



Interior of the IBC Building in Presidente Prudente, Brazil

Investigation of historic, constructive, spatial and pathological aspects regarding the IBC (Instituto Brasileiro do Café) in Presidente Prudente, Brazil

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ABSTRACT

In this case study the building of the Brazilian Institute of Coffee (IBC) in Presidente Prudente, Brazil, will be presented. The building was built in the 1940s for the usage of storing coffee. The timber construction is more than 70 years old, which make the shed a historically important heritage to the city. After the revitalization process the building is used as an event center nowadays. The special thing about the architecture of the IBC consists in the construction as a series of wooden latticed porticos. These porticos are still functional and visually appealing, but after so many years of use, they suffer from pathological manifestations. To gain more knowledge about which problems are common in the wooden construction all the porticos were examined in detail. The investigation process revealed, that every portico is affected by at least one of the anomalies studied, even though the degree varies from portico to portico. In addition to the research about the interior of the building, its surrounding was analysed. The urban location and the proximity to other cultural hotspots mean a great chance for the IBC, which should be taken. Comparing the IBC to the cultural center and former coal mine Zollverein in Germany, it becomes clear, that there are several opportunities to reuse a historic building and bind it into city structure. Finally, a critical reflexion of the revitalization process, of the current use and the embedding of the IBC in the environment shows several weaknesses, which could be improved through maintenance and an overall planning concept.

KEYWORDS

revitalization, reuse, preservation, pathological manifestations, timber structures, urban public space

1. INTRODUCTION

Historical buildings are an enrichment for every city. They attract the population of a city as well as visitors and represent a huge potential. In today times a liveable and unique city with cultural heritage means an important location factor. Old buildings with a special architecture symbolize diversity and difference comparing other places (Tonhon, 2009). People identify with their neighbourhood and develop a feeling of belonging, which can contribute to the awakening of citizenship, as well (Reis 2007). Historical buildings make us want to learn more about the people and the culture of the past (Correia, 2014). They are points of collective memory and should be bound into the cultural landscape of a city (Périco; Baron, 2014).

But how can we implement old buildings as part of today's urban structure and at the same time save them for future generations? Which challenges do we have

to deal with regarding the preservation of historical building stock? Preserving historical heritage is not an easy task. It is our duty to gather as much information on the subject as possible. Above, the buildings should be integrated into the city and fulfil a certain use (Périco; Baron, 2014). Even though, the building stock might be well preserved, it should not stay abandoned for years - unused and unappreciated. For this reason, sometimes a conservation can be carried out only through conversion.

In this article those issues will be discussed based on the example of the former Brazilian Institute of coffee (IBC) in Presidente Prudente (Fig.1).

The city Presidente Prudente is located to the west of Sao Paulo and has ca. 227.000 inhabitants (Governo do Estado Sao Paulo, 2011). Its economy is based on the tertiary sector for the most part, even if ca. 80 years ago the cultivation of coffee and cotton was the most important branch of economy. Today the city holds the status of a main regional center, especially

Figure 1.
*Sketch of the outside
of the IBC.*



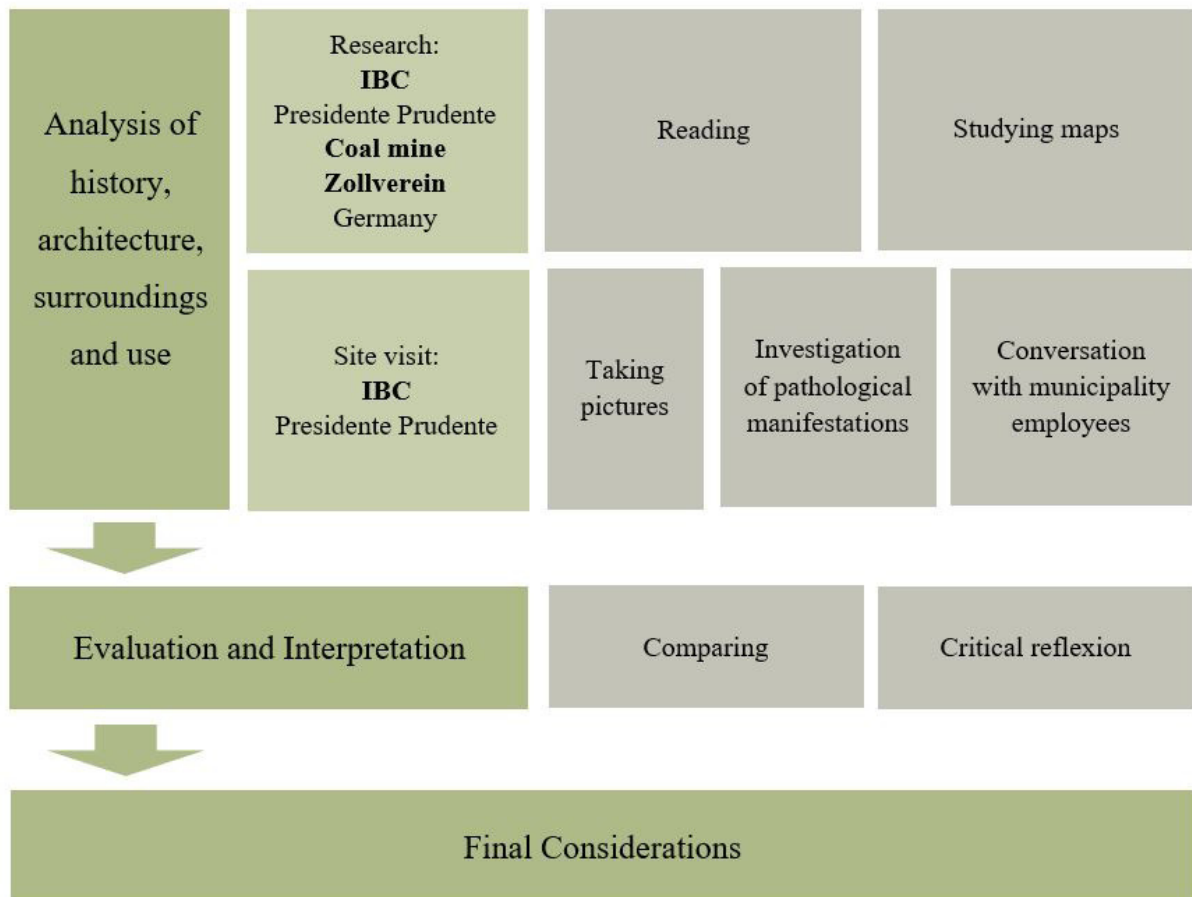
due to its privileged geographical location (Ache Tudo e Região, 2019). For this reason, Presidente Prudente can attract consumers from all the smaller cities around for shopping and entertainment (Périco; Baron, 2014).

This analysis aims to investigate the history of the IBC, to present the general state of the IBC with its construction details and pathological manifestations and put the results in the context of the current use. The goal is to make a critical reflexion of the revitalisation process and the current use as an event center.

2. METHODOLOGY

At first the investigation will examine the history of Presidente Prudente and the IBC (Fig.2). In addition, the architecture of the building and the recent revitalization process will be discussed. Analysing the building structure, the appearance of pathological manifestations in the wooden construction is going to be explained in detail. This part of the work is based on research and own investigations as part of a site visit. In the second step, a comparison between the

Figure 2.
Scheme of the methodology.



revitalization process of the IBC and the Zollverein coal mine in Germany will be pursued. Although the general conditions of the two projects are very different, there are several parallels due to the cultural reuse of both industrial buildings. Based on the example of Zollverein, suggestions for the future development of the IBC and its surroundings can be made. This article will close with a short summary and conclusion of the results.

3. HISTORICAL CONTEXT OF THE IBC

In the beginning of the 20th century the Estrada de Ferro Sorocaba (EFS railroad) arrived in Vila Marcondes and Vila Goulart and bring innovation and development to the west of Sao Paulo (Tonhon, 2009). Due to the rapid development around the railway, the City of Presidente Prudente was established in 1921. The railway station was named Presidente Prudente and gave the name to the municipality.

At this time the production of agricultural products, such as cotton and coffee, was an important part of the economy. After the economic crisis in 1929 the coffee as a good of luxury couldn't be sold anymore and the prices fell (Ache Tudo e Região, 2019). Coffee suffered a lot of devaluations throughout the 1940th and 1950th (Tonhon, 2009). For this reason, it became necessary to protect Brazilian coffee as a good and to build up a place to store the coffee (Martins; Fioriti, 2017). Due to this, the Brazilian Coffee Institute was created. Its task was the promotion of research and innovation to lower the production costs and increase efficiency. The institute supported fair competition and marketing of Brazilian coffee. (Périco; Baron, 2014)

According to information from the municipal officials, the IBC shed was built in the 1940s using wood obtained from the region of Presidente Prudente. The types of wood are called Ipê and Peroba. All the wood was cut and shipped to Germany, where it was treated, processed properly, fully formed and assembled. After that, the entire wooden structure

was dismantled and brought back to Presidente Prudente by ship. It is noteworthy that this process took approximately 7 years.

In 1959 the IBC shed was occupied by the State, originally for storing cotton. At this time the government had to fight a lot against coffee smuggling and in this context 4.000 bags of coffee were seized on the border to Paraguay. All this coffee had to be stored somewhere and for this reason, the IBC shed was used for that (Correia, 2014).

Another relevant information from the municipal officials relates to the first renovation of the IBC building in the 1970s, when pieces of wood from other wood species were used as well as metal nails to form the connection of these new pieces.

In 1998 the function of the IBC was transferred to the Ministry of Planning (Périco; Baron, 2014) and the shed was left unused (Fig.3).

After more than 15 years of abandonment and underutilization the transformation of the IBC shed was discussed in the Municipal Government of Presidente Prudente and in 2007 a contract about the new purpose of the IBC was signed (Tonhon, 2009). This contract granted the right of administrating the former IBC building for 30 years (until 2036) and it paved the way for the implementation of an Event Center (Botelho, 2013). More than 3.500.000 Brazilian Real were spent on the project. That's equivalent to round about 900.000 US Dollar. This investment was used to adjust various lacks which should support the establishment of an event center in the former IBC shed. Modern facilities were installed, a big parking area as well as a new outbuilding for administration and the concierge was built up. In addition, some safety precautions had to be set up e.g. emergency exits and adequate lightning. Among these improvements the accessibility of the area was a very important issue for the municipality of Presidente Prudente (Governo de Presidente Prudente, 2015).

On 15/10/2015 the IBC Event Center opened the door for the first time to host the 5th Book Fair (Correia, 2015). The revitalization process is finished and the IBC provides all necessities for various types of events.



Figure 3.
IBC before the revitalization
(source: Martins; Fioriti, 2015).

4. ANALYSIS

4.1 ARCHITECTURE

The IBC building is located in Vila Furquim in the north eastern part of the city. The total area around the building includes 36.000m² (Governo de Presidente Prudente, 2019). The shed includes an area of almost 5.000m² and is based on a rectangular form. The dimensions are 142m x 35m and the building is 16m high at the ridge. That is why the hall can house up to 7.243 people.

The large dimensions of the building interior remind of gothic cathedrals and can be perceived as a masterpiece of the carpenters of this time and as a proof of their skills (Botelho, 2013).

The IBC building is one of the biggest wooden constructions in Brazil. Twenty-two wooden porticos together form the hall at intervals of 6m.

Based on English architecture, the materials used for the construction were chosen by its availability

and accessibility. The construction is kept simple and the connection between the pieces of wood is constructed using the dowel process without nails or screws. The arrangement of the porticos resembles a cylindrical vault and thanks to the waiver of columns in the middle the shed can be used flexible and depending on the situation (Botelho, 2013).

The IBC building has a four-part roof with metal shingles. The west elevation of the roof is extended to protect critical points of the wooden porticos from the weather and other environmental influences (Périco; Baron, 2014).

4.2 SURROUNDINGS

Examining the environment, it's clear, that the IBC shed is embedded into an urban area quite near to the center of Presidente Prudente. This spatial relationship is a huge advantage and a good condition for the implementation of an event center.

During the revitalization process the road system around the Marcondes village was remodelled. Therefore, two streets were transformed and carried

out with two runways. These fixes will make a profit also for population living in Marcondes village. "The infrastructure is part of a set of works being carried out by the administration" (Governo de Presidente Prudente, 2008).

In addition to the technical infrastructure around the IBC, it is important to analyze the social and cultural aspects. The Matarazzo Center, a cultural center close to the IBC is already implemented as an important part of the social infrastructure of Presidente Prudente (Tonhon, 2009). Its structure allows to align various events like exhibitions, concerts and seminars. Most of the events are offered for free which makes it a place where different population groups come together. The offers provided in the Matarazzo Center could not replace the IBC event center, but both places can complete each other. So, both places could support each other in its business through proximity as well in the spatial as in the content manner.

5. PATHOLOGICAL MANIFESTATIONS

In the 1920th until the 1960th a lot of wooden constructions were used all over the country. Most of the buildings are still in use, but they suffer from pathological problems (Martins; Fioriti, 2017).

Wood is a very sustainable material and suitable for the constructions of various types of buildings. The handling is easy and doesn't consume a lot of energy. It's thermal insulation properties and its strength make it a very efficient material. On the other hand, as it is a natural material, it's mechanical characteristics and capacity depend on the arrangement of its fibres. The composition of the fibres is irregular and differ from every piece of wood to another. In addition, wooden material is very vulnerable to biotic and abiotic agents, which can impair and destroy the wood (Martins; Fioriti, 2015).

These anomalies can be found in the IBC building as well. There are various problems which have its beginning in diverse causes. The most present and frequent pathological manifestations in the structural system of wood are: biotic attacks, rot of pieces, fissures, deficient unions and geometrical

irregularities.

Wood is a material especially susceptible for biotic attacks e.g. by insects or fungi. These attacks don't cause mechanical problems, but they can increase the permeability and change the colorations of the surface. This will decrease its resistance to other negative influences. Another form of attacks through insects cause pipes on the surface area. This pathology is difficult to detect and to heal. The loss of strength depends on the volume of material which was consumed by the insects (Martins; Fioriti, 2015; Botelho Junior, 2006).

Abiotic attacks can cause various problems as well. In this case, by the term abiotic, physical, mechanical, chemical and climatic conditions are meant. Due to these conditions the wood can be deformed, it can rot or get fissures. Above, the abiotic attacks influence and impair the connection between the pieces of wood.



Analysing both sides of every Portico in the IBC building, there are results for 44 points of investigation. At these points, the appearance of the pathological manifestations, mentioned above, was counted. The chart below shows the number of affected porticos and examples for the corresponding anomalies (Fig.4).

The results show, that deficient unions and biotic attacks are the most common anomalies (Fig.4, Fig.5). Almost every of the 22 porticos suffer from these problems. Indeed, these problems often affect only a part of the portico. In addition to deficient unions and biotic attacks, a lot of geometrical irregularities could be determined. These deformations affect the whole portico and they are very difficult to prevent. Three of the porticos show critical deformations so that an additional support in form of a reinforcement out of metal or wood was necessary.

Fissures are one of the pathological manifestations that are common in the wood construction, too. Rot of pieces could be determined only at 5 points of investigations. Nevertheless, this anomaly can become a big problem, because it influences the load capacity of the construction.

To show the counted anomalies in context of the architecture of the building, the following figures

Figure 4.
Investigated pathological manifestations.

PATHOLOGICAL MANIFESTATION	NUMBER OF THE AFFECTED PORTICOS	EXAMPLES
Biotic attacks	n.19	
Rot of pieces	n.5	
Fissures	n.16	

PATHOLOGICAL MANIFESTATION	NUMBER OF THE AFFECTED PORTICOS	EXAMPLES	
Deficient unions	n.20		
Geometrical irregularities	n.17		
Reinforcement	n.3		

point out the different areas of appearance at the Porticos. Therefore, the porticos can be subdivided into the area of the base, the pillar, the portico knot and the beam (Fig.6).

As we can see in Figure 7, the right side of the building shows a huge amount of deficient unions. Most of them are missing completely. Especially in the back part of the IBC deficient unions reduce the stability of the wooden construction. The appearance of biotic attacks is very common as well, even more than on the other side of the building.

In the right side of the building the problem of fissures affects only a few points of investigation. Nevertheless, it should also be mentioned, that the last portico (number 22) suffers from fissures, which affect almost the whole portico. Together with deficient unions and geometrical irregularities this portico suffers from serious problems.

In addition, the figure shows, that almost every Portico suffers from geometrical irregularities, which affect great parts of the beam. When this problem occurs, the other side of the portico is affected as well. For specially affected areas a reinforcement became necessary. These reinforcements can be found only on the left part of the building.

The left side of the building shows more pathological manifestations (Fig.7). A great number of porticos are affected by fissures, deficient unions and biotic attacks. Happily, the rot of pieces is not a common pathological manifestation in the IBC Building. Only at portico number 14 the rot means a huge problem. There, we can observe signs of rot at the base as well as at the pillar of the portico.

Comparing both sides of the IBC it is getting clear that the right side suffer a lot from different kinds of pathological manifestations, especially in the back area. From portico number 8 until portico number 22 almost every portico shows more than one kind of anomaly. The left side of the building is less affected. There the biggest problems show up in the middle area at the porticos 6 to 14. Here, especially deficient unions don't matter as much as on the right side of the IBC. Since the pathological manifestations affect the proper function of the building it is of great importance to prevent further damages trough an appropriate

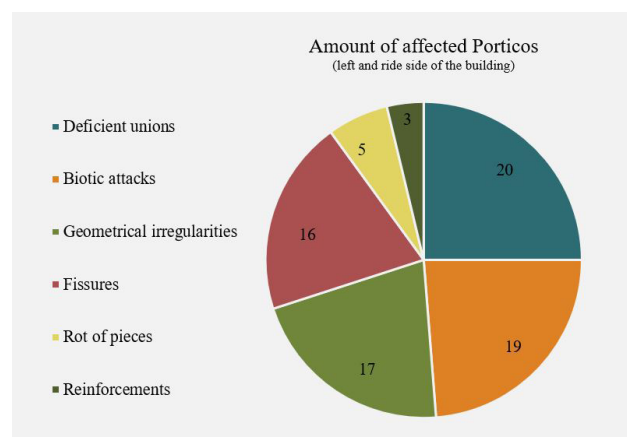


Figure 5.
Diagram about the amount of affected porticos.

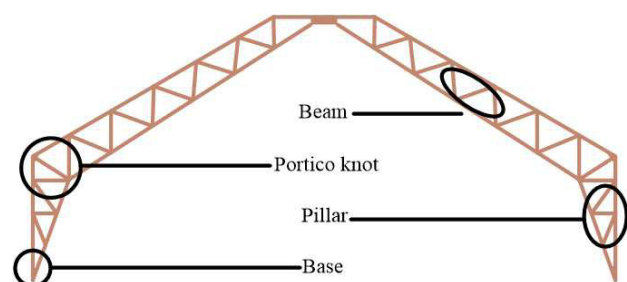
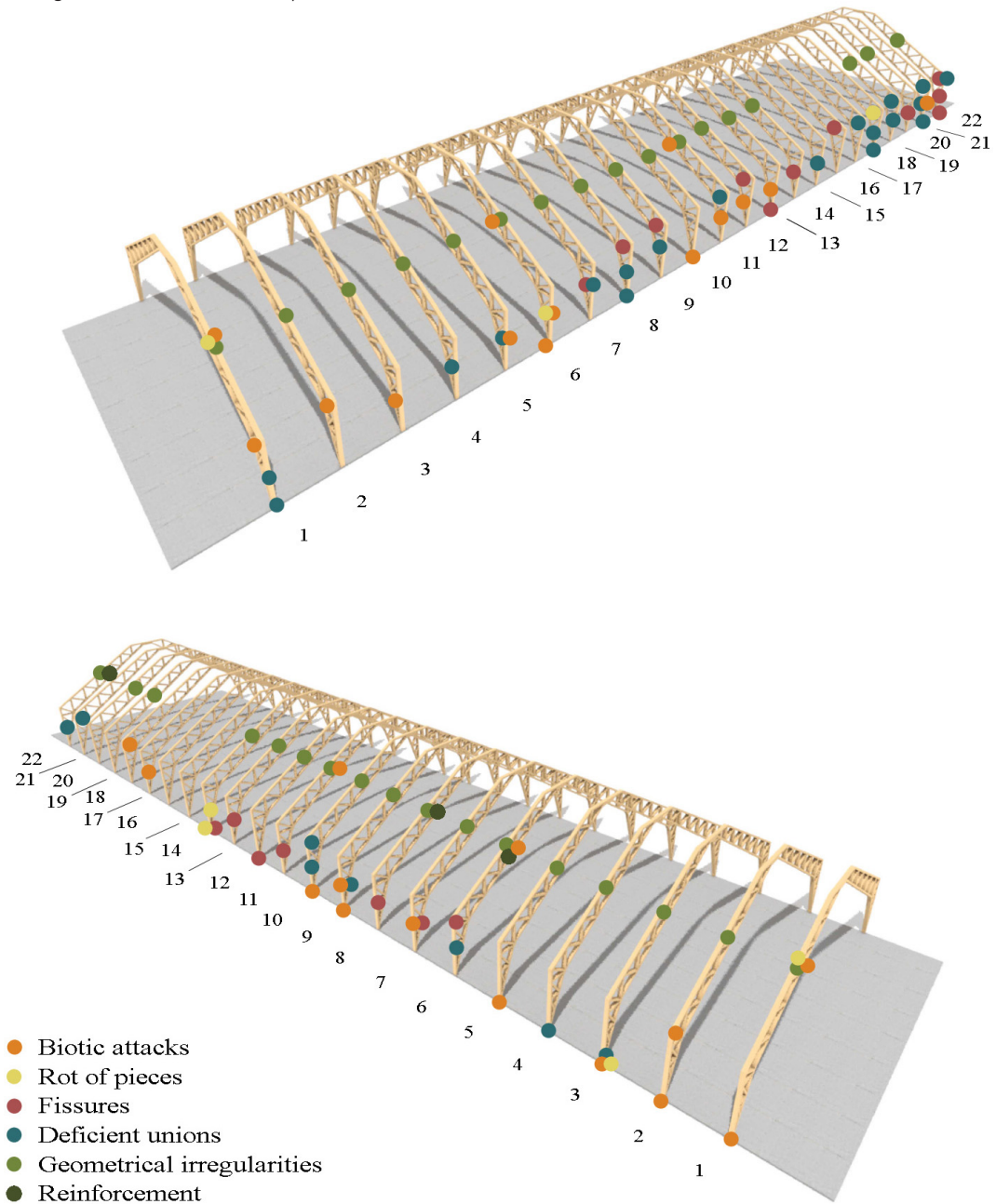


Figure 6.
Portico overview.

maintenance management and restauration. Most of the anomalies could be minimized if there was a preventive periodic maintenance. It is very important to remove dirt and accumulations of moisture to protect the wood from humidity. Also, the drainage system should be cleaned regularly, broken parts of the roof should be repaired as soon as they occur, and the protective coating should be restored on time (Martins; Fioriti, 2015). Until now it was not possible to take a sample to study the material properties more intense, because this would have destroyed the wood. For this reason, the analysis could be operated only superficially and some questions regarding the inner structure of the wood remain open.

Figure 7.
Location of pathological manifestations at the porticos.



6. CURRENT USE

6.1 IBC

After the revitalisation process the IBC can house events in a large scale and provides opportunities to attract people from all over the region. This makes a direct link to the development of tourism in Presidente Prudente. This is a very important issue, especially regarding the new demands in the tertiary sector (Périco; Baron, 2014). The revitalization can be considered successful. Now the building provides more space and comfort for the visitors (Correia, 2015). The Government of Presidente Prudente sums up: "We all hunger for food, but we also hunger for culture. This work will not only mark the story, but the lives of people" (Governo de Presidente Prudente, 2015).

The IBC is capable of hosting cultural as well as academic events (Périco; Baron, 2014). Cultural events like the Japanese Culture festival and the Festa Junina already took place there. Because of the huge area of the hall and the surroundings, even a car festival could happen there. It is appropriate for various types of shows, weddings or dinners. Academic events include all types of fairs, exhibitions, congresses, conferences or academic ceremonies.

6.2 ZOLLVEREIN, GERMANY

Zollverein was built up during the industrialisation phase to produce coal. After deep structural changes the coal production ended in the whole region and in 1986 Zollverein was closed. Nevertheless, the architecture, which is characterized by using only few materials (concrete, bricks, steel and glass), still was a unique heritage. As an example of the Bauhaus-Design in industrial contexts it documents a critical phase of the European industry and represents the extraordinary quality of architecture. For this reason, the coal mine industrial complex Zollverein was listed as an UNESCO world heritage in 2001 (Stiftung Zollverein, 2019).

The International Building Exhibition gave the impulse

to reuse the huge industrial area. The transformation took more than 10 years (Stiftung Zollverein, 2019). During the process it was paid special attention to avoid demolishing the historical building stock without necessity and allow only meaningful modifications (Universität Essen, 2000). The involved experts represented different opinions on the extent of transformations, but they came to the conclusion, that preservation and development don't have to be opposites (Stiftung Zollverein, 2019). They found a way to reach both goals and "not just reuse the building but make it possible for the visitors to experience it and its former purpose" (Stiftung Zollverein, 2019).

Today the former coal mine is a location of art, culture, industrial history, design and events. On the surface an industrial museum, a design museum, a faculty of arts and a swimming pool was realized (Stiftung Zollverein, 2019). Like the IBC, the building can host various events, too. It provides space for congresses, company events, presentations, anniversaries as well as weddings (NRW Stiftung, 2012).

6.3 CRITICAL REFLEXION

Because of the huge dimensions of Zollverein, a comparison with the IBC may be difficult. Nevertheless, both places have in common, that they mean an important historical heritage for their whole city. The population of both cities identifies with the buildings and may be proud of the efforts which were made to preserve this heritage. The buildings remind of former live and working conditions and the great architecture of these times. Today, regarding their new use as event centers, they support the economy and create jobs. For these reasons, both revitalization processes can be perceived as successful and well planned.

Despite various advantages, reusing a building often goes along with interventions in the historical substance. Setting up necessary aspects like sanitary facilities or emergency exits presupposes modifications and destruction. These changes made on the buildings can impair the aesthetic overall composition and reduce the value of the historic heritage. Nevertheless, a building like the IBC could

not be preserved if there was no meaningful use. Reusing the IBC as an event center will make the population appreciate it even more and develop a new view on this heritage.

Having an unbiased and inexperienced view on Presidente Prudente and the IBC some suggestions about the future development can be made at this point of investigation. During the research it became obvious, that the IBC is not as integrated into the daily life of the population as Zollverein. During the week there are no attractions, and nobody is visiting the IBC. It attracts the population only on certain weekends, but most of the time, the building is still unused. For this reason, it might be an approach to think about other kinds of attractions and uses, which fit together with the use as an event center. In Zollverein for example, the park and the museum attract people of all parts of the city, even during the week. Maybe it is a possibility to make a direct link to the Matarazzo cultural center in order to animate the use of the IBC.

Because of the spatial and contextual proximity between the Matarazzo Center and the IBC one

suggestion may be to strengthen the connection between both places. The old railway leads from the Matarazzo Center directly to the IBC. Building up a new urban green space for pedestrians on this path could be an idea for the future development of this area. As we can see in the reference pictures, there is a great amount of possibilities to reuse an abandoned railway and revitalize its environment. In Germany there are a lot of railways, which aren't used for trains anymore. Many cities saw an opportunity to implement a new green infrastructure on these areas. Today they are important green spaces, which connect cultural and historic centers. The paths are especially attractive for pedestrians and cyclists, because these railways offer a direct way without detours.

Especially the path around the Zollverein area is a good example of using abandoned railways (Fig.8, Fig.9). Indeed, the path can't be perceived as a direct connection, but it builds up a ring promenade (3,5km) all around the former coal mine. Today it is established as a kind of city park, which functions as recreation area. There are banks and various places to rest and



Figure 8.
Pedestrian and bicycle
path on the former railway,
Zollverein
(source: Thomas Meier,
Planergruppe Oberhausen;
<https://www.planergruppe-oberhausen.de/zollverein-park/>).



Figure 9.
*Green space in front of
the historic monuments,
Zollverein*
(source: Claudia Dreyße,
Planergruppe Oberhausen;
<https://www.planergruppe-oberhausen.de/zollverein-park/>).



Figure 10.
*Abandoned railway in
the center of Presidente
Prudente.*

enjoy. Visiting the area is free and possible all day (NRW Stiftung, 2012). To make the path attractive and safe for both pedestrians and cyclists there are two different lanes.

Therefore, the railway in Presidente Prudente is a missed opportunity. Until now, it is an unused and

dead area, directly in the city center (Fig. 10).

As we can see in Figure 11, a pedestrian path on the old railway could build up a historic and cultural corridor, which include the IBC, the Matarazzo and the old railway station (Fig.13). On this path there could be established a link to the history of Presidente

Prudente as well. The IBC was used to store coffee and there are railways, which lead directly to the building. That opens up a chance to implement a "coffee path", which inform the population about the coffee production and the history of the IBC. Like an open-air-museum the path could have points of remembering and feeling the city's history. It may be a suggestion to build up some information boards, theme-based playgrounds, coffee plants and historic equipment, which was used to process coffee. The path could end in the IBC, where some historic pictures could be shown on the walls. This could help to integrate the IBC event center more into the daily live of the people and opens a new green space for the population.

In the long run, it should be suggested to connect this path to the Parque de Povo, the biggest park in Presidente Prudente, as well. In the end, there would be a connection for pedestrians from north to south through the railway path as well as from west to east through the Parque de Povo. These urban green structures would mean a great asset not only to the neighbourhood but to the whole city. The population would get a new perspective on the historic heritage along the path and maybe this would contribute to the appreciation its significance. As the preservation of historic monuments is a difficult and expensive project, it is of great importance, that the population as well as the politicians support it.

7. FINAL CONSIDERATIONS

The results of the analysis show that it is important to appreciate the IBC building due to its history and as well due to its architecture. The Architect and Designer Clyber Luciano Vieira concludes: "The IBC shed is not a banal structure, but a true work of art engineering, which deserves to be preserved" (Correia, 2014).

Despite the pathological manifestations, the building suffers from, the architecture still can be described as outstanding and multifaceted. To preserve especially the wooden structure of the building it is of great importance to prevent further damages. As the process of repairing and reconstructing is difficult and

Figure 11.
Urban context of the IBC and suggestion on future development.



very expensive, investing in prevention of anomalies and in ongoing maintenance will be the better option. The experience shows, that preservation shouldn't end on a single building but take into account a larger scale. Historical heritage can be perceived as a cultural landscape that should be integrated into the city and can contribute to a sustainable city structure. It is still open, what will happen to the IBC building, when the contract of the municipality runs out in 2036. However, as it is a cultural enrichment for the city and an important historical heritage it should be preserved for future generations and used in an appropriate and meaningful way.

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