts and nuts, and screws with round or flat circular heads or hexagonal flat heads (Figure 17). It is valid to emphasize that these buildings are assembled and have received several paint layers over the years. Consequently, the

identification is limited to visual observation, which does not make the distinguishment and absolute description of each of these small objects viable - due to thick coat layers and hidden or internal pieces. Only in a few cases, usually in areas showing a poor conservation state, was it possible to establish the kind of fixing. Many vacant holes indicate where those missing elements were supposed to fit.

Besides overlapped pieces, other attachment methods were identified on a smaller scale. In General Magalhães Bandstand, the railings' bars bring cut-outs as fittings: sliding one segment over the next, fixing the overlapping segments with rivets. Simpler auxiliary joints are seen at the Batista Campos Bandstands: V, T, and circular-shaped plates connecting beams and the plans of the roofs and corner boxes linking the railings' bars. In Santa Helena Magno Pavilion, there is a particular occurrence of joints that attach elements adjacent to the pillars and are noticeably guided by the construction design, thus presenting an unconventional aesthetic intention (Figure 17).

**Figure 17 - Examples of fittings, joints, and fixing tools found at the bandstands**



The usage of welding is seen in specific parts of some of the structures, mainly in whole segments of Batista Campos Bandstand 1 and in some sections of General Magalhães Bandstand's railings. It is likely the result of contemporary interventions since one of the key advantages of historical iron buildings was mobility, and the method hinders the easy assembly and disassembly of components. In addition, its use strongly suggests that it was applied to elements that have been highly corroded and lost their parts and fixing pieces.

Since bandstands are typically open spaces, they do not include walls in their composition. Therefore, metallic sheets are primarily used on their roofs' covers and components and not for sealing. In turn, vertical conductors are not found in any of the structures - thus, the roofs direct the rainwater straight out of the covers and eaves.

After this description process, the key point of this architectural analysis is that Belém's bandstands are not entirely alike. Industrialization products like them are not necessarily identical/copies regardless of their manufacturing processes' precision. Their historical track and traits originate from the different environments and conditions in which they were inserted, and their meanings to society turn them into singular cultural objects, as Muñoz Viñas (2005) addresses.

Batista Campos Bandstands 1 and 2 illustrate this situation, which is the same model and likely from the same foundry as 3 and 4. The first two could be duplicated structures since they match almost entirely in their physical features. Nonetheless, their few differences are enough to indicate the changes that happened to each one throughout the periods. The common characteristics of all four of them display the possibilities of assembling/customizing different buildings using pieces in diverse combinations, typical of the cast iron era (SILVA CONTRERAS, 2010).

The architectural composition described previously has already been detailed as the essence of bandstands - standard and yet plural, without an exclusive formula (RACALBUTO, 2005) - which is maintained in Belém's case. Contributing to that and according to the variety of styles applied to those eight buildings, what has also been reaffirmed as a significant characteristic is the tremendous esthetical potential that cast iron and bandstands have when combined. It certainly reflects the comprehensive design options offered to the clients by the iron companies, as pointed out by Silva (1986).

Their ornamental vocabulary, a distinguishing attribute, is consistent with the eclectic style. Most of the themes observed in the bandstands, with some visual variation, are applied to other eclectic architectural components documented in the city: the numerous iron water ducts and vitrified ceramic ornaments (ARRUDA; SANJAD, 2017; PALÁCIOS et al., 2021). However, the musical motifs seem to be a particularity of these structures, making a clear allusion to their leading utility in the details.

On the other hand, they could represent a lower technical intricacy than iron buildings could reach compared to other constructions. As previously introduced, Belém has an impressive iron architecture collection of which the bandstands are a part. In turn, the Belgian chalets in the city spread the iron usage to walls, ceilings, roof tiles, water ducts, trusses, and profiles (PALÁCIOS; SANJAD, 2021). The residences also represent the Danly system, typical for its thermal insulation and attractive ventilation solutions (SILVA, 1986).

The connecting methods and fixing tools might look trivial but are a technical innovation as much as the rest of the aspects involving prefabricated buildings. This work identified rivets, bolts and nuts, and screws as the most common kinds. At this point, it does not substantially differ the bandstands from other architectural typologies, from residences to railway stations (KÜHL, 1998; MILLER, 2014; PALÁCIOS; SANJAD, 2021). But, apart from these three types, particular connections exhibit extra attention to fit visual composition purposes, not only practical.

As mentioned, the loss of connections is evident, meaning that interesting details may not have been documented in time. It is also a problem that concerns the buildings' integrity since they are vulnerable parts whose exteriors can conceal advanced



deterioration (KÜHL, 1998). Yet, there is no guaranteed approach to assessing fixings' conservation state at high levels of corrosion, so, during interventions, the knowledge of their types is crucial for the fabrication of replicas (MILLER, 2014).

Generally, the results confirm what has already been stated and disseminated in the current related literature. Nonetheless, and more importantly, it enlightens the specificities of this treasured heritage - a crucial record that needed to be added. This information unquestionably put into evidence the 19th and 20th centuries' local scenario (filled with many particular matters), which has made this group of iron buildings a specific occurrence and given a singular interpretation to this global development.

## **Conclusions**

This paper pursued to historically and architecturally document Belém's iron bandstands since documentation is crucial to preserving built heritage and its broader comprehension. This closer observation has been missing even though the buildings are valued as cultural heritage and landmarks and while they are subject to many alterations and losses. The analysis, which followed the data gathering, successfully expanded the body of knowledge of this group of buildings, prefabricated structures, and constructive techniques from the 19th and 20th centuries.

The historical investigation enabled an objective understanding of their trajectories but also brought into light their permanent character to Belém and provided insights about their past and current roles and issues. The graphic products allowed the interpretation of their architectural and constructive similarities and particularities. After merging the information, it is safe to state that, regardless of the level of similarity, identical buildings have not been recognized. More precisely, it is possible to reinforce the complexity and comprehensiveness of the iron architecture and not endorse a reductionist perception of the iron bandstands - and of the building technique - as completely standardized and uniqueness lacking.

The method applied in this research achieved its objectives. Even so, the results can be complemented with the production of 3D models and a careful assessment of the quantities and conservation conditions of the iron pieces - in case better opportunities and tools arise. Since the eight buildings are in high-traffic areas, assessing quantities and conservation conditions is complex. However, this survey is extremely important for conserving and restoring the bandstands and can support future practical interventions.

Documentation is the initial step for those structures in pursuing their proper preservation. Besides what has been uncovered, a broad spectrum of practical information will likely exist regarding technological aspects, conservation and restoration guidelines, and social meanings. Each of these matters furthers the knowledge about the industrial heritage but specifically aids the permanence of the bandstands - which, until these days, is due to their strict relationship with the local people and the places they occupy - that could benefit from a scientific approach.

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