



ANALYSIS OF THE ARCHITECTURE OF THE RAILWAY WORKSHOPS OF THE COMPANHIA PAULISTA IN JUNDIAÍ, SÃO PAULO

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ABSTRACT

The purpose of this paper is to analyze how the construction of the Companhia Paulista railway workshops took place in Jundiaí, São Paulo. The temporal cut is limited to the nineteenth century, comprising the years between 1892 and 1896, the period of the original building's construction. This type of study is justified by the fact that the workshops in Jundiaí had a unique type for the period, compared to same kind of structures in the state of São Paulo. Through visual observation and knowledge of specific bibliography, elements such as implantation, materials, systems, openings and ornaments were analyzed. From this analysis, it is possible to broaden the knowledge about some construction techniques used, as well as to elucidate some aspects of the built industrial heritage.

Keywords: Railway architecture. Industrial Architecture. Railway workshop. Companhia Paulista. Jundiaí.

RESUMO

O presente texto tem por finalidade analisar como se deu a construção das oficinas ferroviárias da Companhia Paulista em Jundiaí, São Paulo. O recorte temporal é limitado ao século XIX, compreendendo os anos entre 1892 e 1896, período em que foi construída a edificação original. Esse tipo de estudo se justifica pelo fato de que as oficinas de Jundiaí detinham uma construção singular para o período em comparação com as demais estruturas do tipo existentes no estado de São Paulo. Por meio da observação visual e do conhecimento de bibliografia específica, foram analisados elementos como implantação, materiais, sistemas, aberturas e ornamentos. A partir dessa análise, pode-se ampliar o conhecimento sobre algumas das técnicas construtivas utilizadas, além de elucidar aspectos do patrimônio industrial edificado.

Palavras-chave: Arquitetura ferroviária. Arquitetura industrial. Oficina ferroviária. Companhia Paulista. Jundiaí.



Figure 1 – Main facade of the Jundiaí workshops. On the left, you can see the North Section, dedicated to cars and wagons, and on the right is the South Section, aimed at locomotives. Source: author's personal collection, 2019.

INTRODUCTION

This text is part of the author's master's research and makes up the third chapter of her dissertation. The object of study is the railway workshops of the Companhia Paulista in the city of Jundiaí, São Paulo (Figure 1) and the main objective of this investigation is to carry out an architectural analysis of the building to understand technical parameters that resulted in the whole built.

In a previous investigation about the railway workshops in the state of São Paulo (SILVA and OLIVEIRA, 2019a), it was possible to identify the uniqueness of this building in some aspects such as: spatialization, the fact that the Jundiaí workshop is one of the few workshops in the state that was designed to concentrate activities in one building; shed roof that, despite occupying the imaginary when talking about the industrial theme, is not usual in the railway workshops; and ornamentation, with exquisite aesthetic elements that make us question its real purposes. Thus, this text seeks to advance on issues strictly related to architecture and the construction of the Jundiaí workshops, discussing its form and function and other elements eligible for the study. The data were obtained through technical

visits, occasions when visual analysis took place, and consultation with the diverse existing documentation related to the workshops, such as photographs, plans, schematic cuts and other drawings; documents archived in the collection of the Museu da Companhia Paulista (MCP), located in the workshops themselves.

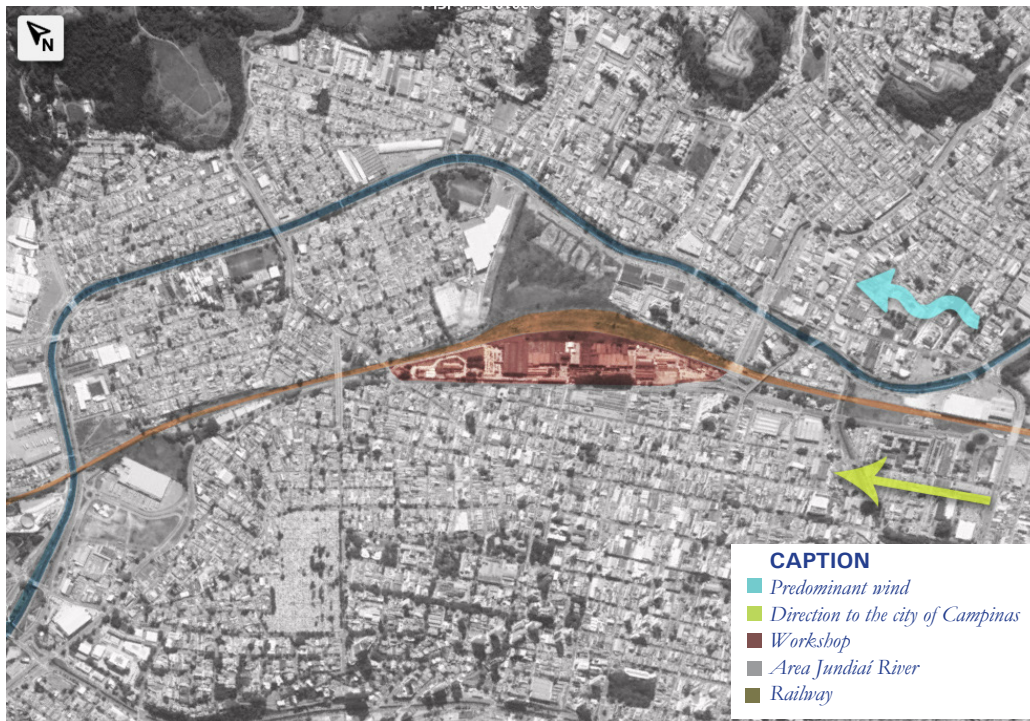
Some historical issues have already been overcome in a previous study (SILVA, 2019b), in which it is possible to verify who were the various professionals and which companies were involved in the design and execution of the workshop and correct some information that had been being disseminated erroneously, such as the authorship of the project. The building project was carried out by Gustavo Adolpho da Silveira, from Minas Gerais, in 1890, then an engineer at the Brazilian railway company Companhia Paulista de Estradas de Ferro (CPEF). The materials used were supplied by different companies, most of them of regional origin – among the exceptions, there is the metal roof structure, which was exported by the North American company Phoenix Bridge. The land preparation work was carried out by the partners Contrucci and Giorgi and the construction was carried out by labor probably from the local (SILVA, 2019b). For the interpretation of the architectural analysis, all these data were considered.

ABOUT THE IMPLEMENTATION

It is known that the workshops in Jundiaí were built to replace one that already existed in Campinas and that had become little moderate for the great work flow (COMPANHIA PAULISTA, 1891; 1894). The reasons why the CPEF chose the city were: logistics, the connection of the city directly with the port of Santos and, therefore, the proximity to a point of loading and unloading of goods; costs, considering that it is known that the land was acquired at a low price (COMPANHIA PAULISTA, 1894); and healthiness, as the city of Campinas was experiencing an outbreak of yellow fever. In general, the city of Jundiaí showed excellent cost-benefit to receive the new workshops. Some French railway works mention that there is no rule for choosing a land on which a workshop will be installed, but that criteria such as location and price are important and must be considered (PERDONNET, 1865; GOSCHLER, 1865). In the case of Jundiaí, it is observed that these criteria were very important for the choice of the city that would receive the new workshops.

The workshops were built on the current União dos Ferroviários Avenue, in a relatively flat area with immediate rugged surroundings. Next to the workshops, the Jundiaí River is located, considered the most important in the city (Figure 2). Despite this proximity, the river was not identified as a determining factor for the choice of land, because the water supply of the workshops was carried out by the authorized company of the city (PINTO, 1903). The fact that the land is flat, however, must be considered an element of great relevance, because its adoption would eliminate costly earthworks.

The construction is oriented from northeast to southeast; the glazed face of the shed roof is facing southeast, the same direction of the prevailing wind. The original land, an area of more than 145 thousand square meters (PINTO, 1903), is rectangular in shape and its linearity follows the railway line. Despite the large area of the land, it is noted that the implementation of the complex was conditioned to its linear format, obeying a functional logic that leads to the railway operation.



*Figure 2 – Implementation of the workshop in the city of Jundiaí.
Source: prepared by the author from a Google Earth image.*

ABOUT THE OBJECT

The CPEF workshop complex in the city of Jundiaí has undergone several changes over the years, but the object of the present study is limited to the first form of the workshops, designed in the 1890s and built between 1892 and 1896. This first project can be viewed in the original structure and roof plan prepared by the North American company Phoenix Bridge, archived in the collection of the Museu da Companhia Paulista and redesigned for the present research, as shown in Figure 3.

Analyzing old photographs from the MCP collection and the available workshop plans, it can be identified that some areas of the current set were built immediately after the completion of the first plan or even concurrently, which suggests that the project was not carried out faithfully. Take as an example what today is understood as the central block of the complex, consisting of two floors, recognized by its pediment (see Figures 1 and 4), it is possible to conclude that the construction of this central block, as seen today, took at least 70 years.

Still regarding this central block of two floors, with regard to the area facing south, the Phoenix Bridge roof plan reinforces that the block was not foreseen in the foreground of the workshops. In addition, the old photographs available both in the collection of

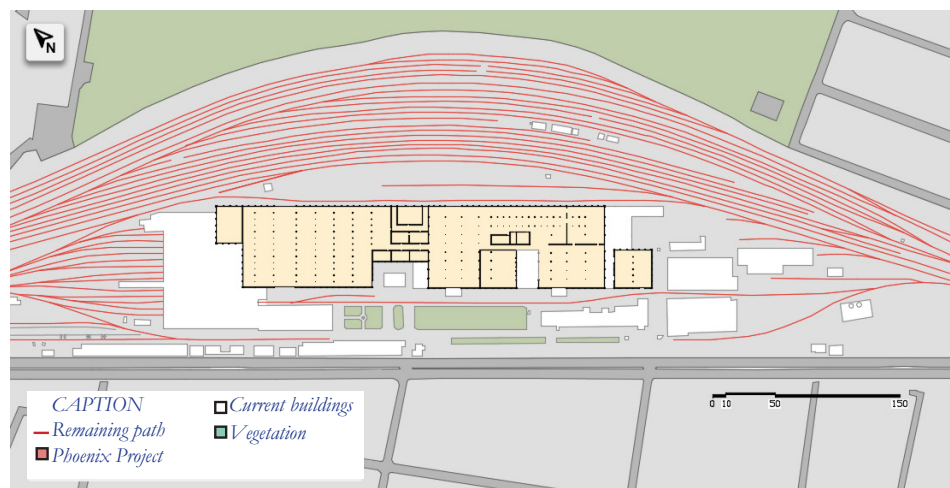
the Museu da Companhia Paulista and in the work of Pérez (1918) point to the presence of an old staircase outside the building, making the connection between the ground floor and the first floor. Due to the fact that this staircase is outside the complex, it can be deduced that it had not been designed in the original plan and, therefore, it is believed that the building of two floors was designed and built after 1896 (year of completion of the works of the workshops) or concurrently with the rest of the construction, facing a new program of needs.

A particularity identified during the analysis of the plans of the Jundiaí workshops is also mentioned: the presence of two “protruding walls” in relation to the facade, which mark the presence of the traversers and which were not foreseen in the Phoenix Bridge roof project. In a visit to the site, it was identified that these appendages were erected with the metallic structure exported by the Phoenix, even though they were not dimensioned in the original project – which reinforces the hypothesis that the project was adapted.

Thus, the constructive chronology of the object of study is understood as follows, as shown in Figure 4: the area highlighted in blue corresponds to the first plan of the workshops, designed in 1892 and whose construction was completed in 1896; the green highlighted area corresponds to the addition of which it was not possible to identify the correct date, but which is not found in the Phoenix project. On it, it is

Figure 3 – Representation of the first project of the Jundiaí workshops based on the coverage plan prepared by Phoenix Bridge in 1892, superimposed on the current buildings, identified from different plans available in the collection of the Museu da Companhia Paulista.

Source: elaborated by the author from the plans of The Phoenix Bridge Co. (1892) and the Companhia Paulista de Estradas de Ferro (1969).



believed that it was designed and built after 1896 – or, at most, during the construction of the workshops. In purple, the increase in the high ceiling that occurred in 1913 is highlighted (COMPANHIA PAULISTA, 1914); in orange, the increase that occurred in the 1920s is highlighted; in red, there is an increase in a floor that was designed in 1951 and built after 1954 and which modified the area corresponding to the ground floor. Finally, the addition whose date has not been identified, but which is believed to have occurred near the 1950s, is probably highlighted in yellow, probably with the increasing after 1954 (marked in red in the Figure).

ABOUT THE FORM AND FUNCTION

For the organization of the complex, the space was divided into three: the south side, focusing on the services related to locomotives; the north side, dedicated to cars and wagons, and the center, were allocated the rooms dedicated to the administration and the lunchtime (PINTO, 1903) (Figure 5). As far as the south side is concerned, the building was divided into five parts, corresponding to the sections of foundry, blacksmithing, boilerwork, machine tools (turning,

plating and drilling metal parts) and the adjustment and assembly of locomotives and painting. According to Pinto (1903), the driving force was provided by a fixed engine and by boilers that offered steam. The transmission was guaranteed by trees “whose direction is parallel to the longitudinal axis of the building, and whose supports, equidistant from 3m, are placed on columns that support the scissor truss” (PINTO, 1903, p.105). The north side, which housed all the machines used in woodworking, was divided into the following sections: sawmill, carpentry and painting. The fuel used in the machines was wood sawdust; the driving force arrived at the sawmill through three parallel transmission trees and the transmissions were underground (PINTO, 1903).

The layout of the sections was conditioned to the division of labor and the segmentation of space into “cars and wagons to the north” and “locomotives to the south” is evidence of this concern in maintaining a methodical work. In this case, each large section housed the activities that competed to its end, which would avoid wasting time with unnecessary maneuvers. From the visual analysis of the sections and internal paths, it is possible to identify that the locomotive assembly section, for example, allowed to disassemble and assemble parts for repair, which was done in the

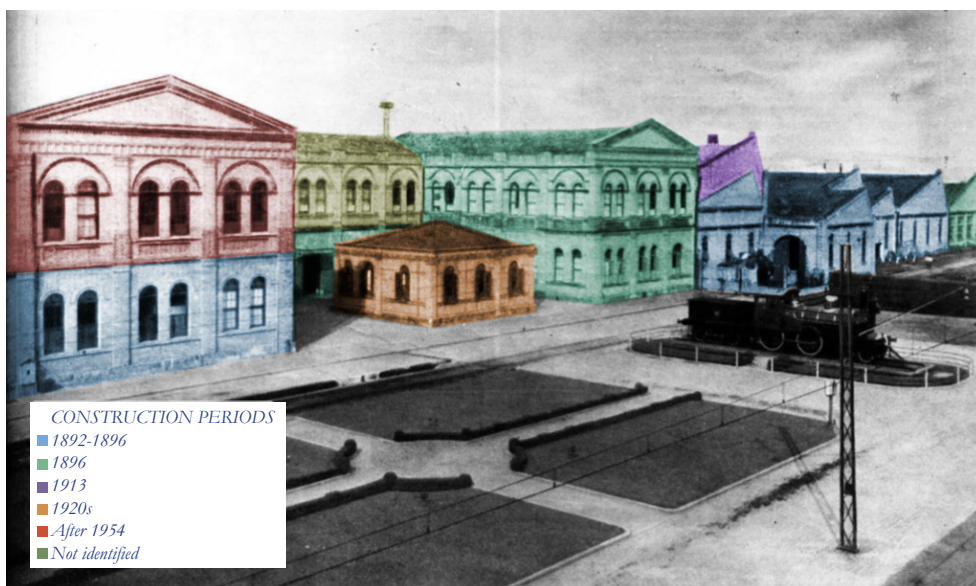


Figure 4 – Partial view of the facade of the workshops in the late 1950s.

Source: Collection of the Museu da Companhia Paulista.

Author's markings.

Figure 4 is not our authorship, but is in the public domain.

machine tool section, and then the boilerwork and the blacksmith shop. The steam engine responsible for the operation of the main shaft was in the middle of these sections, therefore, some machines should be close.

A condition of the shape of the railway workshops was the technology used in their operation. In the case of the Jundiaí workshops, they worked primarily with mechanical technology: the machinery used in the workshops' work was linked to pulleys and spindles, which, in most cases, were propped up on roof shears. Hence the importance of resistant scissor truss (and the need to replace wood with iron).

The plan on a longitudinal axis in a rectangular shape, following the railway, also points to technology as a condition of shape and, more than that, the rationalization of space, which is justified by the fact that the economy was a priority in the industrial period. Linearity also marks the internal and external flows of the complex (Figure 5).

The work flow was linked to technology, being directed by the internal paths of the workshops, another condition of the form. The representation of the layout of the internal paths (in Figure 5) was obtained by

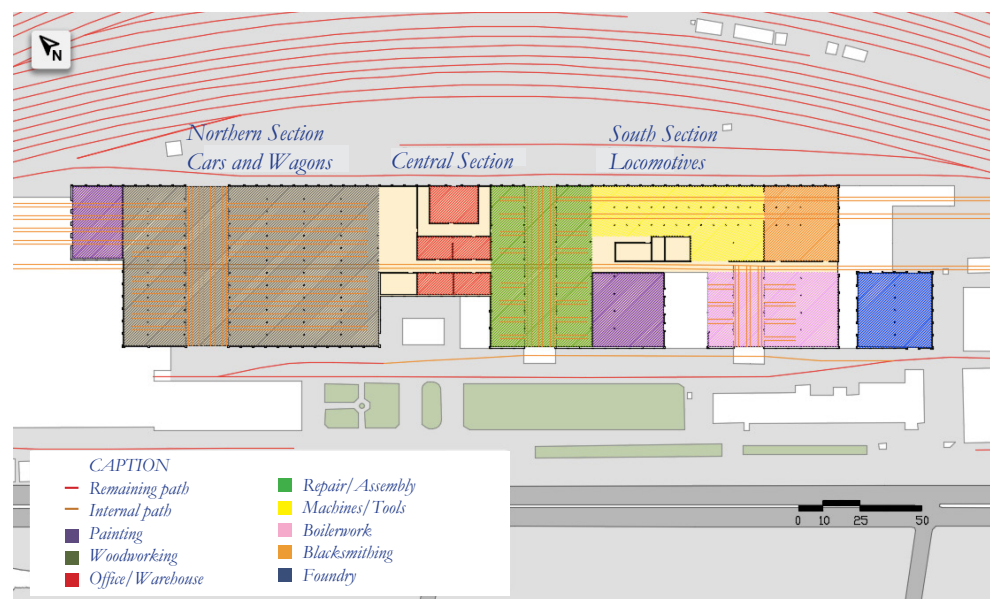
consulting old plans and visiting the site and eventually may present some flaws that are expected to correct from future contributions. In any case, it is clear how linearity defined the work space: the lack of a turntable (device that moves the undercarriage alternating the direction of its route) shows this flow in a straight line.

Some European models of paths were followed, such as comb, herringbone and grid, synthesized by Flamache *et al.*, in which the fills (paths and work areas) and empties (yards) formed the workshops (FLAMACHE *et al.*, 1889). In the case of the Jundiaí workshops, the absence of the internal yards does not inhibit the comparison; it is observed that their organization was based on the disposition of herringbone (FLAMACHE *et al.*, 1889), determined by the three traversers and the longitudinal path that crosses the building. As for the disposition, Perdonnet (1865) mentions that each case must be analyzed to avoid unnecessary maneuvers.

It is noteworthy that the concentration of sections in a single building reinforces the integrated and articulated way of operating the site. At the same time, this concentration would make it impossible to increase sections, which would force the company, in a future moment, to move to new spaces. It is also

Figure 5 – Plan of the Jundiaí workshops with indication of sections and internal paths (the colors of this figure are not related to Figure 4).

Source: elaborated by the author from The Phoenix Bridge Co. (1892) and Companhia Paulista de Estradas de Ferro (1969).



worth noting that the unification of the sections in a single building could become a problem in case of fire (FLAMACHE *et al.*, 1889).

Thus, it is observed that the main elements that influenced the shape of the building were the activities, the workflow and the technology required. In other words, this is a building totally focused on the functionalist logic of work. The topography and the dimension of the land are other relevant (and perhaps essential) elements of influence. It is not yet known whether they helped to enable or limit the project viable – see the reports of 1891 and 1894. Which now suggest that the land was chosen because it was of a good size and low cost and now indicates that the space was acquired because it was suitable for what it was intended to build (COMPANHIA PAULISTA, 1891; 1894).

Another issue to be addressed concerns machinery. As already mentioned, the Company's reports pointed out that the old workshops of Campinas were not adequate for the good functioning of the work, so they would be replaced by the new ones in Jundiaí. Thus, it is possible to affirm that the plan of the Jundiaí workshops was also conditioned to the machinery that they would house. It is noteworthy that the use of a free plan for the design of a railway workshop is the only feasible possibility from the economic and practical point of view, because it is the one that best accommodates the various machinery used for carrying out repair and related work. In addition, the free plan made possible spatial reordering.

The relationship between form, function and technology in industrial buildings is so relevant that it is not difficult to find visible renovations in different buildings of the kind. For Kühl (2013), this is justified because of its functional character. In the Jundiaí workshops, a study about some of these relationships can be seen in the texts by Sanchiz (2015) and Torrejais (2016), in which the traces of reforms are pointed out due to the change in technology employed. In this case, there was an increase in the high ceiling (in 1913)

to accommodate an electric crane and some openings were made in the gables to support equipment. These changes that can be seen and understood as the natural accumulation of layers of this type of space, defining the complexity of industrial architecture.

ABOUT THE OPENINGS, LIGHTING AND VENTILATION

The south-facing shed roof guaranteed daily lighting with diffused natural light, highlighting the importance of the installation, which, by itself, already ensured considerable natural lighting. For night work, electric lighting was used. The exchange of air took place through the windows, open on all the walls of the building, and through the oculi, which are currently visible in a punctual manner. When present, the roof monitor also served as a lighting and ventilation device. The presence of skylights for these purposes was also identified.

The oculi were present in the first construction plan of the workshops and, at a later time, ceased to exist because of some reforms. A remaining oculus can be seen in Figure 6. As for use, it can be identified that it was linked to the complex's technology, being seen in sections that needed constant air exchange. This justifies the scarce presence of the device in electrified workshops, being more easily found in buildings that functioned as a garage and that housed cars and locomotives that emitted a considerable amount of steam.

Regarding the side openings, some types of windows present in the complex can also be seen in Figure 6. Highlight for the rectangular windows: the different coloring of the bricks above them reveals that they have replaced arched windows. In a survey of the openings, it was noted that the arched windows were the originals of the complex, designed and exported by the North American Phoenix Bridge, according to architectural drawing in the MCP (THE PHOENIX BRIDGE CO., 1892b).

Figure 6 – External view of the Northern Section. Note the different openings that made up the lighting and ventilation system: shed, windows and oculus.
Fonte: Source: Author's personal collection, 2018.



In the area of the study's cut, it was also identified a rectangular window, also of metallic frame, present today in the Northern Section. However, the year in which the window was inserted was not identified, nor the reason for the replacement. Extrapolating the period of the study, it is possible to see other openings: in the South Section, there is the punctual presence of a rectangular window (seen at the threshold of Figure 4) and in the Central Section there are arched wooden windows and doors.

According to some railway treatises (BRICKA, 1894; GOSCHLER, 1865; MOREAU, 1898; PERDONNET, 1865), natural lighting is a constant concern, being advised for its practicality and for helping to save electricity. Shed, for example, is usually recommended in treatises to compose repair and adjustment sections. The use of side windows usually meets other criteria, its position must be relatively high so that the useful space of the wall below the opening can receive work benches.

In the Jundiaí workshops, shed roof can be seen throughout the original complex, regardless of the section's function. As for the side windows, in the South Section (where the building still preserves the original windows), they were installed 1.70 m high in relation to the floor, which makes it possible to arrange work benches on the walls. The windows of the Central Section, which housed the accountancy,

were installed at a lower height, about 1.20 m from the floor. This difference in height is not conditioned to the structural issues of the building, but to the internal functions of each environment. At the same time, it can be inferred that they are also related to the control of the worker, considering that those who are unable to visualize beyond their workspace are physically focused on their activities.

ABOUT THE MATERIALS AND STRUCTURES

The baked clay brick (not glazed) is the most prominent among the materials that were observed in the construction (Figure 7), it is used throughout the complex as a closure and, sometimes, for structural purposes. The predominant color varies between light orange and terracotta and, despite the construction date, the corrosion of the material can be seen in a punctual way, conditioning the damage to possible shocks and wear. The baked clay brick is a material very resistant to heat, also used in places that need to contain a large mass of steam. In this case, the importance of a good ventilation system is perceived in the buildings that use it. In some French railway treatises and courses, the use of this material seems to be linked to convenience, however, the stability in the face of the vibration of the structure and the security it offers against fires is not neglected.

In several elements present on the complex's facade, there is a subtle exploration of the aesthetic qualities of the brick, as in the arches, crowning the openings, the capitals, the friezes and some discreet ornaments – issues that will be addressed in the next item. Inside the building, some walls were plastered and roughcasted.

The bond follows the pattern named “English bricklaying” (HONOUR, FLEMING and PEVSNER, 1977), which may also be called “French bricklaying” or “cross bond” (EVERT, 2010). This type of brickwork is more stable than the regular one due to the size and arrangement of the bricks, and buildings that suffer constant vibrations lack, in fact, a thicker and more stable wall. It is noteworthy that in the *Dicionário de Estradas de Ferro de Picanço* (Dictionary of Railways of Picanço) (1892), in the entry related to brick masonry, the author comments that “the walls made with this masonry will not in general be plastered, and on their wall faces the bricks will present the combination called cruciform” (PICANÇO, 1892, p.56). When the author refers to the brickwork (using the word “combination”) English/in cross without giving further details of its composition, it is understood that the use of this bricklaying was already a consolidated knowledge by professionals in the field.

In the Jundiaí workshops, this bricklaying can be seen both in the areas that correspond to the original building and in the renovations and additions that have occurred over the years. It is noteworthy that this equipment, as well as the ornaments, supposed a certain degree of technical knowledge and its choice, in detriment to the regular one, may be linked to the fact that the first gives greater stability to the building or even the possibility of the builder having benefited from the same instruction that Picanço (1892) suggested existed.

Although it is commonplace to state that the exposed brick corresponds to the railway or factory aesthetic, it is important to note that this is not a rule. Such a statement can perpetuate precarious views on the property in question and distance discussions about its complexity as an architectural object, as already mentioned in another study (OLIVEIRA and SILVA, 2020). In this case, the field of study becomes more fruitful by turning attention to the manual work of masonry than to the supposed homogenization of buildings of the type.

Another material identified in the complex is stone, which is used in the foundation and supports the walls: mortar and equipment in a regular system with different sizes, most likely it was chosen due to the stability it gave to the building and for the protection against capillary rise (which would explain, in parts, the excellent state of conservation of the bricks). The stone, however, is not seen in buildings after the original construction. The wood is seen in a punctual way, present on purlins and rafters and on the old floor¹. The punctual use of wood is attributed to the issue of fire risk, because it is an easily combustible material². Its use in the roof structure, however, seems to us to be a convenient choice in terms of its lightness in relation to other materials: it would not be usual, nor interesting, be it due to the cost or weight, to make an entire roof structure in metallic materials.

The Complex's structural system is also composed of the metallic structures exported by Phoenix, to which the most characteristic shape of the Jundiaí workshops is attributed. The framework exported by the American company could be assembled on site by contractors, which is thought to have occurred in this case. The structure of the thin metal parts precludes the possibility of major damage to the building in the

¹ A deeper approach to this variety can be seen in the work of Sanchiz (2018), which includes a mapping of the types of flooring present in the Southern Section of the complex.

² Some contemporary studies, however, prove that wood can be more resistant than steel in relation to combustion.



Figure 7 – Main materials identified in the Jundiá workshops. Source: author's personal collection, 2019.

case of fire – which would not happen if the structure were made of wood. It is also important to note that the measure of the base of the scissor truss varies between 12 and 20 meters, to this fact, it is attributed the dynamics of the internal space where they were delimited precisely in relation to the activities that belonged to them, as previously mentioned. This difference between the bases of the scissor truss, which is reflected in the layout of the complex, is another reflection of the function on the final shape.

The original tiles of the complex are of the French type, in baked clay. At that time, some smaller workshops opted for zinc plate coverings, which would not be possible in the case of the Jundiá workshops, given that the large amount of steam expelled by the numerous locomotives could corrode this type of covering.

In the most recent buildings in the complex, almost the same materials can be seen: clay brick in English, French tile, metallic superstructure and concrete and wood floor. Other materials were also incorporated, such as polycarbonate tiles and reinforced concrete.

ABOUT THE ORNAMENTS

Strictly ornamental, some aesthetic elements appear on the facades of the workshops, suggesting a greater complexity than imagined at the beginning of the research (Figure 8)³. In the southern section of the complex, corresponding to the area dedicated to locomotive repair work, all ornaments were obtained by working with clay brick. It is possible to see a skewed relief in the gable, a skewed frieze (present even in the most recent sections) and the full arch borders crowning the windows. The skewed gable was obtained by overlapping the bricks in an advanced position in relation to the others, giving the effect of high relief. On the ridge, there is an ornamental vaulted tailpiece that refers to the figure of a rivet in profile (visible in Figure 8 with the indication “South Section”).

In relation to the skewed frieze, its shape comes from the position at 45 degrees in which the brick piece was installed, placed in a skewed way to the rest of the device. In Brazil, the name given to this type of frieze was not identified, but in England it is called

³The reader is invited to consult the author's master's dissertation, in which there are more figures on the ornamentation of the Jundiá workshops

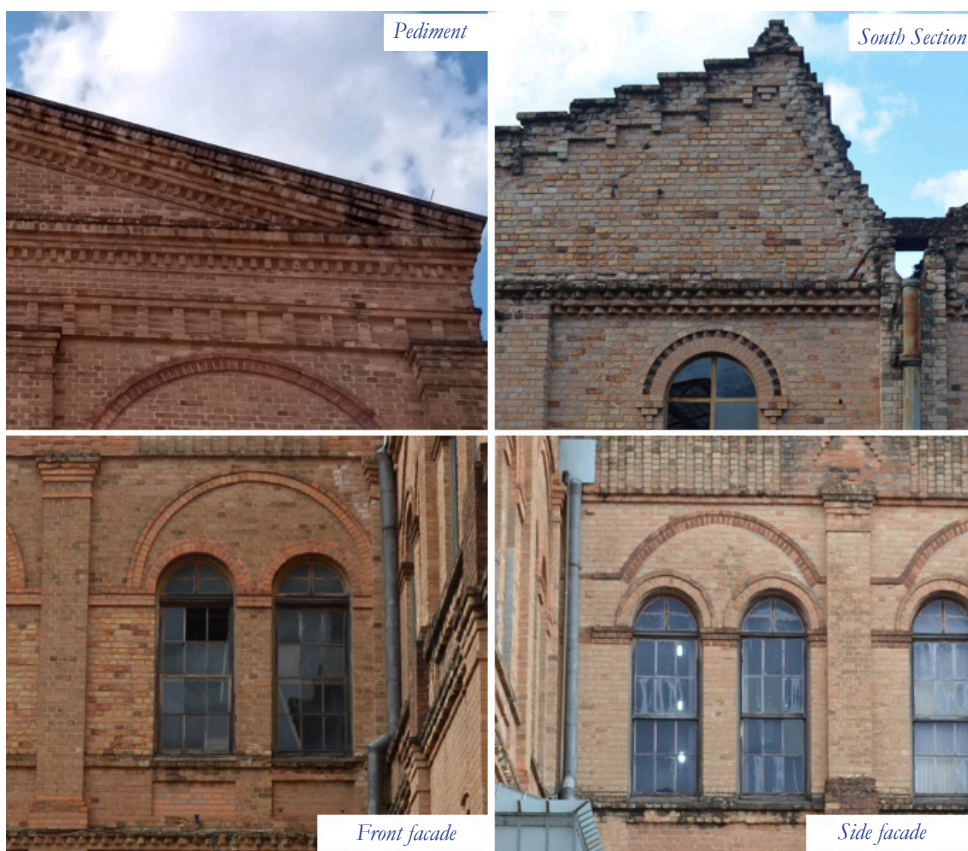


Figure 8 – Different ornaments identified in different sections of the Jundiá workshops.
Source: author's personal collection, 2018, 2018.

dog-tooth and in France it is known as *dent d'engrenage* (NASH, 1990; BARRUOL and ROUQUETTE, 2002) and has a purely ornamental character⁴. This frieze also appears in the old Lidgerwood foundry, in the city of Campinas, designed and built around 1884 by German professionals (MUSEU DA CIDADE, 2015). In a moment after the construction of the Jundiá workshops, the use of this skewed frieze is also observed in the workshops of the Companhia Mogiana, in Campinas, which can be seen in Rita Francisco's dissertation (2007)⁵

The window frames were also made with bricks through an exquisite work of exploration of their shape: they are composed of three arches formed, each, by bricks positioned in different ways and, at the tips of the

arches, a “triangular skewed tailpiece that is composed from the installation of the brick at different depths (visible in Figure 8 with the indication “South Section”). These borders can be seen, again, in the Lidgerwood foundry, in a less exquisite way, and in the workshops of the CMEF of Campinas. The staging of the high relief of the gable that hides the shed roof was not identified in another railway workshop in the state of São Paulo.

As it was possible to observe through the old photographs, the Northern Section benefited from the same ornaments present in the Southern Section. However, in a subsequent alteration, the date of which was not identified, sober layout windows were adopted and the ornament was limited to one small strip of mortar painted in white (Figure6).

⁴ Literal translation from French: gear tooth. In North America this same device can be identified with the name of shark-tooth. According to Barruol and Rouquette (2002), this decorative element is of Italian origin and later spread in Europe.

⁵ Apparently, the skewed frieze was also adopted by several stations built by the CMEF in the 20th century in the Ribeirão Preto region, such as those in Capão da Cruz, Corredeira, Domingos Vilela and others, and it is also visible in the stations of Moçambo, Monte Santo and others, in the state of Minas Gerais.

In the Central Section of the complex, as shown in Figure 8 (in the indications “Front facade” and “Side facade”), there are differences between the frontal and lateral elevations corresponding to the arches that crown the sets of windows that have radii of different measures, the base of the pilasters has different heights, the friezes are different. There are also some differences in the depth of the bricks, with some arches in high relief and others aligned with the wall. A detail that is not homogeneous and that can also be seen at random is the low relief picture just below the windows.

Also in the Central Section, one can notice the presence of the pediment crowning the facade (Figures 1 and 8). This neoclassical element, widely used in eclectic public buildings, also presents a rich work with the bricks, where various possibilities of using the piece are explored, all of them with an ornamental purpose.

Through the ornaments, it is possible to identify issues related to the function of the environment in which they were added, also pointing to the hierarchy of uses: the pediment, for example, is located where was the accountancy, an integral part of the administration office, which was seen as a superior section in relation to the others in the workshop. In addition, there can be a gradual lack of concern with ornaments over the years, an identification already carried out nationwide by Correia (2011). In this way, the simplification of the rectangular window ornaments is not only based on issues of economy and functionality, but also on a general trend of aesthetics in the manufacturing world.

At the same time, it is interesting to highlight the richness and aesthetic complexity of the ornaments in this building, categorized as industrial railway, considering that the workshop was built under the aegis of functionality – as well as the other examples of the type –, its ornaments indicate not only an aesthetic concern, but also a visual communication on social issues of hierarchical spaces. In addition, they follow the pattern identified by Correia (2011) as industrial buildings built at the end of the century in the state of São Paulo: the aesthetic concern is reflected in

the work and finishing of the material, with discreet ornamentation.

In any case, this ornamentation is consistent with what was advocated by Picanço (1892), who stated that the railway buildings should have a simple but artistic decoration; and that the facades should be elegant and with “appropriate emblems” (sic) (PICANÇO, 1892, p.1). The author also stated that coatings, when properly used, could be comparable to works of art (PICANÇO, 1892).

FINAL CONSIDERATIONS

The main objective of this study was to analyze the railway workshops of the CPEF in Jundiaí and understand the questions about their architecture and construction, about which some considerations are made. It can be said that the particularities of this building (unification of sections in a single building, shed floor throughout the complex, linear internal flow) come from the design work of engineer Gustavo Adolpho da Silveira. The materials and systems used were commonly used at the time, pointing out that the building is also the materialization of knowledge and construction conditions of the 19th century. It is also evident that the object of study synthesizes several constructive recommendations present in different European railway treatises and courses, pointing to a possible influence of this literature on the construction project of the Jundiaí workshops.

It should also be noted that economy and functionality were the constructive principles of the railway workshops. In this dynamic, in which there is little (or almost no) space for ornaments, the workshops in Jundiaí do not fail to present aesthetic qualities in relation to ornaments. The exquisite manual work identified on the facades is highlighted, which lacks further investigations on its application and execution, such as: who were the builders, what was the knowledge of these professionals or even if they had the autonomy to develop the ornamentation work or if they just followed the project.

Finally, it is evident that, from the study of the architectural elements of the railway workshop of the Companhia Paulista in Jundiaí, it was possible to understand the complexity of this building as an architectural object, the elements: topography, function and form are intrinsically linked, which makes it impossible to reduce the building to generalist statements. At this point, Figure 4 is resumed, which also summarizes the construction's complexity with its different temporal layers, which reinforces its character as an industrial architecture.

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