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Methodology for the identification of potential functions  
in the reuse of vacant industrial heritage buildings.  
Case study: the industries along the Almendares River, Havana.

Méthodologie pour l'identification des fonctions potentielles  
dans la réutilisation des bâtiments vacants du patrimoine industriel.  
Etude de cas: les industries le long de la rivière Almendares, La Havane.

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## **Dedictory**

To the curiosity to learn



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## **FOREWORD**





## **The formation in the Master Erasmus Mundus TPTI. The theoretical and practical formation.**

The Master Erasmus Mundus Techniques, Patrimoine et Territoires de l'industrie, TPTI follows a holistic methodological design to cover all the dimension of the problematic around the industrial heritage and its components. The development of the thesis was based on a formative process that register a period of two academic years from 2014 until 2016. The programs was organized using the class modalities of conference, seminary, webinar, practice class and field work. As main assessment the program is design to develop an individual research and a collective research. The formative structure of the program addresses the instruction divided in four semester plus a period of special mobility:

First Semester. Université Paris 1 Panthéon-Sorbonne, in France

Second Semester. Università degli Studi di Padova, in Italy

Third Semester. Universidade de Évora, in Portugal

Fourth Semester. Università degli Studi di Padova, in Italy

Period of Special Mobility. Universidad de Alicante, in Spain

The first Semester, Université Paris 1 Panthéon-Sorbonne, in France was coordinated in the frame of the Centre d'Histoire des Techniques, IHMC. It had as main topic, The History and Anthropology of the Technique. The modalities of class were conference, seminary, workshop and field work. A broad diversity of thematises that represents the basis for the understanding of the history, the memory and heritage, was provided by key specialists in the academic and work field. The process of learning utilized the method of the theoretical analysis of concepts, the study of cases as well as the learning by doing. In the case of theoretical analysis, the formation was oriented to identify the scope of term like history, memory and heritage, the components of the study of the technique like the operational thinking, operational chain, technical environment or technological transfer. Through the studies of cases received in the form of seminaries, it was possible to verified similar tendencies across diverse geographies in the way of development of a technique, or the gesture in the work or the system of transfer of knowledge. Also the interchange with candidate to PhD degree and professional of diverse background and geographies opens the understanding of problematic of the technique and the heritage from different approach. Other relevant content was in the field of the institutionalization of the heritage. From the study of the national structure of France until the

level of international organization like UNESCO: the legal frame about the heritage, in term of protection, conflicts, enhancing and scope of action of institution and actors. In the vein, it was significant the comprehension of the system, categories and management of the sources, and principally the ones conserved in Archives. In other hand, the interpretation of the nature of the sources, the credibility and the producers. Speciality connected with my topic of research, it was the course about the enhancing of the industrial Heritage through process of reuse. As student and researcher in the field of the industrial heritage, I incorporated new skill oriented to the process of communication of scientific result. One of them content was the development of website over the platform OMEKA. During this first period, I received course of French and English oriented to enlarge the vocabulary in the field of scientific communication. The period in Paris contributed to the acquisition and consolidation of skills and competences for the comprehension of the industrial heritage, components and dynamics, the universe conceptual and theorist of the research as well as the legal and institutional structure and instruments for its study.

Second semester was conducted by the Università degli Studi di Padova, in Italy, specifically, the Dipartimento di Science Storiche, Geografiche e dell'Antichità, DiSSEGeA. The main subject was the conservation, management and enhancing of industrial heritage. The program was design in the modality of seminary, conference, webinar, visit and field work. The formation covered process, object and components of the industrial heritage. In the cases of process, the social construction of the memory, signification and appropriation of an object of site and the enhancing. Discipline like anthropology gave the tool to determine the social relations, signification process and the appropriation. From Oral historical sources, it was possible to identify an addition resource for the construction of the collective memory. In the case object, especial attention to the evolution and consolidation of the industrial city and its singular component like ports, warehouse, service infrastructure and the utopic models as well as the models of company town, industrial district etc. It was support with the visit and work field to industrial zone of Venice, the company town of Schio and the proto industry of Thiene. In the case of the enhancing of the industrial heritage, the studies was addressed from the type of enhancing, the operation, the legal frame, the institutional organization until the identification of tendencies. In the case of the legal frame, was developed a precise training in the use of the instrument for the inscription to World Heritage List by practice class.

In the cases of the sources, singulars relevance had the enterprise documents and the enterprise archives. The nature of the documents, the producers and the content and type of evidence as

well as the process of archiving, management and enhancing of the archives were some of the key points developed. In other hand, a perspective about economic history in the world, tendency of economic growth, development in the Contemporary Society. Also, the evaluation of the relation between apprenticeship and the organization in guild, in the process of development and economic growth. An example is the type of enhancing through the discipline of museology. In this cases, it was taught the actors organization in the museum, the type of museum public or object oriented, public target, the collection, the repository as well as the criteria, method and tool for the exposition design. This formation was supported with the participation to the Luigi Micheletti Award 2015. In this space where possible to meet with specialist and directors or museum in Europe Union. It was a presentation of cases of study answering the criteria of innovation, creative and enhancing of the territory. This semester was characterized for an acquisition of new tools and methods as well as for good balance between concept and theory, tools and field work.

Third Semester in the Universidade de Évora, in the department of CIDEHUS, was oriented to a multidisciplinary vision of the cultural and specifically industrial landscape. It was conducted with the goal to adding other knowledge skills and competences, specifically from the study of this object, going from its role as a shaper of the territory, the comprehension and identification of the traces of the industrial activities as well as the legislation and institutionalization around the topic. The modalities of class were conference, seminary and visit. The methods followed were the critical approach to concepts and theories and the comparative analysis of cases of study. An interesting chapter was the one dedicated to aesthetic, taste and beauty from a philosophy point of view calling to the reflexion and the discussion. Besides, it was taught the analysis of the object as a testimony of social relations, costume, techniques, knowledge of the society and close connected with geographies and ways of communication. In the case of the type of sources, it was studied the image as evidence for the history. The technique and content in the representation, the objective of the support for the communication, especially in the case of industrial object and process. Other subject of interest was the analysis of the environmental policies and the social struggle around the industrial topic. The course was based on the identification of trends of behaviour in a cross analysis case of study as well as the improvement of skill in the interpretation of media sources, emphasising in the producer. In the case of the visits, it worked as a verification on the ground of the concept and conclusion arrived during the lessons: World Heritage cities, where is possible to observe the overlap of historical period as a source of the history, productive, religious and political, social practices, the process of

management of monuments and sites. In the frame of linguistic skill, I received course of Portuguese and French language.

As part of the formative offer of the program, during five week, took a special mobility in my case in the Universidad de Alicante, Spain. The topic of the formation was the Economy of the Cultural Properties. The structure of the course was conference, seminary and visit about the topic of the creative industries as an economic form for the recuperation of the heritage. A large bibliography was supplied with the goal to enrich the knowledge about the creative economics and other form of preservation and enhancing. The flexible per cent of the curriculum was adapted to each student in the way to correspond perfectly with the need of knowledge according the thematic of study. The final assessment was a comparative cases of study between a Spanish case and your object of research. For my subject, the Spanish case was the Company Town of Sagunto relevant in the role of the civil organization in the recuperation of the tenure of land. This case of study was support with conference, bibliography and a field work.

In the fourth Semester in the Università degli Studi di Padova, the academic program was addressed to development the thesis. The academic support was focus in add specific knowledge according the need of my research. In this way, a wide field work of study cases related to the recuperation of the industrial heritage and the regeneration of the city. One example is the visit to Milan, specifically the district of the Fashion and the company town of Crespi D'Adda. In the first case, it constituted a repository of diverse morphologies of appropriation and recuperation of the industrial past under the operation of the reuse. Small, medium or transnational enterprise, public, private or mixed initiative, full project or progressive one as well as sentimentalism with a familiar connection with the past or functional approach based on location, functionality and market opportunity or cooperation synergy. An important support was the continued discussion with the professor of reference Giovanni Luigi Fontana with pertinent suggestion to conducted the work and achieve the goal. The university provides a large amount of bibliography as well as the student user from the University allowed to access to scientific publications like the Web of Science.

As a complement of the curricular formation, I was selected to participate in the International Summer School "Social and Economic Heritage of Industrial Cities", with the goal to learn, from other experience, about the reuse of industrial heritage and the regeneration of deindustrialized cities with an economic and social focus. International experience in the social

and economic recuperation of cities with vacant industrial areas in Poland, Brazil, Ecuador, Mexico, Italy, Turkey, Japan, Ukraine and Russia. The Workshop was settled down in the city of Lodz, Poland, scenario of the development of the textile industry in the XIX Century with the singularity of a disperse structure integrated in the urban fabric of the city. This context is object of two models of reuse of the industrial heritage following divergent approach: one the small and progressive national investment of small enterprise and the second one, a large and ambitious project support by a foreign investment of a multinational. Other relevant thematic was the economic approach to the consequences, challenges and opportunities of the deindustrialization and the introduction of the economy of service.

The master Erasmus mundus Technique, Patrimoine et Territoire de l'Industria, TPTI, offers an experience of studies in cities of the world leaders in the preservation and enhancing of the heritage. Also the infrastructure academic of the university is support in the historical path of formative tradition based on the systematization of the education. The own university are exponent of the heritage of the nation as well as the humanity. In other hand, the opportunity to interchange criteria under a critical approach about the heritage, contributes to create the competence to recognize and understand, of well-known respect to the cultural diversity since the point in common in manners, objects, techniques that travel and settled from one cultural geography to another.

### **The research of the individual project and the collective project.**

The thesis is divided in two main parts, one dedicated to the individual project and a second one oriented to the collective project. The first material presents the thesis of the individual research titled " Methodology for the identification of potential functions in the reuse of vacant industrial heritage buildings. Case study: the industries along the Almendares River, Havana". My interest for the recuperation of the industrial heritage in Havana came from my time as student and then instructor in the Faculty of Architecture. From the studies in the Research group of Architecture and Industrial Heritage born my concern with the management of the wide amount of examples of Vacant Industrial Heritage Buildings in the territory of Havana. Precedent researches I developed in the way to achieve a progressive approach to the problematic. In the beginning the interest was oriented to the diagnostic of the territory for identify endogenous resources for the reuse of Vacant Industrial Heritage Buildings. Second research was oriented to role of Industrial Heritage in the revitalization of the small town and

after addressed to the study of the Tolerance of Industrial Buildings to maintain their Authenticity during process of reuse.

This background drove my curiosity about the process of definition of potential function for adaptive reuse of industrial buildings. The Master Technique, Patrimoine et Territoire de l'Industrie, TPTI, gave the conceptual basement and the tools to achieve this goal. The possibility of analyse and characterize many cases of studies of reuse of Industrial Buildings in condition of Heritage, showed the existence of a knowhow accumulated in these practices around the world. In this way, the period in the master was concentrated to understand the problematic and its diverse components.

The first semester, in the University of Panthéon Sorbonne Paris 1, the study was oriented to understand the object. The industrial Heritage and in a more precise way the buildings. The focus was oriented to draw the system of references that the Industrial heritage represent for the Society. Material and in-material, mobile or immobile components, the social traces and the meanings are some of their nature. One relevant element was the concept of the chain operative the expression of the spaces and buildings as well as the recognition of the humanization of the work and concept efficiency. Other objective was oriented to the comprehension of the relation of the object with the territory, its dependency and its influence, in the frame of factors for the location, the technique environment, the consequences of the industrialization and the urbanization process. Also during the period, we received the supervisor of Guillaume Blanc and the professor Anne Françoise Garçon that guided the process of bibliography consultation.

In the second semester, in the University of Padua, the interest was addressed to the process of enhancing of the industrial heritage. System of actors, tools, strategies, institutions, type of intervention and practices were the support for identify potential variables that participate in the Reuse. Besides, a large list of good practices around the world and the visit on the field of theirs that located in Italy. Understand the problematic from the perspective of the citizen as the engine of the process of signification and re-appropriation. Case the Arsenal of Venice, or the Faculty of Architecture in the Cotonificio, Venice or the Lanificio Conte.

In the third semester in the University of Évora, the attention was over the systemic thinking method and the identification of tendencies. Also I could developed the ability to find evidences in other supports like visual representation like images, graphics, videos or objects as well as daily publications like journals, blogs or public opinion in social networks. Moreover a course

in Methodology as the basement for the research and the developed of a workshop about the research topic. Besides this location was other opportunity to work in the field in study cases like the faculty of Architecture in Évora in a former Fábrica dos Leões, the recuperation of the waterfront of the harbour of Lisbon and Museum of the Electricity Tejo Central.

During the mobility in the University of Alicante, the study was over the understanding of the cultural economics as alternative of reuse and the civil actions in process of recuperation of the industrial heritage. Also I could profit with the visit to other case of study, the Sagunto Port, which I developed a comparative analysis. As complementary formation I have the opportunity to visit the department of planning of the University of Aachen and Dortmund, and specially the examples of the recuperation of industrial heritage of the Ruhr region.

In the four semester, in the University of Padua, the work was oriented to systematize the analysis of case of study to identified tendency by an inductive approach. The analysis of a wide list of cases of study as well as the state of art. It was defining the variables for the construction of the instrument and was determined the step and form for applied. During this period, the supervisor provided a broad bibliography and cases. Also the visit to a variety of cases diverse in actuation, use, investment, property and relation with the territory. The core was the Milan city, Crespi d'Adda and Dalmine. To reinforce the social and economic perspective, I participated in a Summer School in the University of Lodz, in Poland about the recuperation of industrial cities. Other cases like Manufactura and OFF centre were part of the list of cases.

The second material, is the collective research. The object of the tramway system around the world. From the beginning the research was planning in diverse goal to archive in each semester of the course. The period in Paris was oriented as in the case of the individual research to understand the object. Also was study the cases of the city of Paris and the periphery and its role in the transfer of the technology of the tramway in Europe. As well was study the environment technique of the Paris, the enterprises and diffusion and expansion of innovations. Also the course of Intellectual and Industrial Rights, gave the tools to opens of other field of sources like patent and brand. Beside the practical course of web design by Omeka platform offered a rich support for the digital divulgation of a technical object. The second semester in Padua, the main work was oriented to the communicative expression for the explanation of the object. The design of the website and the standardization of the information. Also the discussion about the topic from the perspective that each member of the team were studying

the object. The third semester in Évora, the goals was the analysis of the cases of the tramway of Lisbon. As well as the four semester in Padua that was the characterization of the case of the tramway of Milan. The richness of topics, tools, professionals, experiences and contexts that the master TPTI offers to the student introduce in the subject of Industrial Heritage, turn them into driving force resource for their own territories in the recuperation and sensibility to the Industrial heritage.



## **Abstract**

The problematic of the reuse of vacant industrial building is a topic relevant for the current society. It lays its regard over the vacant industrial heritage building looking for a possibility of recuperation or repurpose of their spaces. Though the number of examples overtakes the capacity of the decision markers. This together with a lack of tools for the definition of new function leave the spaces to interventions that no always correspond with the context and the object. Nevertheless, there is a large path already done in term of reuse of vacant industrial buildings. Some authors characterize this as a culture of the exploitation. This scenario is also present in Havana, Cuba. There is a vast representation of vacant industrial heritage buildings not correct exploited according their capacities. In this frame, the thesis is supported on the determination of a methodology for the identification of potential uses for the vacant industrial heritage building, taking as a relevant resource, the experience gained in the world in term of reuse that could be applied to the case of the industrial building along the Almendares River.

The research is divided in three chapters, the first concerning to the identification of the variables that model the problematic, the second focus in the learning by the experience and the design of the methodology and the third in the application of this methodology to the study case of the vacant industrial heritage buildings along the Almendares River of Havana. The application to the study case serves from the test of pertinence of the methodology. The thesis has as result the Methodology for identification of potential use for vacant industrial heritage building, a database of experience of reuse and a proposal of potential use to be applied in the case of the Almendares River.

## Résumé

La problématique de la réutilisation des bâtiments industriels vacants est un sujet pertinent pour la société actuelle, qui fixe son regard sur le bâtiment du patrimoine industriel vacant à la recherche d'une possibilité de récupération ou reproposé de leurs espaces. Cependant, le nombre d'exemples dépasse la capacité des décideurs. Ceci, combiné avec un manque d'outils pour la définition d'une nouvelle fonction, laisse les espaces pour les interventions qui ne correspondent toujours avec le contexte et l'objet. Néanmoins, il y a un grand chemin déjà fait en question de réutilisation des bâtiments industriels vacants. Certains auteurs qualifient cela comme une culture de l'exploitation. Ce scénario est également présent à La Havane, Cuba. Il y a une vaste représentation des bâtiments vacants du patrimoine industriel qui ne sont pas exploitées de manière adéquate selon leurs capacités. Dans ce cadre, la thèse est soutenue sur la détermination d'une méthodologie pour l'identification des utilisations potentielles pour le bâtiment industriel vacant du patrimoine, en prenant comme une ressource pertinente, des expériences acquises dans le monde en questions de réutilisation qui pourrait être appliquée au cas du bâtiment industriel le long de la rivière Almendares.

La recherche est divisée en trois chapitres, le premier concernant à l'identification des variables qui modélisent la problématique, le deuxième dans l'apprentissage par l'expérience et la conception de la méthodologie et la troisième a l'application de cette méthodologie à l'étude de cas de les bâtiments industriel vacants de patrimoine le long de la rivière Almendares de la Havane. L'application à l'étude de cas permet pour le test de pertinence de la méthodologie. La thèse a pour résultat la méthodologie pour l'identification des utilisations potentielles pour vacants bâtiment industriel du patrimoine, une base de données de l'expérience de la réutilisation et une proposition des utilisations potentielles à appliquer dans le cas de la rivière Almendares.

# **INTRODUCTION**



## **Definition and justification of the subject**

The reuse of vacant industrial heritage building is a topic of interest in almost all cities in the world. The present of industrial building in vacant condition is a global subject however their causes differ among them. Change in the polity of use of land, incompatibility of the industrial function in the urban fabric, the re-dimension of the economic industrial, the globalization and the industrial delocalization as well as the oil and economic crisis are some of the reason to standstill the industrial activity. One condition or others, positions the current city, in a panorama where the vacant industry are represented in all structures.

It is understood as vacant industrial heritage building, this edification related with production process in direct way: as a container of the productive chain or indirect form, as support of the process, which was standstill and remain in this condition or is underuse. Also it has to be an object of an attribution of social, cultural, historical, aesthetic, technique or scientific value, recognized or not under a declaratory.

These objects are subject of process of recuperation. A variety of type of interventions operated over them. Conservation, Restauration, Reconversion, Rehabilitation, Reuse, as well as Renovation are, from minor to major transformation, actions that turn them into useful. The Adaptive Reuse, is one of this possible actuation. It represents the balance between the cultural and economic value. The identification of the use for the vacant structure is the key point to address an adequate recuperation. Adaptive Reuse, is defined as the incorporation of a new function in a pre-existent structure taken in count the capabilities of the infrastructure from the physical, social, cultural, environmental and economic point of view.

## **Definition of the scope chronology and geography**

The research is addressed from the disciplines of urban planning and conservation of the industrial heritage. It has as object the vacant industrial heritage buildings and as field the operation of adaptive reuse. Research is developed in two level of action. One is oriented to the systematization of reuse experiences of vacant industrial heritage buildings in Europe, America and Australia with the goal to identify the potential use for similar structures according the urban characterization and the industrial type. The second one is addressed to the application of the methodology to the case study of the vacant industries along the Almendares River which is located in Havana city, Cuba. The area began as productive axes in XVI, together with the developed of the settlement. The overlapping of historical layers covered the traces of many of these exponents and others are object of new uses. Thus, the

buildings that are object of studying corresponds with those built at the end of XIX or at the beginning of XX Century and they are underuse or without any.

### **Interest scientific of the subject**

The largest amount of vacant industrial buildings that covered the cities overtakes the capacity of the decision markers to answer to the future of these structures. The reuse is considered a way for the development of the territories and the safeguard of industrial heritage (TICCIH, Retooling, 1) (UNESCO-MAB-SCOPE, 2010,1). In this way it is reflected in the TICCIH guide to Industrial Conservation. Studies from diverse disciplines exposes the contribution that the reuse has in term of energy consummation, conservation of cultural values and use of resources (ICOMOS, TICCIH, 2003(.)). International institutions like UNESCO, recognized the reuse as part of the appropriate operation to run over the industrial heritage. It is the more expanding operation over the industrial buildings due to the physical flexibility of these structures to incorporate other functionalities. But the process of decision of the pertinent use is subject of vulnerabilities that transits among the taste of the decision maker, the mimicry of non-contextualized initiatives, no-economic sustainable proposal to the loss of recognition of the pre-existent activity.

The relevant of the topic is support in three dimensions: first in the particularities of the industrial object in front of traditional tool for the land use definition, second in massive representation of vacant industries in all contexts and third the empiric way that today dominate the reuse that bring the apparition of social consequences like gentrification, loss of the sense of belonging or loss of the value of the object.

The specificities of the industrial architectural theme presents a panorama described by the present of enormous structures, charged of machineries, a common ownership with prevalent economic interests over cultural or social ones, with a population associated to the development of the production that affront several problems as consequences of the standstill and placed over a land classified for industrial purposes but quite attractive for real state. The traditional instruments to defined land use bases their judgement in relation with the centrality and the amount of inhabitants. Thus it is identified for each type of case, uses of first order, secondary and soon on. But, this method did achieve to cover the problematic of industrial programs. The existence of large structures not always corresponds with a large settlement or one with a significant centrality. In this way, a core like a Sugar Mill Company Town with a permanent population around 3500 inhabitant but a built area of 18000 m<sup>2</sup> just could be receptor of

activities of low capacity when physically the object is capable to admit other functions. Or in other way, the dimension of the object could be tentative to locate largest activities that then doesn't find a demand.

The second argument is connected with the massive representation of the industrial heritage in the urban structures (Danbrom, 2004, 68). In this point, the major interest turn around to find diversities of answers according the variety of object and scenarios. Thus it is necessary the existence of a tool that systematized the experience stored and presents a range of potential solutions, more or less precise with the case, according the interest of the decision marker. Also the capability of an approach that simplifies the problematic in simple units or criteria that made more accessible the comprehension of the whole. Besides, the possibility to has a fast first review of the potential of the structures (Danbrom, 2004, 18).

The third position is justified by the vulnerability of the process of decision of new use. An inadequate use disconnected with the territory and the context in general, bring social problematic that before was not present. Some example is the refill of the social fabric, strategical planning or derivate of the application of not correct use as well as the no economic viability, or the low impact in term of job posts as well as the loss of the sense of belonging by the citizens (Danbrom, 2004, 68). It is necessary the existence of a tool that reduce the vulnerability of selection.

### **Problematic**

The reuse of industrial buildings is a topic that today appears in diverse contexts and expressions. It is considered the viability solution for the industrial remains for its capability to equilibrate values and interests (Conejos, Smith and Lagston, 2012(.)), A review of the case studies demonstrated a progressive approach to the definition of pertinent operations. It evolved from the dichotomy of restauration and renovation to a large spectrum of grey that unload in major or minor levels modifications. The Adaptive reuse, appears after operations like reconversion, reutilization or recycling. It is in its own terminology, that the attribute of adaptive stresses over the topic of compatibility, capability and tolerance. As a Mancuso expressed, it is the process of creation of a culture of the exploitation of pre-existent structures (2007(.)) that is contained the raw material for the identification of the form of actuation.

The urban areas around the world are perfect containers for the vacant industrial buildings. It is the own process of industrialization that brought the urban practice to the territory. This bionomic of industry and urban area, in a reciprocity of influence and dependency, where they

could draw their development. Thus, all the attention goes over the definition of the possible new usage. But the great number of objects hinders the identification of uses. From the cases of the legislation, international Charter like The Nizhny Tagil Charter for the Industrial Heritage confirms the reuse of adequate operation (ICOMOS, TICCIH, 2003). For the cases of the instruments, there are limited to defining general guidelines. Other researches are oriented to value the capability of existent buildings to receive other function (Langston, 2012, 2). The literature presented conceptual approach from the local development. However, there is a lack of tool for definition of new use for the industrial remains (Gorse and Highfield, 2009 cited in Conejos, Lagston and Smith, 2012, 2). Nevertheless the experience of reuse offered an opportunity to systematize practices and identify potential use.

The reuse of vacant industrial heritage buildings in Cuba is developed by the State. The intensive works are carried by the Office of the Conservator of the Old Havana City. Warehouses in the Harbour of Havana, Tabaco Factories, Silos, Electric Plants and other programs are objects of project of reuse. The process of selection of the new use as well as the grade of intervention came from an empiric process. A lack of tools to identify the pertinence of the new activities, exposes the territories to vulnerabilities. One example is the waterfront of the Havana harbour that with an interest to democratize the waterfront, became today in the object of exclusive activities oriented to minor sector and foreign visitors. There is a prevalence of one dimensional strategic focus in the economic feasibility.

The preoccupation about the reuse of vacant industrial heritage buildings appeared in the frame of Academic Research Group, Architecture and Industrial Heritage of the Faculty of Habana. The first steps was oriented to the reuse of the industrial heritage of sugar mill company town for the local development in the scale of small town. Other research connected with this topic is annually developed in the faculty in an explorative way. The lack of systematization of experience brings to repeat no pertinent models that in other contexts have demonstrated non desirable effects.

The largest group of vacant industrial buildings are the result of the economic crisis of the 1989 due to the collapse of the Socialist Block. The oil and financial deficit and the limitation of importation of raw materials and components brought their progressive standstill waiting for better times. As a typical measure in the frame of industrial standstill, the infrastructure more efficient were supplied with components and machineries from the less ones. Similar situation happened with the sugar mills that a reduction of the sugar market drove to the re-dimension



of the sector and the standstill of many complexes. One time more one industry provided technical support to the other or the full machineries were sold to other countries. Besides, the rest that remain usually were object of vending as a raw material to earn financial resources.

The panorama of the vacant industrial building of Cuba, is represented, in the majority of cases for buildings with disperse machineries. Nevertheless the industry is a symbol of the power of the workers and the victory of the majority population. It was the basis of the social revolution in the struggle for the right of the workers as well as the representation of the women as independent social entity. Also it constitutes the memory of better times of innovation, mutual help and the construction of a new society. Thus, the perception of the vacant industrial buildings is charge of signification. In this way, the Cuban National Commission of Monument has inventoried all the industrial infrastructure of the country and has declared grade of protection.

In other hand, all the industrial infrastructure belong to the State has a public property. However the administration is in charge of the Ministry correspondent according the productive sector. The fragmentation of the system of institutional system and the lack of capabilities of territorial governance placed the object under a priority economic valuation without integrates social, environmental and cultural values. The infrastructure usually remains empty or underuse due to be a property of a sector that don't need any more of it or don't know how management.

In this scenario is placed the axes of the Almendares River. With a passed that began from the foundation of the city and register the evolution of productive expression in the development of the territory. It is an attractive area that opens the Habana city from North to South by the present of a Metropolitan Park. It area connected central zones with periphery ones where capabilities and needs area expressed in diverse way. Traditional tool of planning of use land, are not available to cover the singularity of the relation among territory and industries. The particular mixture of the land and society, constituted a challenge for the definition of new uses. In this way, it is necessary the creation of a methodology capable to learn from the experience stored and answer to the particularities of the industrial structure and the territory.

## **Problem**

The limitation of the traditional land use tools to answer to the specifics of the vacant industrial land, the vulnerabilities of the process of definition of new uses and the large amount of objects that compromises the capabilities of the decision makers, bring one dimension impact of the reuse, compromise the loss of the cultural values of the industrial heritage, the loss of the sense

of belonging and a restricted panorama of potential development of the territory of the industries along the Almendares River.

### **Hypothesis**

A tool that systematizes the experiences of reuse of vacant industrial heritage buildings bases on the characteristic of the urban area and specifies of the vacant industrial heritage building contributes to the identification of potential use, object of valuation according the grade of pertinence with the needs and the capabilities of Almendares River and its vacant industrial heritage buildings associated.

### **General objective**

Determining a methodology for the identification of potential uses for vacant industrial heritage building in urban areas available to be applied to the study case of industrial buildings along Almendares River.

### **Specific objectives**

1. Determining the variables that model the problematic of the definition of new use in vacant industrial heritage buildings
2. Creating the method for the systematic analysis of the cases.
3. Identifying tendencies of reuses according urban area characteristics and the industrial types.
4. Designing the methodology for the identification of potential uses for vacant industrial heritage buildings
5. Characterizing the Urban Area of Havana and the Almendares River.
6. Characterizing the Industrial Type of the vacant industrial heritage buildings along the Almendares River.
7. Determining potential use for the vacant industrial heritage buildings along the Almendares River.
8. Valuating the pertinence grade of the potential uses for the case of La tropical Brewery according the needs and capabilities of the context and the objects.

### **Description of the methodology design**

To achieve the determination of a tool for the identification of potential use for industrial vacant heritage building along the Almendares River, the research followed an inductive method

analysing the part of the problematic as well as particularities of the references of cases to identify premises possible to applied to other similar cases. Thus the research is divided in three moments: first determining of variables of the problematic, second the systematization of cases of study and the elaboration of the Methodology and third the application of the methodology to the study case of the Almandares River with the correspondent valuation of the pertinence of the potential use.

The first chapter corresponds with the first moment. It is dedicated to the identification of the variables that participate in the process of reuse of vacant industrial heritage building in urban areas. The problematic is divided in four unit of analysis: 1) the Urban Area as the context where are located the industrial buildings 2) the industrial building as the object 3) he recognition of value as an attribute of the object and 4) the adaptive reuse as operation over the object. The instrument of analysis is the bibliography review, observation of the reality and analysis of other instruments.

The second moment it is comprised in the second chapter. It corresponds with the 2, 3 and 4secondary objectives. It is created the instrument for the systematic analysis of cases. It is characterized the Urban Area and the Industrial Type as well as the Value of the Object and the Reuse by a guide. The compilation of data in register in a table for the identification of tendencies of reuse according the characteristics of the context, object and the attribute of value. By the tool of the morphological box it is built the model for potential uses.

The third chapter corresponded with the third moment. It is concerned to the application of the methodology to the Study case of the vacant industrial heritage buildings along the Almandares River. First it is applied the guide for the characterization of the Urban Area and the Industrial Objects, then it is built the morphological box according the corresponding urban and industrial classification and it is defining the potential use. By a method of analysis of objective it is valuated the pertinence of the potential use with the study cases. It is apply a diagnostic to identify the objective to measure and its priorities. The potential uses are subjected of a valuation of their correspondence with the objectives and the priorities. It is identified the grade of pertinence.

The conclusion, recommendations references and bibliography are placed following the end of the chapter.

## **Sources and bibliography**

For the research was consulted primary and secondary sources in the form of printed sources, iconographies and webography. The languages of the material are English, Italian, Portuguese, French, German and Spanish.

In the first chapter the main sources were produced by institutions like National Statistic Centres and National Ministry of Culture, United Nations Organisation ONU, United Nations Educational, Scientific and Cultural Organization UNESCO, The International Committee for the Conservation of the Industrial Heritage TICCIH, United Nations Human Settlements Programme Un-Habitat as well as the United Nations Economic Commission for Latin America and the Caribbean CEPAL. The type of content were laws, regulations, methodology guides, PhD dissertations, monographies, bulletins as well as reports. As a support of these sources were articles registered in scientific and academic database like SciELO, Dialnet as well as Researchgate.

In the second chapter, the sources consulted gave the evidence for the characterization of the Urban Area, the industrial vacant heritage building as well as their project of reuse. In this way, there is a great diversity of forms, origins and producers. Scientific articles, inventories, technical reports, master plans, promotion flyers, conferences as well as the website for the promotion of the objects, are some of the type of materials. Some of the producers were City council, Ministry of Culture, Tourism Offices, local association for the promotion of the industrial heritage and the industrial archaeology and the TICCIH national delegation. For the characterization of the Urban Area and the territory, the main sources where the database of Citypopulation that covers all the world based on the national statistical data and Eurostat for the European Union countries.

The third chapter was oriented to the Study case located in Cuba. The historical review of the evolution of the Havana city and the axes of Almendares River required the multiple consultation of sources to contrast the evidence. Primary iconography sources were relevant to support the evidence that secondary sources provided. Also it was considered the comparison of evidence registered in documents produced by diverse actors like historians, urban planning, economist etc. Besides it was consulted iconography material of the industrial property like the brand.

## INDIVIDUAL RESEARCH

Methodology for the identification of potential functions  
in the reuse of vacant industrial heritage buildings.

Case study: the industries along the Almendares River, Havana.



## **CHAPTER 1**

Adaptive reuse for vacant industrial buildings

Variables for the analysis of study cases





## **Abstract**

The conceptual and theoretical review is oriented to identify variables that participate in the problematic of the re-programming of the abandon industrial heritage buildings in urban areas under the operation of adaptive reuse, which could be relevant to identify tendency in a global comparative analysis of cases of studies. The studies cover the analysis from the discipline of urban planning however is considered the approach that others science propose, with the aim to understand the multi-dimension of the problematic. The theoretical and conceptual research is structured in four units of analysis that cover the main fronts of the problematic. The first unit is the Urban Areas. It is understood as the context that models and contains the industrial buildings. Also that it is the support of the elements that determine the criteria for the Judgement of Value of an object and the satisfaction of the territorial needs. Thus, it is relevance to understand the characteristics of the Urban Area in term of demographic, land use, administration, geographic specification as well as urban morphology.

The second unit of analysis is the "vacant industrial heritage buildings" in Urban Areas. The position broaches the elements that characterize the industrial buildings from an urban point of view. The objectivity to limit the scope of the term corresponds with the interest of analysis from an urban scope, cases that are subject of operation of reuse. It is studied the morphology and the consequence of the process of abandon.

The third unit is dedicated to the valorisation of industrial building as heritage. It is studied the diversity of initiatives, legal frame from a global to local and condition of authenticity and integrity, key points in term of intervention. It is determined the variables for the comparison of cases. The fourth unit is related to the Adaptive Reuse as operation for the enhancing pre-existent building. It is argued the pertinence of Adaptive Reuse for the enhancing of pre-existent building. It is analysed de criteria of capacity of the building to be re-use as well as the restriction that the heritage condition could suppose for them.

## Résumé

L'étude conceptuelle et théorique est orientée à l'identification des variables impliquées dans la problématique de la réutilisation des bâtiments vacants industriels du patrimoine en milieu urbain, dans le cadre de la réutilisation adaptative, qui sont pertinentes pour la détermination des tendances dans une analyse comparative globale des cas d'études. Les études portent sur l'analyse de la discipline de la planification urbaine est cependant considérée comme l'approche que d'autres scientifiques proposent, dans le but de comprendre la multi-dimension de la problématique. La recherche théorique et conceptuelle est structurée en quatre unités d'analyse. La première unité est les zones urbaines, entendue comme le contexte

La première unité est les zones urbaines, entendue comme le contexte qui contient l'industrie des bâtiments. Il est le support des éléments qui déterminent le jugement de la valeur d'un objet et la satisfaction des besoins territoriaux. Il est la pertinence de comprendre les caractéristiques de la zone urbaine en thèmes de démographie, l'utilisation des terres, l'administration, la spécification géographique et ainsi que la morphologie urbaine.

La deuxième unité d'analyse est les bâtiments vacants industriels du patrimoine dans les zones urbaines. La position aborde les éléments qui caractérisent les bâtiments industriels d'un point de vue urbain. L'objectivité de limiter la portée du terme correspond à l'intérêt de l'analyse d'un champ urbain, les cas qui font l'objet de l'opération de réutilisation. Il est étudié le facteur la classification de l'instrument diversifié de la planification urbaine et il définit les variables pour l'observation. Il est étudié la morphologie et les conséquences du processus d'abandon.

La troisième unité est dédiée à la valorisation du bâtiment industriel en tant que patrimoine. Il est étudié la diversité des initiatives, cadre juridique d'un globale, les points clés de la région et l'état de l'authenticité et de l'intégrité en terme d'intervention. . Il est déterminé les variables pour la comparaison des cas.

La quatrième unité est liée à la réutilisation adaptée pour l'amélioration de bâtiment préexistante. On fait valoir la pertinence de réutilisation adaptée pour la valorisation de bâtiment industriel. Il est l'analyse des critères de de la capacité du bâtiment à être réutilise, ainsi que la restriction que la condition du patrimoine pourrait le supposer. Il est analysé les critères de capacité du bâtiment à la réutilisation ainsi que la restriction que la condition du patrimoine pourrait signifier pour eux.

## **1.1. Definitions and variables that determine the urban nature**

The analysis of the urban nature has the goals to identify the variables that model scenarios where the cases of study are settled. Thus, it is consulted the diverse approach related with the classification of urban areas from the sciences as well as the tools for the monitoring and planning of the territory. There is a large diversity of definitions of the urban concept that expressed as an element of homogenization or exclusion that are displayed following qualitative or quantitative approach. It is determined a criterion to identified urban areas as well as the indicator to create type of urban areas for the analysis. The main sources are the Statistical National Centre of countries in America, Europe and Australia as well as regional and global institutions interested in the study of the urban areas. The goals is to determine a common criteria to development a global comparison of cases. The method followed is comparative analysis of terms and indicators contained in handbook and rules for urban areas prepared by ONU, the approach presented by Eurostat and OECD, and the National Institution of Statistics of some countries.

### **1.1.1. Urban Area, more than a form of production, occupation of the land and demography variables.**

The urban though comes from the rational autonomic of the man established in Greece. For Platon, the city was the space for the social and spiritual life. For Aristoteles, the definition of a city was more related with the aggrupation of free people in the exercise of public activities. Similar position was displayed in the Renaissance city, with the public centre of interchange knowledge and promotion of the collective space or the baroque city, where the prevalence of a structure based on the political power and the change in the distribution of the space. Nevertheless, it was with the creation of the industrial society, with the Industrial Revolution, that brought parallel, a process of urbanization result of the accumulation of population in central areas of capital accumulation of the territories.

Redfield, (Redfield cited in Baigorri, 1995, 4) places the classification according a grade of urbanity/rurality, defining from more urbanity to less urbanity. The existence of society based on the information, Baigorri, from the Sociology of the Human Settlements, presents the concept of a global urban cluster -urbe global-, a succession of forms and functions, with major or minor housing densities, structured in cores, in a collective participation of civilization and urban culture. According the author, just an isolated unit, in term of information could be express the rurality.

From the point of view of the observation of the system of population centre and its configuration, Roca, Moix and Arellano (2012) underline the process of inversion of the topology of the landscape. The urban areas or population centre have changed from a well delimited core, defined by the city wall, immerses in a context predominantly green land, to diffuse structures of poli-centralities, where are articulated, agriculture and natural systems fragmented (Ramón Margalef, 1999 cited in Roca, Moix and Arellano, 2012, sec. 3, par. 2). Nowadays, the administrative borders are not any more a limit to distinguish urban areas from rural ones. The phenomenon was presented in the definition of functional understanding of the urban areas by Hausen (1967) and OECD (2010).

A great diversity of concepts rehearse in defined the nature or character of the urban structures. From the Human Geography, the literature exposes the trend to refuse the concept of a system of human settlements based on attraction of some centres over the others in a hierarchy structure. This thesis is support in the path, of the built-up land, that showed a tendency to reduce density, to create mono-functional areas, in the end of the XX Century. In the other hand, from the Economic Science, the concept of urban areas support the role of them as a positive centre of dependence. Moreover, it is interesting to underline that the relation between urban areas and non-urbans, are not always from periphery to centre. It happens, due to some economic poles are located out of the border of the urban area (OECD, 2011). This analysis are based on the study of the generation of job posts in the territory. According Roca, Moix and Arellano (2012), this position has the limitation of not considering, the present of equipment urban structure that constitutes that main element to build centralities.

The dominant approach, it is the one coming from the Economic Science. In this ways, the human settlement systems are classified, in the global scope, according the role that they display in the relation of dependency and influence one over the other.

The multiplicity of variables that takes part in the urban phenomenon, makes more complex the process of definition of urban areas. As a system, relations of dependency and influence, in order of governance, economies, mobility, social organization, functions as well as morphological aspects, are the common points, to determine the performance of the human settlements and its nature. The border where begins a settlement to be consider like urban, is nowadays vague. The before criteria are no support in argumentations that display a difference of ways of life. Baigorri (1995) announced the influence of the informational society and the capital in the territories that homogenized the structure and the relation of production as well

as habits, attitudes and values. The called non-urban areas or rural, become in fragmented open space that, for Baigorri (1995), have the same performance that green zones and parks had for the industrial cities. Nowadays, the urban definition is more than a simple result of human settlement around the capital accumulation in the territories. In some studies, the term of urban area is substituted for population centre (Statistics Canada, 2011) or urban cluster (Eurostat, 1999) more accurate for current times. However, global organization like ONU, continue with the understanding of Urban Area as the first expression of urban settlements as well as, international alliance like OECD or National Statistic Centres in majority of countries of America. This criteria continues be pertinent for the decision maker in term of governance, economy and territorial organization. In this way, it is selected for the author of the thesis, as the criteria to be considered to achieve an operative classification of urban areas for development a comparative analysis.

### **1.1.2. The Census and the International Reports about Human Settlements. Return to demographic variables as an operative criterion to classify urban area.**

The urban nature is a condition attributed to human settlement according the performance of certain key variables. There is not global agreed definition of urban area and its classifications (OECD, 2010, 8). These ones depend on diverse goals according the geography localization, type instruments, science approach, the cultural, political or historical path or stakeholders (Hauser, 1964, 23) (OECD, 2012, 23). The performance of the variables brings a variety of spatial organizations result of urban dynamics that goes from the agglomeration of isolated cores to the multiplication of centralities (OECD, 2012, 23) as well as from the hierarchical structure of centres and sub-centres to the polycentrism (Roca, Moix and Arellano, 2011, sec.3, par. 10). Traditionally, urban areas were associated with human settlements with high density which the main economic sector was not related with agriculture activities. In the same way, rural or common called non-urban areas, were considered dispersed population occupation of the territory, where the main activity was dedicated to agriculture purpose (Hauser, 1964,26). Nevertheless, a simple criterion, like the dominant economic sector, is object of critic by some authors. Baigorri (1995, 9) in his article "From the rural to urban", from this moment, expressed how the agrarian sector, should be understanding like other economic sector with potential to generate urbanity. This position could be demonstrated, in the cases of the Sugar Industry in Cuba and many Latin-American territories. In the case of Cuba, after the abolition of the slavery in 1868, the settlement of this sector in the territory, brought the construction of a human core under urban principles. Division of work, own monetary system, salaried workers,

basic functional structure that covered all the social needs, education, health assistance, religion, governance structure, entertainment, aqueduct, public lighting street, sewage as well as morphological aspect like a planning town, street fabric, regulations in morphological and sanitary aspects<sup>1</sup> are some of the characteristic to be considered urban area (PGOTU, 2013).

In 1964, the ONU created a Handbook for the Social Research in Urban Areas. It was presented an approach to the main positions to define urban areas around the world based on the census reports. It was determined two classifications of analysis areal unit. One was oriented to comprehension of urban areas from the administrative perspective and the second, addressed to the understanding of the territory like a functional unit based on the configuration of cluster like an integrated social entity (Hauser, 1964, 24).

Also, the definition of urban areas, is declared from the position of sciences like geography, economy and social. In the case of economic approach, the variable measure is the number of economically active population rate in agriculture. According geography science, the most relevant variable is the density and it is measured according the number of inhabitant or houses number per a square distant or administrative unit (OECD, 2010,8).

In other hand, urban areas can be classified according competence, indicator or definitions (OECD, 2010,9). The OECD (2010) determined, the existence of tendencies grouped in criteria of administrative competence, physical indicators or functional definitions.

1. Administrative competence is established for administrative interests and correspond with the classification of city. It is structured in sub-division of areas that are organized following a hierarchical order where the largest one overlap the small structure (Hauser, 1964, 23). This type of classification allows vertical analysis of a territory. It is the most recommended in term of access to statistic and analysis of policies. It is the type of organization used for the National Statistic Centres. The limitation are associated to the lack of argumentation to define the administrative borders (OECD, 2010,9-10).
2. Physical indicators are related with the density of brown built-up land, inhabitant or active labour force in non-agriculture activities. It looks for the present of a high density but the criteria to identify the range change from one geography to other. It is potential classification of urban areas in term of gathering to statistical data however according

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<sup>1</sup> In the system of settlement of Cuba, the Batey, as well is known the sugar company town, are considered urban areas however its permanent population could be, in the small ones, around 500 inhabitants (PGOTU, 2013)

OECD (2010) it is not possible to comprehend the singularity the patterns change the urban reality (OECD, 2010,10).

3. Functional definitions is the understanding of the settlement configuration from an economic and social perspective. It was identified as a tendency in the Handbook of Social Research of the UNESCO (1964) called "urban localities". It was applied in some European and American Countries as Iceland, Ireland, Greece and USA (Hauser, 1964, 26). This concept could appear under the term of agglomeration, inhabited place, populated centre, settlement, etc. It permit a genesis analysis of the territory going beyond the administrative borders. It could be referred to the relation between household and firm observing the mobility of labour force from the place to live to the place to work. It defined this criteria as the most potential to develop international comparison (OECD, 2010,11). The main limitation is the access to the statistical data.

The same criterion was the basis for the new meaning of urban areas applied for Organisation for Economic, Co-operation and Development (OECD<sup>2</sup>). The OECD, in cooperation with Eurostat<sup>3</sup>, established a methodology to achieve a common understanding of the definition of urban areas that was assumed by European Union. This methodology was approved in 2011 by the OECD Working Party on Territorial Indicators. It established a new way to delimit urban areas introducing the approach of functional urban areas. It is a concept that goes beyond the administrative borders to understand the territory as a system of economic and social relations (OECD, 2010, 11). In this way, the position establishes a classification based on population density, relation among urban cores and dependency of periphery areas with the urban core in matters of travel to labour to workplace (OECD, 2012, 23)(OECD, 2013).

Administrative classification, physical indicator or functional approach, did not arrive to a common understanding among countries. In the cases of physical indicator, usually applied in the Census Methodology, could be expressed in number of inhabitants (CEPAL, n. d., 1), density or number of inhabitants or houses (Census in Peru, 1993 cited in CEPAL, n. d., 11).

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<sup>2</sup> OECD, it is integrated by 35 countries around the world. Its structure is composed by a council, committees and secretariat. The council has the responsibility of addresses the oversight and strategic direction. It is integrated by representative of member countries and the European Commission. Its Budget for 2016 is EUR 370 million. The main contributors are United State and Japan. Other key stakeholders are civil society related with Business and Industry, Trade Union, as well as Global Parliamentary Network, Council of Europe and NATO Parliamentary Assemblies. It is a contributor of UN-Habitat III, ONU.

<sup>3</sup> Eurostat is a statistical office of the European Union. It is part of the Commissioner for Employment, Social Affairs, Skills and Labour mobility Portfolio. It recording statistic of European Union Members and the rest of the world.

In the same continent, these criteria change among countries. The classification becomes more complex due to some countries don't count with a quantitative classification. In the case of America, exists two argumentations for the definition of urban area: one qualitative and other quantitative. In the case quantitative, the most resorted indicator is the number of inhabitant. Its range of action begin from centenaries of individuals, like in Haiti and Cuba<sup>4</sup> until 2500 inhabitants like in the case of United State, Mexico and Venezuela. The average of starting criterion is 2000 inhabitants.

In the case of the qualitative criterion is associated with characteristics that identified the urban image or the attribution of political-administrative function of the settlements. Examples are Brazil and Uruguay that bases its classification respect to the first scenario. Brazil Census development its classification analysing the existence of built up area, with streets, high human density and for Uruguay the presence potable water, continuity of built up land, and basic equipment (Census in Uruguay from 1950 until 1996 and Census in Brazil, 2010 cited in CEPAL, n. d., 1-13). However, the criterion more used is the association with specific political-administrative structures. This is the situation of Salvador in the municipality level, Dominican Republic in commune or municipal district, Paraguay in capitals of district, Ecuador capital of province and cantons, and Colombia municipal capital (Census in Salvador, 1992, Dominican Republic in 1993, Paraguay in 2002, Ecuador in 1990, Colombia 1993 cited in CEPAL, n. d., 1-13) It is possible to find the combination of criteria inside of the same approach. It is the cases of Canada that defined as the presence of 1000 inhabitants with density of 400 inhabitant per square kilometre (Statistics Canada, 2011) or Costa Rica, with political administrative function with urban image.

A comparative analysis with Europe and specifically with European Union, the evolution of the criteria expressed in the Census are standardized with the central database created by the Union. Eurostat, it is in charge of the recording of the data of the region under a same methodology. It determines the existence of urban area, identified by urban cluster from 5000 inhabitants. For the case of United Kingdom, it is defined by the area of built-up land with at least 20 ha (0.2 km<sup>2</sup>) and 1500 inhabitants.

The analysis in the global scale, carrying by the ONU in the World Urbanization Prospects (2014), expounds that the major population lives in cities smaller than 500000 inhab. and they

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<sup>4</sup> Unit smaller than 2000 inhabitants that had political-administrative function before 1953 or it is sugar cane Company town or it holds secondary or tertiary economic sector.



are identified under the term of Urban Areas (UA). The second largest group of population is located in cities between 1 and 5 million of inhab. (ONU, 2014, 14). It is considered that in 2014, 1 of 5 residents in the world lives in cities in this range. In same frame, are unscripted the largest cities in 79 countries in the world (ONU, 2014, 15). In the same way, around the half of population are placed in urban core not bigger than 500000 inhabitants.

The definition of urban area is a complex topic reflex of the interaction of economic, political and demographic systems. The historical path, the agglomeration of capital and job posts are some of the causals that defined the argumentation to limit the term. With the goal to determine a common basis of analysis, it is decided to follow a quantitative approach, related with the indicator of number of inhabitant per administrative division. It is selected three unit of study. The first is contained in the range from 2000 inhabitants, due to it is the most used minimal indicator, until 500000 inhab., overlapped with the definition of urban cluster (Eurostat, 1999), small urban area of OECD (2011) and urban area of ONU (2014). The second range, arrived until 5000000 inhab. and the third group corresponds with settlements bigger than 5 000 000 inhab.

### **1.1.3. The City, as a complex structure. The representation of the historical path of the city in the classification of the territory**

The path of the evolution of the population centre, and specifically, the cities, were expression of beliefs, symbolism, defensive principles, production forms, social hierarchy as well as sanitary policies. Its morphology found support in the diverse theory formulated to answer the problematics and needs of the society. These representations defined the way of occupation of the territory and its relation with the pre-existent structures. Traditional tools understand the city based on three type of zone: centre, intermedia zone, and periphery. According Panerai, Dapaule and Demorgon (1999,(.)) from the geography science, the city is classified in historical area, centre and periphery. Far from being a searching for a common term, the antagonism resides in the understanding of the historical area as part or not of the centre and the individuality of the centre as an independent structure. In the first case the centre included the historical area conformed for the traditional city until the industrial city of the XIX beginning of the XX, as well as the consolidation of the downtown as a commercial and financial centre. In the second reference, the authors coincide in the limitation that the historical city to be the centre due to a position of incompatibility of land use. As a result of this differences and the variety of possible scenario to find, it is study the characteristic of the historical city and the

centre followed a historical review making mention to examples of cities with this structure, then it is analysed the intermedia zone or peri-urban correspondent with satellite cities, and the periphery or ruruban zone.

### **Historical zone**

Commonly, the centre is defined by an urban core where preindustrial and industrial cities were overlap or juxtaposed in function of the process of conquest and domination among communities or beliefs. The traditional city or preindustrial city, were originated by diverse reasons: defensive, political, economic, cultural or religious. The first cities presented the imposition of geometric form to the nature, straight streets, in many cases the organic growth was substituted by a conscious organization, a functional segregation of the land and a structuration of the space in function of a relevance of the political or religious power. Studies in cities like Ur in Mesopotamia, Harrapan cities in the Indus Valley, or the palace of Tel-el-Amarna, exposed the significance of markets and temples as a centre (Batty, 1994, 11). In the Greek cities, the development of the geometric and the discovery of the spherical form of the earth, placed the geometric as a conception of perfection, and with this the exaltation of the regular structure of the cities. Greek and Roman periods, established the distinction between regular growth and irregular organic (Batty, 1994, 12). The expression of the Roman cities, was marked by the militaries goals of quickly conquest of territories. The usage of a grid remembering the military camps, were well spread in many towns of England. An octagonal consolidated fabric, a central area dominated by a forum with services, defensive infrastructure with the expression of city wall which was surrounded by long surface of agriculture were some of the characteristic of these towns. The proximity to a river used as way of communication, and source of water.

The decadence of the West-Roman Empire and the invasion of the Huns, Germanics, Byzantines, Moors, Normans and Magyars people dissolving the urban notions. During the Middle Ages, the cities where structured follow an organic structure taking the form of the land as a reference (Batty, 1994, 22). It was commonly creation of settlement based on fortress or defensive abbey. In some cases abandon Roman cities were rebuilt under the principles of concentric rings. The city continued organized following professions, ethnic or religious (González, 2003, 82). During the XIII Century, it was the period of the major settled of cities. Some of them, did not achieve great extension but other, like the case of Sarajevo or Warsaw

became in relevance ones (Boerefijn, 2010). XIII and XIV Century was the time for the rediscovering of the geometric and the development of other science.

The medieval cities were limited according the growth of the population. Hygienist principles for the city opened the space for the re-planning of many of them. The arrival of the Renaissance period, displayed the adoration to the perfection of geometric, with the studies of scholar as Vitruvius (Bacon, 1967 cited in Batty, 1994, 22) Radial pattern of the street and the incorporation of squares were fundamentals. In many case, this principles were incorporated to pre-existence cities like is the cases of the Hausmann´ Paris, the re-planning of the Rome under the period of the Pope Sixtus V and L´Enfant´s plan for Washington DC. During the Baroque Style, in Europe, it was prevalence the continuous use of the circular structures. In the case of America, the Baroque, followed the expression of the gridiron due to the capacity for organising large surface in a short time. Batty (1994) considers that the extension of the use of the grid could be support under a spirit of modernity and a distant with the past.

Nevertheless, with the Industrial Revolution and the progress of the Industrial Society, the arrival of high concentration of population to the traditional city, by the attraction of the production place, brought the apparition of high density neighbourhoods without technical infrastructure and basic sanitary conditions. The impact of the industry for the city, the pollution, the mobility congestion, the overcrowding of population and the depression of the attractive of the historical city, wrote the way to re-thinking the urban space. The influence of the Industrial Revolutions brought the progress in the communication network, related with transportation and diffusion of information. The industry that constituted a problem for the traditional city, with the new means of transportation could be relocated in the borders. In America and Western Europe, the cities were surrounding by a belt of manufactures. Near to this zone, worker neighbourhoods were built answering to hygienist criteria but that just achieved to incorporate a basic infrastructure. Singular experience are in France Mulhouse, Le Creusot and the Colonia Menier as well as in Germany with the Krupp family. In America, under the structure of company town interesting experience were developed like Lowell and Pullman. Other types of worker housing are the worker building in the Haussmann Plan, Paris. New ideologies about the planning of the city emerged by the utopic socialism oriented to cooperative form of work as well as hygienist or ethic principles. Some examples of these fundamentals are the Cabot with the Icaria, Robert Owen with the Ideal Community, and Fourier with the Falasterio and Fodin with the Familisterio. The new economic order and the apparition of new techniques productive created the field for the modernization of the society. The new

demands of productive areas and its complexity carried on the design of specific structures. The needs and the environmental decadence of the city brought the apparition of other theories to articulate the productive functions with the other structure of the city. The city garden of Howard, the industrial city of Garnier or the Lineal city of Arturo Soria, are some of the example of the new way of conceiving the urban space. Its development was displayed during XIX and XX and they were known as Industrial Cities (Cárdenas, 1998; Ríos, 2007; Ponce, s.d.).

The traditional city, limited by the city wall was small for the demand of space for the settlement of the modern bourgeoisie and the workers. In many cases, the military protective area surrounding the pre-existent city was the scenario for the plan of expansion of the settlement. Boulevards, parks, theatres, squares and train stations were common structure in this zone. It included the habitat for the middle class under sanitary and technical principles (Monclús and Guàrdia, 2006 115), high qualified with technical infrastructure. The city wall were, in many cases, demolished for the spatial articulation of the areas. This zone reached relevance in the social life. The pressure of the land speculation as well as the automobile as a new form of transportation, addressed to consider the declaration of agreement to protect not just pre-existent building, also the entire structure of the centre (Monclús and Guàrdia, 2006, 460). During the period of the post-industrial city, the historical city was transformed from a residential to a tertiary character. The organization of the old, medieval, modern and industrial city approach, find expression in diverse ways in the settlement according there historical path. In some cases the urban fabric were overlap, hidden pre-existent city under the other, in other cases were juxtaposed or integrated. It is not possible to generalize the performance of the cities. It is necessary an approach to each cases to identified the traces of pre-existent city.

In the case of young cities or where the process of rebuilding were intense, it will identified by the overlap of urban morphologies. In both scenario, this area will be the concentration of the political-administrative power as well as commercial and financial core. The area corresponding with the expansion of the city, it is common to find the central business district characterized with buildings in height. To study the centre and the system of centralities, Panerai, Dapaule and Demorgon (1999, (.)) in an approach to the understanding of the centralities in city of Paris, identified two types of centralities: local and extra-local. The local related with the existence of a core with increase of the density of equipment due to an accumulations of a type and the extra-local referred to the attractive activities that the city or a

large area present to mobilize a great amount of population. This could be link to job post, singular equipment, etc.

### **Intermedia zone or peri-urban**

The proposal of the Modern Movement, in the debate of the International Congress of Modern Architecture, CIAM, Ponce (s.d.), Gympel (1996), Tietz (1999) and Ríos (2007) underline the relevance of the Athens Charter as the basis for the fundamentals of the functional city promote by le Corbusier. The space was thinking respect to an efficient performance in four function: live, work, leisure and mobility. According Ponce (n.d.) the principles stressed over the housing and not over the industry as was before. The housing became the centre of the urban process and not the industry. This theoretical position together with the lack of space in the city for the industry, the environmental degradation, the density of population, the congestion of traffic as well as the high price of tax, brought that in 1930, was created a new type of industrial organization well known as industrial polygons, which was applied until 1970 (Rios, 2007, n.pp.). During the middle of the XX Century, it was promoted programs of industrialization in the main capitalist economies. The rural environment became attractive for the location of the industrial activities. The development in means of transportation potential the growth of this type of organization. Urban settlements related with the industrial activity, were built as a direct supply of worker force. This represented for the entrepreneurs an advantage in term of price of land, low wages for worker force, a contained social climate (Benito, 2005). This area was the scenario for the creation satellites cities or dormitory cities, oriented to answer habitat under the principle mono-functional. Its structure is characterized with a low density, the existence of mono-functional area dominated by residential function. The area is alternated with nucleus of entertainment and commercial activities associated to industrial districts.

### **Periphery or rururban zone**

In 1970, it was the beginning of a process of deindustrialization in many capitalist countries with a strong economic. It was the effect of globalization of the economic models that looked for relocating in low wages regions in the world (Scott and Storper, 2014, 5). In 1980, the industrialized cities concentrated its economic development in the tertiary sector (Scott and Storper, 2014, 5). New form of organization of the land as well as type of industrial production were displayed. Benito (2005) and Ríos (2007) explain the characteristic of the process based on the relation of key components like the industry, the technological innovation and the city. The new model turned around the high technology, the information and the knowledge as raw

materials supplied for the present of scientific centre and universities in the area. This principles took the expression scientific or technological parks where morphological expressions of the industrial polygons remain. Its structure combines small, medium and large enterprises, with University and Research centre as well as residential zones and services functions. All of these expressions and point of evolution of the urban areas did not constitute a parallel and lineal process in all the cities in the world. The overlap of scenarios co-habitat in the territories however a tendency to geo-localize development states. In the majority of the case of developing countries, the expression of industrial polygons dominate the productive morphology nevertheless, in some location, principally in cities of emergent economics like China and Brazil, the concept of technological or scientific park are wide displayed. In other countries like Cuba, this type of structure is also followed in specific sector like biotechnology. The zone is related with an area where the open land is predominant. In the more relevant cities in developed countries, this area is attractive for the creation of close neighbourhoods for the higher class. For the case of developing countries, this area is the space for the location of modest industry or transnational core.

All the structure explained constituted a general analysis that should be precise for each urban cases. Nevertheless the richness of the historical path of the urban space offered a complexity of scenario where the reuse of vacant industrial building can find diverse ways.

#### **1.1.4. Urban macro and micro variables**

It is defined variables for the characterization of Urban Areas with the goal achieve the identification of pattern respect to type of urban scenario capable to be analysis as potential for similar context in the world. Thus, the variables are divided in two scale of observation: macro and micro. The macro corresponds with the city where the object is located. The micro scale, relates with one kilometre square from the position of the object. The measure of this unit correspond with the statistic dimension followed OECD and world population to analysis the territories in Western Europe. This dimension allow understand the type of fabric as well as the land use. Inside of the measure also corresponds with walkable distant to arrive to common form of transportation or other structure of mobility. Also the studies about the continuity of urban land established spatial continuity in the cases of settlement with a distant from 200 until 500 metres.

**Macro level:** Correspond with the level of the city, and describes the general characteristics of the settlement according administrative, geography, demography and morphological criteria.

## **Administrative, geography, demography, morphological and economic criteria**

### Administrative criteria

- 1) Administrative level: capital, capital of province, secondary city, towns
- 2) Local governance representation: yes (1)/ no (0)

### Geography criteria

- 3) Water front: yes (1)/ no (0)
- 4) River: yes (1)/ no (0)

### Demography criteria

- 5) Number of inhabitants: expressed in inhab.
- 6) Density: expressed in inhab/km<sup>2</sup>
- 7) Population growth: increase, decrease, maintained
- 8) Per cent of the active population: population between 16 and 60 year old.
- 9) Dominant age group: population minor of 16 year old, population between 16 and 50 year old, population over 50 year old.
- 10) Per cent of women: expressed in per cent

### Morphological criteria

- 11) Area of the settlement: expressed in km<sup>2</sup>
- 12) Type of urban structure: continues, discontinues
- 13) Morphology of the growth: Draughtboard, radial, disperse, along ways,
- 14) Organization of centralities: monocentric, hierarchical, polycentric

### Economic criteria

- 15) Dominant economic sector: financial services, cultural service, tourism, light industry, heavy industry, agriculture
- 16) PIB per capita: expressed in Euro
- 17) Proximity to potential market: until 1km, 1-5km, more than 5km expressed in km
- 18) Estimation of the population potential of the market: expressed in inhab.

**Micro level:** corresponds with the level of the area in 1 km surrounding the object.

### Morphological criteria

- 1) Zone of the city: historical city, centre, intermedia zone, periphery
- 2) Built up land (COS): expressed in per cent
- 3) Predominant storeys: 1-2 level, 3-5 level, 5-10 level, more of 10 levels
- 4) Disposition among buildings: abutment, sanitary corridor

## Functional criteria

- 5) Type of land use: mono-functional or mixed
- 6) Dominant use: Units (U): U14 Mining and quarrying, U21 Energy production, unit 31 transport, communication networks, storage, protective works, U32 water and waste treatment, U33 Construction, U34 Commerce, finance, business, U35 Community services, U36 Recreation, leisure, sport and U37 residential. Corresponds with the first level of Eurostat System of Classification
- 7) Proximity to infrastructure of mobility: expressed in linear km.
- 8) Type of infrastructure of mobility in the proximity: railway, metro, tramway, bus lines, ship, others

### **1.2. Vacant industrial buildings**

The object of the research is the vacant building of the industrial heritage, specifically the building related with the productive activities. The study of the topic is divided in two lines of attention, the first oriented to determine the morphological type of industrial building as well as the variables to observe in the classification that could indicate a difference in the capacity of the building to assume some use. The second direction, it is concerned with state of the building before the process of reuse. In this way is study the type of possible scenario respect the condition of the building and contextual problematics.

#### **1.2.1. Types of industrial buildings**

The productive activities in the proto-industrial period, were with a low level of complexity, dominated by the disperse buildings and craft techniques. The location of the productive activities depended on the proximity with the raw material and the water as energy source. The building were commonly object of small dimensions however in the cases of production located with the Royal foundations, achieved great size with a monumental character. During XVII and XVIII, the production of ceramic and textile developed structures in form of productive colonies with a large amount of workers. For Mumford (1982) the reason of this disparities of growth had its basis in the direct capabilities and knowhow of the craftsman. For this moment, it was utilized the course of water as hydraulic power source. The development in horizontal were most common expression of the buildings.

The industrial revolution, with its scientific and technique improvements, introduced new relation of production that influenced in the industrial architecture. The first industrial



revolution of Paleo-technique phase, was characterized with the introduction and transference of the steam machine as source of energy. The main restriction that this type of source had it was related with the transmission of the energy. In this way, the design of the factory was focalized to facilitate that transmission of power. The experience in the power transmission system, was developed from the expertise that the hydraulic power source provided before. The power transmission of the first industries were a direct system. A unique engine, moved all the machineries. With the increase of the power capacity the production were enlarged. But the power system demanded a reduction of distant for an efficiency transmission of the power. In this way appeared buildings with rectangular form, narrow and long. The growth in height allowed the utilization of a vertical axis from with a horizontal system the power was transmitted. The building began to be higher, with simple facades that repeated the same composite criteria used for the domestic buildings. A homogenous line of windows provided a natural illumination to the interior. The expression of the building was based on utilitarian architecture (Mumford, 1982, Perpiñá, s/a y Acosta, 1986).

Capel (1996) divides this process in two periods, the first in pioneers phase and the second one, the process of consolidation with the attention to the monumentality. Together with the growth of the enterprise was the development of the expression of the building. With the consolidation of the enterprise and the complexity of the function, was necessary the skill of an architect for the design. In the first period, the industrial buildings were strictly functional, they were built with the local materials available. The form depended of the source of energy and the activities. The introduction and divulgation of new material like a cast iron, initially limited to structural elements, allowed a special continuity and the use of largest spaces.

The second period was models by the economic growth, the technological innovation in the constructive technique, the humanization of the work under efficient concept and the spirit to expose the glorification of the industrial based on the confidence in the progress. Thus, it is the beginning of the proliferation of enormous factories conscience of the aesthetic as a symbol of glory. The interest was expressed in the adaptation of the facades to the artistic language of the time, in the way that the interior continued answering to program. In the beginning of the XIX Century, the neoclassicism dominated the industrial themes. It was used pilaster attached to the wall, cornice and entablature as decorative resource. Other historicist tendencies influenced the design. In the way that the facades showed the use of pinnacles, turret or gothic windows, the interior followed and structure of large space organized under criteria of efficiency. Some remains of decoration could appear in the interior most in areas of signification.

The celebrations of International Exposition, brought proposals of sumptuous palace of exposition as a perfect reference to industrial themes. The factory building turned into a monument to the progress of the Industrial Society as well as a social recognition of a new class dominant, the bourgeoisie. In this moment, appears the figure of the architect specialized in industrial themes who register patents of material and technical innovations for factories, like a reduction of the dimension of the entresol or the lightness of wall to allowed bigger windows.

Concepts like the repetition, standard, series became in pillars of design and soon they are extended to other architectural programs. Gympel (1996), Tietz (1999) and Ríos (2007), considered the basis for architectural models called prefabricate architecture, of catalogue and standardized. The functional requirements were as relevant as the aesthetic criteria. Material like the cast iron, cement and reinforced concrete combined with traditional ones like the brick, brought the creation of challenge form like helicoid chimneys. With the phase of the neo-technique, the changes were focused in the increased of the window with the use of the glass, the zenith lighting with the use of skylight or the roof with saw form. The introduction of the electric engine in the place of the steam machine, allowed the design of building larger still. The introduction electricity and the gas lighting system enlarged the work day. The return to the models of one floor with the preference to a horizontal spatial continuity. The power source favoured a flexibility in the distribution of the machinery. It is a great change in principles of organization from a compact and vertical structure of the buildings with a mechanic transmission of the power to a horizontal ones. The functional and rationalist solutions coming from a theoretical approach were applied to industrial themes. The used of prefabricated components, homogenized the images of the industry across the types. From 1940, there is past from saw ceiling to translucent roof like termolux, coloured glass, etc.

The incorporation of the electricity permitted the control of the environmental condition of the area of production with electric system of ventilation and illumination. The modular design of the space contributed to the flexibility of the building to assumed diverse program (Benito, 2005). The industrial polygons are exponents of this morphology. The third industrial revolution, or technical scientific revolution, with the structure in technological park bring a wide variety of forms that combines a major freedom in from in administrative and scientific areas in contraposition of the standardization and the homogenization of the industrial blocks.

The elements more susceptible to vary in an industrial building are type of growth horizontal or vertical, organizational composition: lineal, fractal, radial, etc.; articulation of volume, juxtaposition, intersection, etc; number of levels, the permeability of the building, the type of roof and the structure. A review of historical path of the architecture of the productive space, proposal a point of view of the different conditionings and principles that dominate the morphology.

### **1.2.2. Scenario of the vacant industrial building**

Many cities with an industrial economic basis affront a process of decadence due to the cessation of the productive activities. It is a problematic that affects all countries around the world motivated by diverse causes. In the developed countries, first in 1960 with the dislocation of the industry out of the urban area and the creation of industrial polygons, after with the oil crisis 1973 and with the energetic crisis 1979, a large number of industries standstill their productions. During the 1980, the strengthening of the globalization and the collapse of the traditional models, caused the relocation of the production in context with low wages worker force. In the cases of the developing countries, the oil and energetic crisis affected the efficiency and the competitively of the products in the global market. Thus, economic sectors were re-dimensions and the complex with low performance were standstill to retool, in many cases, the others complexes with a better output. One of the most common cause of vacant industrial building has its origins in the phenomenon of obsolescence. This process could have many causals. Mansfield (2000) mentions the functional, configuration, technological. Economic, environmental, location, regulatory and aesthetic variable (as well as aesthetic, functional, social aspects (Baum, 1994 and Mansfield, 2000 cited in Conejos, 2013, 30) Klaasen (1989) considered that these potential causals for the standstill depend on a temporality and circumstantiality frame that contribute to turn on relevant them.

The consequences of the standstill of the activity could be direct or derivative. A direct consequence corresponds with the immediate impact in the territory in term of social, economic, environmental or the infrastructure. The derivative consequence are the impact of the effect result of the cessation of the activities. Some of the direct social consequences are related with the reduction of the job posts bringing increase of the rate of unemployed and unbalance of the domestic economic. Also the degradation of the urban fabric and term of use of land and infrastructure. Rojas (2008) identified this phenomenon as interstices among zones, in the fabric, disconnected territories, affecting the coherence of the landscape that require a

restructuring. From the economic point of view, decapitalization of the industry in the territory as well as a depreciation of the land of the surrounding area.

This situation is expressed in environmental problems derivative of the former production and the lack in policies of maintenance of the area. In the majority of the case, in the territory where the industrial production was the economic centre, exist a lack in instrumentation to regulate the action of the owner to neutralize the environmental impact that the production or the paralysation caused. In this way, industrial complex before related with the invasive activities for the nature, use to lest land and water supply contaminated.

From a view of the infrastructure, with the standstill of the activity many service associated with the production close. This consequence is more perceptible in structure of Company Town or industrial districts. Transportation, educational, entertainment support by the industry stop to be offered.

In the case of the derivate consequence, the existence of large vacant areas brings the apparition of zone out of vigilance that are potential for the development of illicit activities. Also this characteristics, favours the agglomeration of informal settlements. This condition affect the value of the land and the corresponding reduction of taxes, services and investment by the administration. The unemployment as direct consequence and the reduction of the financial domestic support, increase the records of criminality and affecting the security of the area (Schilling, 2002, 1).

Other relevant derivate impact is the loss of historical reference. With the paralysation of the activities, the well location of some vacant building, attracted the attention of the land market. The process of recognizing of value and its corresponding protection by the administrative instruments takes longer time that the interest of the owners or banks to recuperated financial sources. For this reason, it is common first the sale of the machinery as raw material and then the sale of land, potential to contain examples of the collective heritage to be demolish and the land rebuilt. Nevertheless, the loss of these components can come from spontaneous manifestation of deconstruction made in illicit way.

From the environmental position, the lack in control over these spaces, brings an accumulation and propagation of plagues that affect the sanity of the area. The possible store of contaminant products as well as the absence of maintenance strategies, cause the possible contamination of other resource like water course. In other way, the contamination of the land and the non-

existence of plans, limits the potentialities of the vacant industry to be reuse answering to new needs of the territory.

The other side of vacant industrial building is the process of sensibility of the value of the industrial remains for the Society. International agreements, national legal instruments, methodologies, the civil actions as well as spontaneous initiatives, models scenario of compromise and conscience about the industrial heritage.

The state of vacant and the efficiency of instrument of protection, opens the frame to several intervention that affect the integrity of the object. The industrial building arrives the present in many cases in partially state result of the common strategies of recuperation of capital with the sale of the industry as raw material. Capel (1996) defined it like empty shallow vault. It is described five type of conditions: 1) demolition of the building and remains of the urban pattern 2) randomly selection of elements, in the majority of the cases due to its visual impact in the landscape like chimneys, part of the façade or machineries. The last ones could remain in the original position or redistributed in arbitrary way 3) dismantling of the machinery and remain almost empty buildings 4) remain the significant machinery 5) remain machinery.

The scenario of the vacant industrial building exposes space of opportunities as well as challenges. The large group of needs to answers draw the way to possible solution of recuperation and adaptation of the industrial space. In the majority of the cases, the industry are not integral. However, the remains are charge of signification recognized by a great diversity of social communities.

### **1.2.3. Variables of the vacant industrial buildings**

The determination of variables for the classification of industrial building will depend of the interest of the classification. In the term of cataloguing, the Fetisov (2013) in its articles about the typology of the modern typology of vacant or working industrial building in European urbanized cities, stablished seven criteria in functional order: 1) period of establishing, 2) position in the city system, 3) functionality, 4) modern state, 5)economic influence and 6)operation type. The criteria number 5 and 6 are not considered due to correspond with operational objects.

- 1) Period of establishing: industrial and post-industrial
- 2) Position in the city system: city area, city borders, outside of the city,

- 3) Functionality: Standard of classification of industry in function of the national statistic system.
- 4) Modern state: secular industrial building, reconstructed industrial building, non-operating building

In order or morphological characteristic six criteria are defined: 1) architectural style, 2) planning arrangement, 3) size of total area, 4) number of storeys, 5) solidity and 6) special status. The criteria number 2, it is referred to the organizational design: compact, blocked, perimeter form or complex configuration. The criteria number 5. Is related with the permanence of the structure and the criteria number 6, with the condition of heritage. The classifications vary according the goals and the sources of information. In the classification, the aspect regarding the actual status of the building are limited to the technical condition and the state use. There is not any consideration in function of the integrity of the object. In this way, it is identified for the interest of the research the following variables:

### **General data**

- 1) Current name: it corresponds with the name associated with the current activities.
- 2) Former name: it corresponds with the name of the former enterprise or the name commonly used for identifying the object.
- 3) Year of built: expressed in year (YYYY)
- 4) Year of standstill: expressed in year (YYYY)

### **Functional criteria**

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 5) General: correspond with the first level of classification, SIC
- 6) Specific: correspond with the second level of classification SIC
- 7) Part of an industrial complex: yes (1)/ no (0)
- 8) Transportation infrastructure associated: railway, port, highway, airport, any

### **Morphological criteria**

- 9) Coefficient of occupation of land (COS) it correspond with the built up area per lot.  
Data is estimated by the image of google map and expressed in per cent.
- 10) Number of storeys: 1-2, 3-5, over 5
- 11) Configuration: vertical, horizontal, mixed

- 12) Spatial organization: compact, disperse, articulated
- 13) Singularity stylistic: yes (1)/ no (0)
- 14) Spatial continuity: yes (1)/ no (0)
- 15) Type of structure: skeleton, load-bearing wall, mixed
- 16) Spacing of the structure: Indicated in meter per meter

**State of the object before the intervention criteria**

- 17) Technical condition: good, regular, bad
- 18) Integrity of the object: 1) demolition of the building and remains of the urban pattern  
2) randomly selection of elements, in the majority of the cases due to its visual impact in the landscape like chimneys, part of the façade or machineries. The last ones could remain in the original position or redistributed in arbitrary way 3) dismantling of the machinery and remain almost empty buildings 4) remain the significant machinery 5) remain machinery
- 19) Contamination of the land: yes (1)/ no (0)

**1.3. Heritage in vacant industrial buildings**

The enhancing of vacant industrial building in condition of heritage has a wide variety of actuation around the world. From first step of recognition of its significance for the Society until the assignation of new use as part a process of resignification of value. Ethic with the past and collective memory, the capacity to identify the traces of the former function are some of the consideration around the condition of heritage. In this way, it is study the scenario of the valorisation and the approach for the judgement of value.

**1.3.1. Scenario of the process of signification**

The industrial subject is novel in the field of heritage that reclaims a long way of progressive approach until arrive to a pertinent understanding. Harrison and Schofield (2010, 34-40 cited in Orange eds, 2015, 23) associated this interest with the preoccupation of loss of identity due to quickly process of globalization, media, production and technological change that took places during 1970. From 1971 was established the Society for Industrial Archaeology (SIA) with the goal of interchange knowledge about industrial archaeology of the remains of the Industrial Revolution. It was organized International Congresses around the thematic for the conservation of Industrial Monuments. In 1978, took place the creation of the International

Committee on the Conservation of Industrial heritage (TICCIH) oriented to encourage the international cooperation for the preserving, conserving, investigating, documenting, researching, interpreting and advancing education of the expressions of the industrial heritage. It was defined the basis for the inventory, cataloguing, protection and recognition of the industrial heritage as part of the culture of the global society. In 2003, it was determined the definition of industrial heritage with a wide approach in the Charter of Nizhny Tagil Charter for the Industrial Heritage (TICCIH, ICOMOS, UNESCO, 2003). It was defined as material and in-material representations of the industrial activities, including buildings, infrastructure, process, tools, sites, social relations, direct related with the productive activity or collateral like social spaces, etc. that are subject of historical, technological, social architectural or scientific values. Also was specified the scope of the Industrial Archaeology, referred to the interdisciplinary method of study the evidence result of the industrial process. The other contributions were in the order of identification of value, the method for identification, recording and research, the legal protection and the operation over the object like maintenance and conservation, preservation, interpretation and the capacitation of human resources. In the Dublin Principles for the conservation of Industrial heritage sites, structures, areas and Landscape (ICOMOS, TICCIH, 2011) there is an specification of the definition of the industrial heritage, making stress over the diverse functional types of industrial heritage.

The alliance for the cooperation among organization like TICCIH and ICOMOS (ICOMOS, TICCIH, 2014, 3), dedicated to the safeguard of the heritage, contributed to the register in the World Heritage List a large number industrial sites. As part of the infrastructure displayed in support to the methodological work about industrial heritage, every two years take place the International Conference, Vestiges of Industry in Czech Republic. The regional understanding of a common heritage is the basis for the cooperative works. In this space was declared as part of the main topics, the reuse of the industrial heritage as a resource of cultural potential with the goal of revitalizing the territory to diverse scales: regional, local, sectorial (Vestiges of Industry, 2005 cited in Sýkora, Holický, Marková, n.d.4)

Nevertheless, the wide capacity of the industrial buildings to be reuse and its attractive in the land market, place them in front of vulnerabilities. Former workers and their families, witness of the standstill of the industry and the process of decadence, perceive in some result of reuse as an attack to their history and way of life. According Puig (2008) and Cárdenas (1993), the successful resides in the appropriation, use and representation that the citizens attribute to the object process of enhancing and use of the new purpose. Rojas (1993), Coyula (1985) and Puig



(2008), coincide that the heritage properties should not be a decoration of the past, but in an object of quotidian use, that is appreciate due to the beauty but also for the functionality. It is in this scenario, where is not necessary reinvent the object.

In some cases the national instruments are considered not sufficient efficient to motivate process of recuperation of the vacant industrial land under conservation classification (Yifan, 2013, 14). The sensibility about the industrial heritage is manifested in different ways. In the territories where it is located the vacant industry, present a change in the social structure of the population. In some cases, the standstill of the production, brought the immigration of the former workers to other areas with industrial productive capacity (Puig, 2008, (.)). In this way, in some areas, there is a lack in the representation of the citizen with a sensibility around the industrial heritage. The same manner, territories with a large path relation with the industry and where the industry was the main economic activity or protagonist in the urban development, the mobilization and appropriation of the properties by the citizen are more actives than in other context where the activity was discrete (Puig,2008, (.)). In this ways the reuse of industrial spaces, should be attractive for diverse social collective.

In the process of re-appropriation, vacant industrial building are object of actuaciones like conservation, maintenance, preservation, restoration, reconstruction and adaptation (ICOMOS, 2011, 4). In the Burra Charter (2011) it is declared the scope of the before operations in the frame of heritages. Conservation is understood as the group of process to maintain the significance of a place. In the case of Maintenance is related with an actions to upkeep the places and its components. Preservation is defined as the process to continue the current state of the object and slow down the deterioration. Restauration and reconstruction are the same goal to re-establishing the initial state or the state of value of the object but the way of action are different. In the first is displayed by the way of remove posterior alterations and the connection of the part without the introduction of new material or components and in the second one, by introduction new materials. A finally adaptation that corresponded with the modification of use. In the Spanish literature, the term conservation is usually replace for the term rehabilitation due to large scope that is referred not just to the object but also to the community associated. The rehabilitation, according Chateloin (1990) is oriented to conserve these values of singularity. From the recognition of the values, the rehabilitation is addressed not just related with the recuperation of the material expression of the building, but the quality of life of the communities related (Rojas, 2000 and Ortega, 1999).

### **1.3.2. Judgement of value and instrument for the industrial heritage**

The International and national instruments for the analysis of value of cultural heritage are structure in function of type of heritage as well as criteria of signification. The UNESCO promoted in 1972, the creation of the World Heritage List for the conservation and promotion of the Humankind Heritage. It is identified three type of industrial heritage: cultural, natural and mixed. In the case of cultural it could be classified such as monument, ensemble of monuments, architectural conservation area, archaeological site or reserve, cultural landscape and in its intangible expression in folklore, traditions, language, and knowledge. The industrial heritage is included inside of the classification of cultural heritage. In 2001 the industrial heritage represented the 5,3 (28/529) per cent of the all cultural sites and the 4 (28/690) per cent of the World Heritage Sites (Falser, 2001, 10) The criteria for the evaluation the cultural heritage are six and covers aspect from material and in-material representations. The evaluation is based on the condition of outstanding signification- It go from a master piece until a representative example.

In the The Nizhny Tagil Charter for the Industrial Heritage (ICOMOS, TICCIH, 2003), it is argued the value of the industrial heritage. It is recognised a social value resides in the consideration as a testimony of the live of common people, as well as the sense of identity. Also it is recognised the technological and scientific contribution to the knowledge and knowhow of the Society. The representation of this values are linked to the material and in-material elements of the object.

In the Burra Charter (Australia ICOMOS, 2013) centres the attention in the criteria to determining the signification of industrial heritage. In this manner, it is recognized the aptitude of it as a container of aesthetic, historic, scientific, social or spiritual values. The second relevant point is it the compromise and the ethic with the past, present and future generation in the safeguarding of the heritage. Also it is underline intrinsic character of the object as the representation material or immaterial of the values.

Related the legal instrument for the protection, it is recommended the construction of especial categories regarding to the nature of the industrial heritage. However, the legislation of monument or cultural and historical heritage in the national scope, commonly includes the industrial heritage as part of cultural heritage. A unique system of classification is considered for all expression of cultural and historical heritage.

Nevertheless, it is other initiative oriented to identify the specificity of the industrial heritage. In this manner, The Industrial Heritage Guide of Ireland, proposes a multi-criteria analysis for the identification of value. The design of the method is organized in the form of question addressed to answer the significance. It is divided in intrinsic and contextual values. The first ones correspond with Aesthetic qualities, physical qualities, historic interest, technical and scientific, social, age and rarity as well as setting. The contextual ones, are related with the context and path of the object in the time giving attention over the process of life instead of just the origin (Hamond and McMahon, 2002, 34-40).

### **1.3.3. Variables of value**

The variables of value identified as key for the comparative analysis are those which could constitute a restriction or a potentiality for the reuse. In this way, it is selected the following variables:

#### **Value criteria:**

- 1) Declaration of protection: yes (1)/ no (0)
- 2) Level of protection: World Heritage List, National, Local, or non-recognized.
- 3) Singularity: master piece/ representative
- 4) Type of value: historical, social, technique or and scientific, aesthetic,

### **1.4. Adaptive reuse for the re-appropriation**

The speculation of the land in central areas, that from XIX, were already attractive for the consolidation of the financial and commercial centre, it was carried on intensive process of demolition and rebuilt of the pre-existence city. During the second half of the XX Century, the cities were expression of a large movement of demolition of historical centres, based on the principles of the modernization and the intensive speculation of the land. The hygienist, technological modernization according the new economic dynamics of the Society led the conception of another form promoting the rejection to the pre-existent one. From this period, the oil crisis generated an environmental conscience related with the consummation of resource. The topic of reuse of pre-existent structure, began to be exposed in the scholar circles in United State (Cantell, 2005, 3 cited in Conejos, 2013, 3). The recognition of the value of the built environment was presented in the diverse global agreements settled. Conejos (2013) made reference to some key documents like the United Kingdom Monument Act in 1882, the Antiquities Act in the US in 1906, the Hague Convention in 1954 (ICOMOS, 1994), the Venice

Charter in 1960, Australia's Burra Charter in 1979 as well as the Hoi An Protocols in 2005 (UNESCO, 2009).

The guide of TICCIH for the industrial heritage is entitled Re-tooling, term preferred from engineering to refer to the process of modernization of the machinery with new process or equipment to turn into efficient and competitive. As part of its thematic the Adaptive Reuse is developed as an alternative to enhance the industrial heritage (TICCIH, Retooling, 1). Clarke (2013) in a synthetic way expressed, in the text, "Adaptive Re-use of Industrial Heritage", the main value of the reuse as operation for the heritage, is making it useful for the Society. It is in this capacity of a continuity of use, the frame to find a balance intervention between demolition and mineralization. According ODASA (2014) the adaptive reuse, have taken place, more over in monuments not register in protective heritage list. The cases of the industrial heritage, more than other buildings typologies, constituted an opportunity for reutilized the territory due to the number of cases as well as the capacity of these buildings to be adapted to other needs (TICCIH, Retooling, 1). Nevertheless, it also represented a challenge due to the limited numbers of methodological material for achieve a balance reuse of vacant industrial building and the conservation according its signification (yifan, 2013, 14).

This situation, is present in countries like Australia, where the industrial ensembles could have a lack of perception of the recognition, due to marginalization and the scale of the site, the short built age of the object or the visual explicit aesthetic values (ODASA, 2014, 2). In other context like China, the limitation are related with the lack of policies for the evaluation of contamination of industrial soil to lead process of rehabilitation (Yifan, 2013, 14).

The reuse, as operation is immersed in the rehabilitation, as a largest frame of intervention. Its scope is adjustable according the grade of protection of heritage that determines each stage of proceedings in which, the ensemble, is object. It is the smart sought, taken advantage of the local potentialities of the ensemble to be enhancing in the new use. This operation, is an alternative in to prolong the utile life of the building. According Conejos, Smith and Lagston (2012), adaptive reuse is the good practices to the enhancing of the heritage buildings. It is a wide expanding practices in United States, Australia, Asia Pacific and in Europe. It is considered for urban planner as key object for the regeneration of the territory (TICCIH, Retooling, 1). It is in the frame cities competition, that the heritage appears as an element of singularity. According Mengüşoğlu and Boyacıoğlu (2013) the industrial heritage constituted

a recurrent resource for the administration to attractive investment and tourism in frame of process of recuperation of declined urban areas.

#### **1.4.1. Pertinence of the adaptive reuse for the enhancing and re-appropriation of pre-existent structure**

From the sustainable studies, the reuse, as intervention, is considered as rentable operation, in term of reduction of energy spending. It is based on the consideration of existent building are container of energy already spent in its design and construction. ODASA (2014) considered that the amount of energy consumed as well as the expenditure of material are inferior in the case of reuse of pre-existent buildings that in the setting up of new structures (ICOMOS, TICCIH, 2003(.)), (CEMVID, 2012, 22-23). For 2001, the 40 per cent of the annual energy for the production of raw material had as destiny the production of new buildings. Just this activity, corresponded with the 45 per cent of the global carbon dioxide production and the around the 50 per cent of greenhouse emission of the developed countries. The Australian Greenhouse Office, identified that the reuse of building saved 95 per cent of the embodied energy (Department of the Environment and Heritage, 2004, 4). The reduction in cost are possible due to in the existence of a urbanization infrastructure, high technical capacity supply, a pre-existent building with the capacity of charge, built foundation (CEMVID, 2012, 22-23) (ODASA, 2014, 3) (Langston, 2008 cited in Conejos, 2013).

Nevertheless, some economic studies demonstrated, according the technical complexity and specialization, the recuperation could support a similar cost or in some case also superior (Bullen, 2007). There is a tendency to the decision of an architectonic program of mixed use of the building with the goal of make self-financing the reuse of the structure. This is common in areas where the core of population are small or present a structure of low density. Other scenario is the progressive interventions. Instead of prepared a fix project place on one time term, it is possible to develop a project in stage where in the first moment could generated financial supply for the next phases as well as adjustment related with appropriation and acceptance of the population to the new uses. It a potential resource for the regeneration of decayed areas. Also from the human point of view, the continuity of use of a space with a high signification for the large community, contribute to the psychological stabilities of the citizen and provide a new form of employment (ICOMOS, TICCIH, 2003(.)).

In order to prevent a un-balance intervention and the loss of the legibility of former activity, governments have indicated guidelines for the intervention in instruments like policies and

regulations. In the cases of Australia, it is promoted the "discouraging of façadism", a term used to distant the action of preserving the enveloping, with limited intervention in the way that allows wide possibilities of intervention at the interior of the building. The determination of the scope of the intervention, will depend, always of the values recognized in the object. In this ways, this practice could be appropriated in cases where the value of the object are connected with the urban image and the understanding of the object as a piece of an ensemble. A second recommendation is associated to the pertinence of the representation. In this case, it is suggest the creation of forms that reflex the principles of the current society avoiding the false representation of a past time. The third main idea, is addressed to the compatibly of functions. The new uses should correspond with former activities and its representation in space, morphologies, practices and social imaginary. The analysis of the capacity of an infrastructure support the new activities goes over the simple position of a physical analysis of volume and areas. Intangibles elements as the legibility of the former function translate in the characteristic resource like the paths, the organization among activities, the scale of the space, proportion, as well as the rhythms of full and empty, the permeability and the continuity of the space come together with semantic of the place (a place of work, social struggle, innovation, creative, representation of the woman, etc), imaginary of the population and the respect to the past (Department of the Environment and Heritage, 2004, 3). The position concerning to the intervention, should be presented as a new stratus of the development of the place, other layer more adjusted and integrated to the history path of the site (ICOMOS, TICCIH, 2003(.)).

Sýkora, Holický, Marková (n.d.) determined aspects to considered in the intervention over heritage structures. In the order social and cultural the selection of adequate function respectable with the values. From the economic point of view, the additional cost related with the consolidation of the pre-existent structure as well as from the perspective of the sustainable development, the reduction for the waste and the recycling of materials (ICOMOS, TICCIH, 2003(.)).

Other relevant issues is the correspondence between the environmental conditioning requirements of the new use with the capacity of the building to answer by it-self. The point is crucial in term of feasibility of the project during the period of exploitation. For example, the morphology of industrial building during the Modern Movement, are characterized for the use large surface of glass windows, with possibility to regulate the air intakes, a high height of ceiling, as well as large dimension of the space. These elements are key for modifying the environment indicators appropriated for the development of certain activities by the human. In

countries where the climate could arrived low temperature, achieve an appropriate terminal comfort usually requires of large consummation of energy. In other hand, the reuse of this facilities are object of a security, comfort and energetic requirements to allow the operation. In this tone, the Dublin Principles, (ICOMOS, TICCIH, 2011,6) referred to the adjustment of this measure to the condition of heritage. Thinking in the capacity and its nature of the ensemble as well as the context, are the basement for the well reuse.

#### **1.4.2. Capacity of the pre-existent structure to accepted new use.**

Scholars have developed some tools to guide the adaptive reuse in buildings. However, the panorama of the evaluation of adaptive reuse, were based on empiric approaches (Gorse and Highfield, 2009 cited in Conejos, Lagston and Smith, 2012, 2) In the last years, a some tools have been presented to cover the lack. Some of this tools are addressed to analysis specific aspect like the environmental security of the land, the physical capability of a building to reuse or the economic feasibility of the intervention. One of the well-known is the case of AdaptSTAR model, a rating instrument based on the measure of variables in the field of physical, economic, functional, technological, social, legal and political characteristics (Conejos, Lagston and Smith, 2012,1).

Other of the tools is the case of the Adaptive Reuse Potential Model. It is an instrument that can estimated the potential of reuse of a building in during its cycle of life. It could be apply to any geography context as well as to any type of building. The analysis valuated the capability of the building from the position of the potential obsolescence of the building. In this way it is determinate seven types of obsolescence: physical, economic, functional, technological, social, legal or political. The tool classified the building with more than 50% with high capability of reuse (Langston, 2012, 4).

One of the main limitation is the possible existence of the land contaminated. In this way, Lambda Alpha International (2000) proposes three strategies to return the capability to be use: 1) major environmental clean-up and decontamination, 2) Legal work to limit liability 3) Re-planning and assembling workable sites for new uses. Other limitation is related with the legal frame of intervention. Land use and Building code are tool for the urban planning that regulate the destiny of use. Before to consider the morphological characteristics of the object to receive a new function, elements related to the declaration with vocation of the land, affects the possibility to generate new projects, it is the condition of frozen land that could be change with the re-qualification of the land.

The evaluation of the capability of the industrial building to be reuse depend of aspects physical, functional, economic, technological as well as restriction like healthy of the land, tenure of the land, legal frame and heritage condition. In the before topics were realized a regard about of the territorial, physical, economic, environmental and heritage aspects.

In this point, will be analysis the functional, technological and legal variables that should influence in the capability of the industrial building to be reuse. In the functional aspect, Conejos (2013), based on a theoretical review, proposes the analysis seven elements: 1) flexibility, 2) Disassembly, 3) Spatial flow, 4) Convertibility, 5) Atria, 6) Structural grid, 7) Service ducts and corridors. In the study of the description of the aspect some of them are global that could involve others presents. Example is flexibility and convertibility. The flexibility described as "space capability to change according to newly required needs, plug and play elements, etc" englobes aspect like structural grid or spatial flow in the order of the characteristics of the space to be adjusted to other organizational structure. In the same vein, it is the use of the term convertibility, explained with the criteria divisibility, elasticity, multi-functionality. Nevertheless, this approach constitutes a relevant step in the analysis of the subject from a holistic approach.

In the technological category, the elements are oriented to the characteristic of the building to provide an environment of comfort (Conejos, 2013, 96). However the analysis is central principally in the thermic and illumination comfort. The acoustic comfort are not developed in the Conejos (2013) analysis. Topics is divided in two direction: the first, about the use of the natural resource, sunlight, wind, etc., and the second, about material and technological characteristics of the building to complement the environmental requirements. Related with the sunlight, the variables are orientation of the main volumes, system of protection of the direct sunlight, insulation and shading and natural interior lighting. Respect to the wind is observe the natural ventilations. In the case of the material and technological characteristic of the building. One of the variables are oriented to the equipment for the environmental monitoring of the building and the second one with the capability of the building the balance the thermic requirement during summer and winter. Elements like the Security of the space or the artificial illumination are not explained. In the legal category, the elements to concern are concentrated over the certificated of operative required to allow the performance of other activities. In this line, it is analysis, the fire protection, and environmental quality in term of contamination, ergonomic of the space and the security for the work, security devices, comfort, disability and energetic rating.



The analysis of the capability of industrial heritage building for the reuse is an issues that demand a holistic analysis. In the scope of this thesis of master, it will considered this variables that could be analysis in a comparative global study of cases. With this goal aspect some variables will be not included due to the lack of available information.

#### **1.4.3. Limitation for the condition of heritage. Problematic and instruments for the control.**

The Nizhny Tagil Charter for the Industrial Heritage (ICOMOS, TICCIH, 2003), it is considered the possibility of reuse of industrial sites except in cases with especial historical significance. Sýkora, Holický, Marková (n.d.) underline the relevance ethic criteria in the intervention over structures potential of contains heritage attributes. For the authors, social and cultural aspects should be considered in the way to avoid the loss of elements representative of the heritage values. The World Heritage List incorporated the condition of authenticity and integrity for the valuation of the pertinence of the object value.

The authenticity, was considered, for first time in the international sphere, in the Charter of Venice to announce the compromise with the past and its conservation as well as to explain the ethic in the process of restoration in the use of legitimate documents (ICOMOS, 1964). The attention appeared as result of the actions of the reconstruction of properties and objects developed around the world but principal due to, the diversity of approach that in East Asia displayed with the deconstruction and construction of monuments. Seung-Jim Chung (2005: 68-69 cited in Jokilehto 2006, 3), called the attention about the European Cultural value perspective of the Venice Charter, based on the notion of visual beauty, diverse of the East Asian Culture more related with the nature and spirituality perception of the property. Other authors like Stolen (2007) associates the concept of Authenticity result of the term integrity, used in the American National Register of Historic Places from 1953.

In 1994 it was expressed in the Document of Nara, the necessity of a test of authenticity for the cultural properties registered in the World Heritage List. The concept of Authenticity was associated with the legitimacy of the cultural values, which should be evaluated in the cultural context which it belongs (UNESCO, ICOMOS, ICCROM, 1994) (Watnik, 2013) (Marin, 2001). It was attempt to address an objective of the pertinence of the value of cultural properties. The valuation of authenticity and integrity is a tool to defining and monitoring the cultural heritage. The analysis is referred to the credibility of the information sources or documents as evidence that support the value (Flores, 2010) (UNESCO, ICOMOS, ICCROM

1994). Although, its focus is oriented to the genuineness of value, the elements analysing correspond with materialization of the object and not the value itself. The authenticity as a condition, limited the range of action over the property. About the focus of the Test of Authenticity over the materiality of the object, Martin, (2010) called the attention, around the risk of affecting the natural process of cultural formation with the combination and selection of the sources. The operational guides of the World Heritage List, explained the scope of these conditions. For the Authenticity the analysis of the veracity of the form and design, materials and substance, use and function, tradition, techniques and management systems, location and settings, language and other form of intangible heritage, spirit and feeling and other internal and external factors. Denyer (2011) explained that the authenticity concept is link between the attributes and the Outstanding Universal Value diverse of Integrity that corresponds with the completeness and intactness of the attributes. Still, it is the material existence of the heritage, the place where is located the point of stress of the authenticity and not in its attributes.

An approach of the topic of Authenticity from the field of the adaptive reuse and the continuity of use, authors place its definition in a matter of existentiality. According Flores (2010), the dimension of Authenticity transits the field of social, economic, political, cultural, anecdotic and traditional. It should be focus in the object and the principles of for who, for what, for whom it was created. In this way, the analysis of the authenticity is oriented to a practical and functional, symbolic of value and aesthetic of texture valuation. The aim point it is the relation among container and content. Stovel (2007) explains the vulnerability of the term, when the built cultural properties usually are objects reuse with the loss of the continuity of the initial propose. The utilization of the term Authenticity in the world heritage list, were in many cases not correct use. Some examples use as an additional value itself or they developed partial analysis without include the four field: design, material, setting, workmanship (Stovel, 2007, 2). But the understanding of authenticity has other positions. In the case of Cousins (2013) relates the concept to a wide description. It covers the invariants of the regions understanding like these elements with the potential to don't change until the particular to the characteristic of the material representation. The unclear definition of authenticity, continues stressing over the origins as state of legitimism instead of the representation of the elements contained of the values. Other position carries the concept of a progressive authenticity as a range of tolerance to be change.

For the author all the problematic goes around what is really representative of the value, in which ways the system of elements complementary influence over the determinant elements,

with the goal to identify the range of tolerance of pertinent modification. In the Nizhny Tagil Charter for the Industrial Heritage, is recommended to maintain the original patterns of circulation as a reflexed of the spatial organization (ICOMOS, TICCIH, 2003). Also it is mention a compatibility with the former use as well as the creation of an area for the interpretation of the site.

A second condition to evaluate the properties appear under the name of integrity. In the Operational Guide for the World Heritage List (2005), the integrity is more objective defined. It is limited to the elements representative of the Outstanding Universal Value. For the cases of the cultural heritage properties, mention the necessity of the physical evidence of the fabric, and the technical condition of the whole. According this, it is explained the requirement of the control of the degradation. In the cases of the site or other living structure, it is required the continuity of the relation and the functional dynamics. Wholeness to tell the history and intactness related with technical condition are the dominant criteria. Other type of integrity from the functional point are also considered. A review of some cases, showed how the analysis was not fully displayed by the State Parties or commonly confused one term with the other. Stolen (2007) mention how some publications make reference to these concepts as were just one, in the binomial of integrity/authenticity.

In any cases, the criteria which today support the evaluation of the authenticity and integrity, suppose a limitation for operation like the reuse as well as any other action in the way to answers to the current needs of the Society. Where is embedded the authenticity, how much are capable to be modified and how much should remain of an object to be considered integral? Jokilehto (2006, 2) associated this concepts with the notion of continuity, change and truth. Related with this, it is the statement of space-temporal continuity, there is a difference between the gradual renovation of ancient monument and the total or partial reconstruction (Jokilehto, 2006, 3). The intervention should be reversible with a discrete impact. In term of integrity, the Nizhny Tagil Charter for the Industrial Heritage (2003) proposes the documentation of all transformation as well as the storage of any significant elements.

The bibliography are yet limited to understand the frame that the conceptual position and the range of tolerance of actuations. The criteria should not be generalized and should be adapted to the elements that contain the value. Otherwise, could be tentative the apparition of process of mineralization of the past without signification with the current Society.

#### **1.4.4. Traditional instrument for the definition of new use from the urban scale. Land Use Change.**

The urban function is one of the more dominant characteristic that the observer could remember in the moment that describes an urban space. The existence or not of a café shop, or housing or an industry are common resource used to represent the image of a place (Beaujeu-Garnier cited in Panerai, Dapaule and Demorgon, 1999, ()),

The land use is related with the function that the man made of the land according the activities. It is common find a not correct use of the term in document related to studies of the land. Land use and land cover are used under the same definition. Nevertheless, the land use is an understanding of the land diverse of the land cover. In the case of the first, it is related with the manipulation of the biophysical attribute of the land by the human beings (Meyer 1995, 25 and Turner et al. 1995, 20 cited in Briassoulis, 2000, (.) (FAO, <http://www.fao.org>) The second one is related with the biophysical state of the land and it is a description of the physical state (Meyer 1995, 25 cited in Moser 1996, 247) (FAO, <http://www.fao.org>)

The relevance of the land planning appeared a result of the preoccupation of the non-efficient use of the land and its finite condition as a resource. The cultivable areas are limited in the world and were being occupied by the built environment. The expansion of the cities with low density of occupation, the increase of population and the growth of the demand of food together with the energetic crisis of the 70'S called the attention to rethink the territory. Other cause was the accumulation of large extensions of areas in condition of brown fields in location with a high demand of land reason that led to the land use change. This concept of land use change, it is base of the problematic of reuse of industrial land in other function. Thus, it will be developed forward.

#### **Classification of land use**

The form of distribution of the urban function are displayed following a hierarchical classification that divided the function in diverse informational levels. A first level are commonly related with a generic classification of the use. It can be divided in: 1) military, 2) commercial, 3) industrial, 4) cultural, 5)reception, 6) administrative or politic (Beaujeu-Garnier cited in Panerai, Dapaule and Demorgon, 1999, (.)). In the global scope, the FAO, established a classification according territorial scale. Urban areas is synthetized to the term of urban land (LADA, 2008). Regional institutions like Eurostat for European Union, determined a classification to an urban level. It constitutes an advantage in relation with other models that

don't distinguish among rural and urban functions. The classification that corresponded with the urban areas, is determined the following Units (U): U14 Mining and quarrying, U21 Energy production, unit 31 transport, communication networks, storage, protective works, U32 water and waste treatment, U33 Construction, U34 Commerce, finance, business, U35 Community services, U36 Recreation, leisure, sport and U37 residential. This classification present a well balance between the level of information for the analysis and the association by types (Eurostat, 2006, 41-49).

There is not a consensus among the countries to defining the classification of the use of the land and its variety can arrive to difference approach inside of the same country in the level of State or province as well as local administration (Anderson et all, 1976,4) In the case of the Standard classification System for the Mapping of land Use an Land Cover of the State of North Carolina, (1994) it developed a cross analysis among the document generated in the State referred to use of the land. It established three level of information, the first related with the character of the function divided in 1) residential, 2) commercial and services, 3)institutional, 4)manufacturing and raw material processing,5)transportation, 6)communication and utilities, 7)industrial and commercial complexes, 8)mixed developed land, 9)public assembly, recreational cultural and entertainment, 10)Mining and resource extraction, 11)others. It classification count with two levels more where the type of functions are details. In this organization is interested to observer how some function without relation are combine like the case of public assembly and recreation and other like manufacturing and industry are separated. The last situation appear also in the classification of Anderson and others (1976) where it is determined two groups with similar characteristic one: industrial that covers light and heavy manufacturing, and raw material extraction as well as it is classified a second group: Industrial and Commercial complexes related with the existence of industrial parks. The explanation is based on the nature of this area that is combined with other use like farm land and residential. The entire unit is identified as industrial and commercial complex.

The topic of industrial building, as object of the research, conditions a broad classification of industrial use. Thus, it is identified that the Division of Corporation Finance, United States, created in 1937 a Standard Industrial Classification that is followed for other countries like United Kingdom. This code will use in the two first levels of classification: general and the specific one (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

The land use classification could be adjusted according the level of information to record. It depends on the goal of the analysis. In function of the scope of the research, it is followed a classification of land use in two level of information: one generic and a one specific. The study of the compatibility of the system of classification consulted with the descriptive objective of the research, it is determined that the Eurostat classification system is more pertinent due to the specification for the urban use as well as the synthesis of classification without significant ambiguities. For the classification of industrial uses, it is utilized the SIC Standard Industrial of Classification because the wide description of industrial type.

### **Land use change. Principles and traditional tools for the land use planning.**

The land use is a reflection of the socio-economic structure of the Society. Following the evolution of the socio-economic relations, the land use is transforming to achieve the new expression. The process of variation is well known as land use change. This term appear first related with the preoccupation of loss of productive land due to natural phenomena, but it is the human action the responsible of the major reduction of this resource. The first approach to this subject, was based in the observation of the impact of the human action over the environment as well as studies for the efficiency farming of the land in relation with the proximity of the market. During the beginning of the XX Century, from the Sociology field by the Chicago School, were concentrated in explaining the physical pattern of the urban regions and their social and economic dynamics Briassoulis, 2000, (.)). Other position functionalist were interested in the location of human activities and their form of patterns. In the second half there was a diversity of studies about land use change, with the incorporation of the statistic. From the sociology, geography and economy, the regard over the land use change, from a board diversity of approach. The integration of position brought, the notion of the ecological equilibrium based on population, resources technology and institutions (Meyer and Turner 1996 cited in Briassoulis, 2000, (.)). The current times related the understanding of the land use change, a key point for the sustainable future of the planet.

The term, in its definition, corresponds with the necessity to change the use of the land for which it was dedicated. The type of change is identified as: 1) conversion: it is change of the use example. From industrial to commerce or residential or mixed land 2) modification: change of performance of the use, example: from heavy manufacture to light ones, or from residential area of low incoming to high incoming. The cause of the change could be associated to demographic, economic, technological, environmental or non-compatibility of function issues

(Verheye, 2009(.)). In term of use change, it is important to analysis the reason of the change and the impact of it. According this Briassoulis (2000) classified in biophysical drives and socio-economic drivers. In the first case it is related with to organic modification of the natural environment. For the frame of the industrial heritage, the factor determinant will be of socio-economic order. They are related with population change, industrial structure, technology, family structure, market, policies, rules, values etc. The discipline that in charge of the design of the land use is land use planning.

The land use planning is understood as the systematic assessment of land and water potential for natural, economic and social condition of the society looking for identify the adequate option of use of land (FAO, 1993(.)) The creation of a land use planning should be base in the existence of a problematic to resolve. Also it is the instrument to organize the territory. According Verheye (2009) the instrument for the land use planning are the plan, strategies and projects. A crucial instrument is the national land policies that regulated the scope of actuation over the territory.

The planning of the land use is oriented to satisfy concept of efficiency, equity and sustainability. In the book Guidelines for land-use planning prepared by Soil Resources, Management and Conservation Service under the direction of Inter-Departmental Working Group on Land Use Planning, it was created a methodology for defining the use of the land. This approach propose a participative strategic where authorities, citizens and planners contribute together to the model of the land use. It is declared steps that go from the compilation of data, definition of the goals, problems, opportunities, limitations and restrictions, criteria of selection of proposals, scope of the plan, common agreement and the identification of operational lines. The approach has to count with decision take bottom up with the goal to adjust the proposal to the real needs of the society (Verheye, 2009(.))

The key information for the land use is natural physical land resources, current land use, current infrastructure, demographic characteristics, land tenure, government, legislation, non-government organization and commercial organization (FAO, 1993(.))

Xiang and Clarke (2003) studies the modelling of scenario as a toolkit for the land use planning. They propose five components to structure a scenario: 1) potential options of land use plans, policies and regulations 2) estimation of the physical, ecological, economical, and social effect 3) causes for the consequences 4) time frame and the vulnerabilities in the way 5) impact measure in footprint. The value of the modelling of scenario resides in the critical analysis of

the land use planning and the broad of possibilities. One time more, the construction of scenario as well as the land use planning should be a participative process that involve a wide representation of the society and interests.

#### **1.4.5. Variables of the Adaptive Reuse**

The thematic of the adaptive reuse is a multidimensional subject. In the bibliography the variables are oriented to identify diverse morphology of actuation. With this goal they are divided according focus of interest: functional, sustainability, intervention, ethic with the value, investment and social retribution. It is possible to find variables related with the intervention. Graeme Brooker and Sally Stone (2004, 79-128) establish three expressions: 1) intervention 2) insertion and 3) installation. The first corresponds with a physical integration of the new actuation with the existent ones. The second one is related with addition process of form in the surrounding or interior of the object and the third one, answers to actuation with the possibility to be reversible and support the minimal affectation to the pre-existent structure. Krejcisz (2012, 39-40) developed a large classification based on the type of composite operation applied. In the manner, the author defined 1) Amalgamation, 2) Add on, 3) inside to out, 4) Put on, and 5) Installation. Other way of classification of the reuse is front position of the type of initiative: 1) State support 2) Private 3) Mixed 4) Civil organization 5) Sectorial 6) Spontaneous initiative. The bibliography review developed before showed a wide universe of thematic to attend related with the reuse.

Corresponding with the goal of the research, to realize comparative analysis of case of study the following variables will be use:

#### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 1) General: Units (U): Second level of classification U14 Mining and quarrying, U15 Other primary production U21 Energy production, U22 industry and manufacturing U31 transport, communication networks, storage, protective works, U32 water and waste treatment, U33 Construction, U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.



- 2) Specific: correspond with the third level of Eurostat Classification System. Consult reference.
- 3) Continuity of use: Yes (1)/ no (0)
- 4) Correspondence with the land use for the area: Yes (1)/ no (0)

**Architectural Intervention criteria:**

- 5) Type of actuation: Amalgamation, Add on, inside to out, Put on, Installation.
- 6) Planning of the intervention: Yes (1)/ no (0)
- 7) Significant change of the façade and morphology: Yes (1)/ no (0)

**Ethic of value criteria:**

- 8) Remains of the former name: Yes (1)/ no (0)
- 9) Reversibility: Possible, partial, non-reversible
- 10) Demolition: Yes (1)/ no (0)
- 11) Storage of the element removed: Yes (1)/ no (0)
- 12) Existence of a centre of interpretation or museum: yes (1)/ o (0)

**Investment criteria:**

- 13) Type of financial support: State, Administration local, Administration Regional, Private, Mixed, Communitarian, Sectorial, Spontaneous initiative.
- 14) Property: Public, Private
- 15) Tenure of the land: Property, rental, Usufruct, illegal
- 16) Location of the investment: national or foreign

**Social criteria:**

- 17) Job post: Amount of job posts generated with the new activities
- 18) Public target: wide, sectorial, age group, former worker,
- 19) Answer to a need: territorial, local, individual

## **Partial conclusion**

In this chapter was identified the variables that participate in the problematic of reuse of vacant industrial heritage building. The structure of the problematic was divided in the comprehension of urban area as the context of the object, Industrial Building as the object, cultural signification as a condition of the object and adaptive reuse as operation for enhancing over the object.

It was developed a review of the literature to determine the structure of the problematic in a system of criteria and variables. It was analysed the definition of urban area and its form of classification. In the case of vacant industrial buildings, it was relevant to determine the variables that characterize the type of industrial buildings as well as others that turn into relevance during the process of vacant space. In the case of cultural signification, the attention was over the attribution of value and form of judgement. Finally, in the topic of Adaptive reuse the focus was over two lines of interest: one in the tone of the pertinence of the operation, the capacity of the industrial building to accepted new use as well as the restriction that the condition of heritage supposes for the reuse; and the second oriented to the traditional tool of land use from an urban perspective.

There is not agreement among the definition of what an urban area is in the literature and the position are change from one science to the other. The use of the term urban area are modified in some contexts. However it is possible to conclude that in the scope of the territorial analysis the definition continue be a reference for the studies. In this way, form the frame of this research, the term Urban Area is considered as a concentrate human settlement with political-administrative recognition and a population over 2000 inhabitants. It was identified the criteria of urban area and a set of 26 variables organized in two level of observation: micro y macro.

The study of vacant industrial building was addressed in two directions. One oriented to the characterization of the type of industrial building and the second with the affectation that the condition of vacant could attribute to its classification for the adaptive reuse. From a point of the evolution of practices and morphologies of the industrial buildings, it was identified the relevant role in the modification of the form of the conditions of the location, the power sources, the particularity of the activity, the humanization of the work and the relation with the city. In this way was determined that the elements more susceptible to change and determine the morphology of the industrial building was the growth of the building, organizational composition of the volumes, number of storeys, structural system, permeability, singularity stylist and spatial continuity. From the vacant condition of the building, other variables should

be considered like technical condition, integrity of the object and contamination of the land. In this manner, it was identified 19 variables distributed in three criteria of analysis: functional, morphological and state of the object.

In the study of the cultural signification of vacant industrial heritage buildings was taking into account the multi-semantic attributes of the industrial buildings for the society. Social, technological, economic, historical and Aesthetic appreciations are some of the consideration around the subject. It was identified the criteria and the variables for its consideration.

In the last subject dedicated to the adaptive reuse, the main contribution was the recognition of the value of the operation from diverse dimension. Moreover, the value of the operation, from a social point of view, that turned the vacant industrial buildings into a useful object for the Society. It was determined the relevant role of the integrity and authenticity to measure and restrict the interventions. The panorama of practices, legislation and concepts built the basement for the identification of the variables the interest to consider in the characterization of the reuse. Thus, it is defined five criteria: functional, architectural intervention, ethic of value, investment and social distributed in a total of 15 variables.

The problematic of the adaptive reuse of industrial building in condition of heritage from the urban planning, is a complex problematic that joint object, territory, operations and dimensions. The definition of the problematic in unit of analysis, criteria and variables permitted structure the topic in unit less complex to can analysis de parts and the whole. In total was determined 26 variables related with the classification of the context and 38 variables referred to the classification of the object and the operation of reuse, for a total of 62 variables.



## **CHAPTER II**

### **Methodology for the identification of potential use for vacant industrial heritage buildings**



## **Abstract**

The second chapter is dedicated to the elaboration of a methodology for the identification of potential use for vacant industrial heritage building from the method of the comparative analysis of experiences. With this goal the chapter is divided in five moments. The first subdivision is oriented to design an instrument for the comparative analysis of cases. In the second moment is identified the sample and characterized the cases in function form the Urban Area and the Industrial Heritage Building type. With the record of the cases and its indexed in a database, it is possible to pass to the third moment that corresponds with the identification of tendencies of potential uses according diverse observations. This subdivision has the aim to determine paths of practices as well as to explorer the capacity that the study of experiences by this method provided for the research.

A fourth moment is linked with the identification of a tool for the use of the database that allows the generation of multiple possibilities. This followed an inductive thinking where is generalized the result of the particular characteristics provided by the cases. A finally, the firth subdivision that is oriented to the creation of the methodology oriented to identify potential uses for vacant industrial heritage buildings by the experience of cases. This methodology is the integration of the tools and reflexions achieved during the studies the state of art and the comparative analysis of cases.

## Résumé

Le deuxième chapitre est consacré à l'élaboration d'une méthodologie pour l'identification des utilisations potentielles pour vacants bâtiment du patrimoine industriel par la méthode de l'analyse comparative des expériences. Avec cet objectif, le chapitre est divisé en cinq moments. La première subdivision est orientée vers la conception d'un instrument pour l'analyse comparative des cas. Dans le deuxième moment est identifié l'échantillon et caractérisé les cas en fonction du contexte urbain et le type de bâtiment patrimoine industriel. Avec l'enregistrement des cas et son indexation dans une base de données, il est possible de passer au troisième moment qui correspond à l'identification des tendances des utilisations potentielles selon diverses observations. Cette subdivision a pour but de déterminer les chemins de pratiques ainsi que l'exploration de la capacité que l'étude des expériences par cette méthode apporter à la recherche.

Un quatrième moment est liée à l'identification d'un outil pour l'utilisation de la base de données qui permet la génération de multiples possibilités. Ceci fait suite à une réflexion inductive où est généralisé le résultat des caractéristiques particulières fournies par les cas. La cinquième subdivision est orientée vers le design de la méthodologie pour l'identification des utilisations potentielles pour vacants bâtiment du patrimoine industriel par la méthode de l'analyse comparative des expériences. Cette méthodologie est l'intégration des outils et des réflexions obtenus au cours des études de l'état de l'art et de l'analyse comparative des cas.



## **2.1. Methodology for the comparative analysis of case studies.**

The culture of the exploitation of the vacant industrial heritage building represents a capital of practices that light up the way of potential new use. With the goal of systematizing the study of these practices it is designed a method for the cross analysis of variables.

Thus, it necessary to build a set of tools that allows the classification of cases and their registration for the comparison. According with the goal of the study, the registration of cases will have the materialization of a database. In this way, it will utilize a form of registration for the characterization, a table for the indexation of the data as well as for the comparative analysis. The nature of the database is the possibility to be enlarge in the time with other cases. Thus, as vast is the database, in the same way will be wider the spectrum of potential use.

### **2.1.1. The Form, tool for the characterization.**

(See Appendix 1. Form for the characterization of urban area)

(See Appendix 2. Form for the characterization of vacant industrial heritage building)

The characterization of the cases are addressed in two direction: one from the comprehension of the context and the other from the understanding of the object. The structure for the characterization is built by the criteria and variables identified in the first chapter. The instruments for the characterization has the expression of a form. This morphology is wide used for the catalogue of item in database. The form is elaborated in format word. Two forms covered the characterization.

The first one oriented to the context is it organized in a macro and micro level. First in the level of the territory and the second in the level of the micro unit of 1km surrounding the object. Then main sources for the information recollection are the 'Citypopulation' database, Eurostat and the National Statistic centres.

For the recording of the data of the object corresponding with the second form, it is followed the same structure. For the content the main sources are contained in academic and scientific articles, the website of the place, the report of the ministry of culture about the declaration of monument, technical reports of the projects and satellite view of the site by google map. As a complement of the form, in case where the information is interest it will be more developed in the area of observations. Also at the end of each form it is related the bibliography.

For the identification of the object in the database it is assigned a codification. For the case of the city, it is constituted by the initial of the Continent, followed for the initial of the country and then for the city. For the case of the object, it is used the before codification plus the number one (1). In the situation of more than one case in the same city, the numeration will continue 2, 3, etc.

Example:

- Continent: Europa
- Country: Italy
- City: Milan

Code of the Urban Area: EIM

Object: Base coworking, MUDEC Museum, Scenary Workshop of the Scala Theatre.

Code of the object. EIM1

More than one object:

Object: Fondazione Arnaldo Pomodoro. Code of the object: EIM2

It is possible to find the structure country-city that could coincide. In this cases the second character of the name will be used. Example Portugal Lisbon (EPLI) and Poland Lodz (EPLO).

### **2.1.2. Database, tool for the comparative analysis**

One time completed the forms for Urban Area and Industrial Heritage Building the data is indexed in a four tables. One corresponding with the Urban Area Characterization and the other three related with the Object. Industrial Building Characteristics, Value and Reuse join the all the elements of the object for the analysis.

The relation among the tables is established by the use of the code assigned. With the structure in form of matrix it is possible to filter the database in function of goals. It is possible to study for a type of industrial building with use are more frequent, or which use are commonly used for industrial building under declaratory of Monument or which morphologies of industrial buildings are more use for a determined use as well as which mode of property, tenure of land or investment are potential for a use or other. Also in relation with the intervention, with type of actuation are followed according the declaratory of monument or the type of property. Besides the relation among the type of use and the territory, according the performance of certain variables like for cities between 500 000 and 5 000 000 inhab. or for a range of densities or geographies.

In this manner, it is possible to identify tendencies, that will be more precise as representative and wide the database will be. Thus, it is important identified a representative sample of cases.

## **2.2.Selection of cases for the comparative analysis**

Defining the sample required the pertinent identification of goals the drive the limitation of the sample. Balance representation, state commitment, accessibility to the information are some of the key point to mark the borders. For the scope of this research, the interest is to have a wider sample. According the number of the items as well as their diversity more rich will be the result. However, due to the objectiveness for the frame of the research, it is decided the amount of 30 items, as an illustrative demonstration of the possibilities that the method allows.

### **2.2.1. Delimitation of the sample**

The criteria to select the cases of study are based on a representation of the universe of performance in the reuse of industrial heritage in urban areas. The study is enclosed in three continent with the objective to have accessible to database on-line as well as the language possibility of the author for the interpretation the sources. The basic language used are English, France, Portuguese and Spanish. In this way the selection is settled in Europe, America and Australia. The main goals are to achieve wide representation of scenario according a variety of urban configurations, industrial morphologies and legal frame in heritage protection. Following is presented a progressive approach to the definition of the sample.

#### Main assets

1. Wide representation of scenario
2. Variety of urban areas according administrative level, population density, size, coefficient of built-up land (COS).
3. Variety of industrial morphology according complexity of the structure, foundational and coefficient of built-up land, investment type
4. Variety in legal protection of the properties in term of heritage

The considerations are focus in three levels of identification of the case of study: belonging to a State, belonging to an urban area and as an individual unit. In the level of State, it is declared a common requirements for the selection of the sample with the aims to count with a starting

point held up a States commitment about heritage, moreover industrial heritage as well as the interest in the urban development. Thus, it is presented following terms:

#### State commitment criteria referred to the country selection

(See Appendix 3. State Commitment)

1. Country members of UNESCO, which signed the Convention for the Protection of the World Cultural and Natural Heritage (UNESCO, 1972), Convention for the safeguarding of the Intangible Cultural Heritage (UNESCO, 2003), Convention on the Protection and Promotion of the Diversity of Cultural Expressions (UNESCO, 2005)
2. Country members of TICCIH, The International Committee for the Conservation of the Industrial Heritage.
3. Country participant in UN-Habitat III, 2016 is the United Nations Conference on Housing and Sustainable Urban Development focus on the implementation of a New Urban Agenda, corresponding to Habitat Agenda, Istanbul, 1996.

A second group of requirements is related with the accessibility to data to recollect. Therefore, it is enumerated the main sources of information below:

#### Data accessibility

1. Available on-line Census Report developed in the period of 2000-2016
2. Available on-line Policies in the National and administrative sub-level
3. Available on-line Information about vacant industrial heritage buildings
4. Available on-line UN-Habitat Report

The selection according this criteria showed that just 10 countries in America, 22 countries in Europe and Australia have a national representation of TICCIH. Also countries with a relevant number of site register in World Heritage List did not signed the conventions considered. This is the case of Canada that did not signed the Convention for the safeguarding of the Intangible Cultural Heritage and United State of America that did not signed the Convention for the safeguarding of the Intangible Cultural Heritage and the Convention on the Protection and Promotion of the Diversity of Cultural Expressions. The situation of United State of America is the same that Australia. In the case of Europe, Rumania did not signed Convention for the Protection of the World Cultural and Natural Heritage and United Kingdom did not signed the

Convention for the safeguarding of the Intangible Cultural Heritage. However this result, the countries of United Kingdom and United State of America, will be considered in the sample due to their wide actuation in the reuse of industrial buildings. The potential countries for the searching of cases offers the first level of representation.

A second moment, the selection looks for a balance representation of the samples of cases. Then, the selection is focus in a diversity of uses. Special attention is in the urban areas with population between 5000 000 and 5 000 000 inhab. due to is the size of the majorities cities in the world. Also countries with a wide tradition in the reuse of industrial building are taking as a rich scenery for good practices. In this way it priority countries like Germany, Italy, United Kingdom, France, Poland, Portugal and Spain. In the same tone, other countries with an intense market of land are also considered as an interest context identified other performance in the reuse. This is the case of United State of America.

These criteria warranty the present of cases in the diverse contexts. In same manner, the criteria fixing the performance of the variables, that limited the diversity of cases. In the way to correct this restriction, it is declared the reduced number of variables.

Target group of sample:

- Preference per cases in cities between 500 000 to 5 000 000 inhab.
- With a population between 750 to 5 000 inhab/km<sup>2</sup>
- Diversity zone of the city
- Diversity former productions turn into Educational, Office and Residential

### **2.2.2. Representability of the sample**

(Appendix 4 Sample for the comparative analysis)

The sample is majoritarian from European cases. The distribution by countries is one case in United State, one in Finland, three in France, six in Germany, nine in Italy, two in Poland, two in Portugal, two in Spain and five in United Kingdom.

The distribution is diversified in the administrative level of city. In Finland, there is one case in Helsinki. In France there are one in Montreuil, one in Lille and one in Paris. In Germany, there are one in Delmenhorst, one in Duisburg, one in Essen, one Hamburg and two in

Oberhausen. In Italy there are one in Ferrara, four in Milan, two in Rovereto, one in Verona and one in Venice. In the case of Poland, there are two in Lodz. In Portugal there are two in Lisbon. In Spain there are one in Madrid and one in Seville. For United Kingdom, there are two in London and three in Manchester.

### **Distribution of the sample by urban area**

According the number of inhabitants there are 11 cases that correspond with cities between 2000 and 500 000 inhab. It represents the 35% of the sample. There are 18 cases that correspond with settlements between 500 000 and 5 000 000 inhab. It constituted largest group with a 58% of the total. The cities with a population between over 5 000 000 inhab. There are 2 items that are the 7% of the sample.

In term of density, under 500 inhab/km<sup>2</sup> there is one case that is the 3% of the sample and it is the city of Ferrara. In the range between 500 and 5000 inhab/km<sup>2</sup> there are 17 cases that represent the 54%. In the range of items between 5000 and 10 000 inhab/km<sup>2</sup> there are 10 cases that it is the 32%. Over 10 000 inhab/km<sup>2</sup> there are 3 items that it is 11%.

The representation related with the variable "area" is structured in 3 groups: under 100 km<sup>2</sup>, between 100 and 1000 km<sup>2</sup> and over 1000 km<sup>2</sup>. The settlements contained in the first group are 10 items that cover the countries of France, Italy, Germany, United State and Portugal. In the middle group, there are 15 cases. In this group the countries Italy and United Kingdom has the bigger amount with 7 cases and 5 cases respectively. The group over 1000 km<sup>2</sup>, is composed by 6 cases. The bigger area is the city of Seville, Spain and the small one is the commune of Montreuil in France.

The representation of the sample is well distributed among the variables. However, it possible that some of them were less balance due to the goal to favoured the variety in others as well as have a representation of former production to developed trend studies.

### **Distribution of the sample by objects**

As well as the sample was analysis in function of its representation in the Urban Area, also it is observed in relation with the variables that model the industrial object. In this frame, it will be described the representation according antiquity, moment of the standstill, former production, coefficient of built land and number of levels. Regarding to the antiquity, there is

1 case in XII Century, 2 cases in XVIII Century, 12 in XIX Century and 15 in the XX Century. The majoritarian group belong to XIX and XX Century that represents the 87% of the total. In the variable related with the standstill, there are 4 cases that its production stopped before the period of 1960 corresponding with introduction of other models of production concentrated in the creation of industrial districts. One example is the case of the Royal Tobacco Factory in Seville which activity was added to other production and located in the periphery of the city. In the period of after 1960 and 1973, there are 5 cases. It corresponds with former production of electricity, warehouse in harbours and sugar production. In 1973 related with the year of the oil there is an increased of the cases. There is a total of 19 cases that constitutes the 61%. All of them are contained in the period before the crisis of 2008. There is three items that it is not precise the moment of the last production.

The exemplification according the variables of former productions, the analysis is divided according the hierarchical system of classification. First it is analysis the Division, that is the first level of classification and then by Major Group, that is the second level. In the Division the cases are distributed among 1) Manufacturing 2) Mining and 3) Transportation, Communications, Electric, Gas, And Sanitary Services. The Division with the great representation is Manufacturing with 22 items that represents the 70%. The rest is divided in 2 cases for the Mining and 7 for Transportation, Communications, Electric, Gas, And Sanitary Services. In the level of major group, for the division of Manufacturing there are 7 cases of Textile Mill Products, 5 items that corresponds with Food and Kindred Products and 3 of Tobacco Product. There is also one per Electronic and other electrical equipment and components, Paper and Allied Product, Primary Metal Industries, Printing, publishing and Allied Industries, Stone, Clay and Glass and Concrete Product, Transmission And Distribution Equipment transformer and Transportation Equipment. The total of varieties is 10 types. For the division of Mining, there is one in Oil and Gas Extraction and one in Coal mining. For the Division of Transportation, Communications, Electric, Gas, and Sanitary Services, the cases are divided in two major groups. One corresponds with Electric, Gas, and Sanitary Services with a number of 2 items and the other is Motor freight transportation and warehousing wit 5 items.

There is also a great diversity related with the size of the built land. This is represented by the COS, that is the coefficient of built land or occupied soil. In this variable, there 5 cases which COS is under 10 000 m<sup>2</sup>. To have a reference in the dimension a standard football field has an

area of 10 200 m<sup>2</sup>. In the range between 10 000 and 30 000 m<sup>2</sup>, there is 9 cases. From 30 000 to 100 000 m<sup>2</sup> there are 6 items. Over 100 000 m<sup>2</sup> there are 7 more. A similar diversity is related to the number of storeys. In function the indicators of the variables there are three possible performance in the range of 1 to 2 storeys, from 3 to 5 storeys and over 5 storeys. The distribution of cases covers 7 items in 1 to 2 storeys, 13 cases in 3 to 5 storeys and 11 over 5 storeys. There is a tendency to reuse industrial buildings with more than 3 storeys.

The comparison of the number of storeys with the COS, configuration and spatial organization shows, that the object with 1 to 2 storeys has a compact spatial configuration and occupied the major areas of land between 20 000 to 30 000 m<sup>2</sup>. Also that there is a balance present of spatial organization for the buildings with 3 to 5 storeys however that are a tendency to uses buildings with a vertical configuration with a prevalence of 6 over 9 cases. In the same category of amount of storeys, there is preference to the exploitation of structure between 3000 to 10000 m<sup>2</sup>. For the last group, as well as the first type there is a tendency to compact spatial organization. These variables in relation with the classification of former production and the antiquity, there is prevalence of high structure built in XX Century and support of activities like Mill, Warehouse, and Electric Stations. The same trend is presented in the group of 3 to 5 storeys, Mill, Warehouse, Tobacco and Electric Stations but in this case built during the XIX Century.

### **Distribution of the sample by value**

The theme of the value and more specific the declaratory of historical monument, property of cultural interest or world heritage is vulnerable to diverse contextual influence that could limited the legal recognition of the value. In this tone, in the sample, there is just the 64% (20) that are subject of a protection declaratory. The rest of them, has a social recognition of the value by specialist, community but did not count or there is not reference to a classification. Some of the contextual influences are the responsibility of administration to in the safeguard of the property, the interest to open the regeneration of the territory to wider possibilities and investment that could be restricted by a declaratory. Finally the wide representation of some type of industrial buildings in the city, that made them object to a selection of grade of significance. This is the cases of the English Mills, or the Warehouses in inner lands as well as the power station in Finland.



The total of items under classification there are two registered in the World Heritage List and the rest are classified with national relevance. There are 7 with an aesthetic significance, 6 of them also with social, historic and technique and scientific value. The majority of the items there singularity is related with a well preserved or oldest example of a type of industrial building.

### **2.2.3. General descriptions of cases**

(See Appendix 5. Compendium of form of the cases of the database. It appears the form for the Vacant Industrial Objects)

In the following lines is presented a brief description of the cases. An enlarge communication is accessible in the Form of Characterization of Industrial Heritage Object contained in the annexes. It is described the variables referent to former use and new use, antiquity, the morphology, value and singular aspects of the intervention and investment.

#### **Industry city. New York, USA. (code AUSNY1) (See Fig.1)**

It is located in the installation of a former warehouse in waterfront. It has a COS of 2800 m<sup>2</sup> and it is a set of six buildings with more than 5 levels. It was an intermodal shipping together with warehousing as well as manufacturing complex located in the Brooklyn. This was the first infrastructure of this type in New York. It is the first North American integral complex that joint Manufacturing, store and shipping. The Bush Terminal was recalled in the middle of 1980 due to it was bought by Industry City Associates which maintained the same uses. The project as a creative space began at 2009. Also other uses as Centre of Research in Surgery are located in the installation. In 2011 it was made a master plan for the complex. The land as well as the water was contaminated but the state payed a great grant to revitalize the environmental conditions. It is not classified under protection however that is recognized it technical relevance.

#### **Helsinki Courthouse District. Helsinki, Finland (code EFH1) (See Fig.2)**

It is located in a former Distillery and belonged to the Alki headquarters. The production was dedicated to alcoholic beverages. The company was founded in 1932 and it was a national monopoly. The installations counted with administration, factories, and warehouses. It morphology is vertical, articulated with over 5 levels. It is located in a waterfront. The

modification was made under a concept of cost of life for concrete structures. The new use is not limited to communitarian services, also cafeterias, offices, commerce, galleries, and sport shared the same structure. The cost of the project of 60 euros per m<sup>2</sup>. The court of Justice occupied the third part of the space. The success of this experience called the attention of public opinion which begins to be considered project like this in similar thematic structures. It offered 60 000 job posts.

**Dumas. Montreuil, France. (code EFM1) (See Fig.3)**

In the installation of a former Paper Painted Factory, it presented a vertical, articulated organization with more than 5 storeys. It is a building of 1913. Its extension covered 5600 m<sup>2</sup>. It is classified as Historical monument. The reconversion was developed in 1985 to turn the space into offices. The project was addressed to answer a problem of unemployment by the government.

**Euratechnologies. Lille, France (code EFLI1) (See Fig.4)**

Located in the former Le Blan-Lafont Cotton Mill, a building of 1900 that was working until 1989. It has a configuration with a vertical tendency under a compact spatial organization. It has more than 5 storeys and a COS of 24 000m<sup>2</sup>. In 1999 it was classified as Historic Monument. In 2009 it was reused in a media centre, theatre and the Faculty of Law. Also there are offices of computing science like Microsoft and Capgemini. The intervention followed an initiative began in Lille with the location of core for the development of the science. First it was the Euro Santé and then the Euratechnologies experience in the former Blanc Cotton Mill. The operations are defined as reconversion. It was invested 1 142 euros per square meter.

**Grands Moulins Université Paris 7 Denis Diderot. Paris, France (code EFP1) (See Fig.5)**

It is placed in the former Grands Moulins along the canal. It was built in 1921 and its production stopped in 1996. It has a vertical and compact morphology that covered 13000m<sup>2</sup> of surface. It is declared as historic monument contained of historical, social, technique or and scientific, aesthetic values. In 2006 it was turned into the educational facilities of the Paris 7 Denis Diderot University. The ownership of the place is SEMAPA, an institution created in 1985 that joint to Administration of Paris with 57% of the capital, SNCF with 20%, the RIVP with 20%, the State with 5%, the region of Ile de France with 5% and private partners.



Fig. 1 Industry city. New York, USA.  
Source: Bonnie Kong [www.instagram.com](http://www.instagram.com)

Fig.2 Helsinki Courthouse District. Helsinki, Finland  
Source: [www.icecoldcrime.com/](http://www.icecoldcrime.com/)

Fig.3 Dumas. Montreuil, France.  
Source: [google.map.com](http://google.map.com)

Fig. 4 Euratechnologies. Lille, France .  
Source: [www.brossy.com](http://www.brossy.com)

Fig. 5 Grands Moulins Université Paris 7 Denis Diderot. Paris, France  
Source: Novri SUHERMI [www.instagram.com](http://www.instagram.com)



### **Nordwestdeutsche Museum für IndustrieKultur. Delmenhorst, Germany (code EGDE1)**

It is a textile manufactory of wool with structure of company town. Its borders are dominated by the line of railway and a river. It has associated residential core and service core. A model with a social and functional stratification. Its configuration is known as a city inside of other city. The manufactory and the residential settlement are classified as historic monument known under the name of Denkmalshutz. The place is a representative example of the ideas of the industrial architecture in XIX Century. The reuse is in a Museum of Industrial Culture. It was motivated by the located of some open air exhibitions during the World Expo 2000. As part of a complex, many infrastructure associated with the production are reuse, in factory museum, city museum, public university, job centre, Convention centre. (See Fig.6)

### **Museum Küppersmühle. Duisburg, Germany. (code EGDU1) (See Fig.7)**

It is a former warehouse built in 1860 which was working until 1973. In 1969 the union between Werner and Nicola Germania Mühlenwerke and Küppers Mühlenweerken attributed this name. The installation was composed by a fabric building and metal silos which were added in 1930. It has a compact vertical morphology and covered an extension of 3600m<sup>2</sup>. It belongs to the Ruhr Heritage Trail. Its value is linked to the inner harbour. It is well known as the Breadbasket of the Ruhr area. The process conscience about its value emerged due to the attempt of demolition of the metal silos. The facilities were turned into Museum. The reuse was designed by the prestigious architect Herzog and the Meuron following the master plan of Norman Foster.

### **Zollverein UNESCO World Heritage Site. Essen, Germany (code EGE1) (See Fig.8)**

It is the largest colliery in Europe. It is the only UNESCO World Heritage List in the region of the Ruhr. The complex included the central shaft Zollverein XII, Shafts 1/2/8, Coking Plant (Kokerie). It was classified under the criteria ii and iii. The reuse is based on the term industrial culture. The main idea began from 1990 with the initiative of convert Zollverein Shaft XII in an international centre of culture. The program combines culture, dining, design, architecture, handcraft and other creative industry. The project objectives declared were the preservation of the cultural and natural heritage, stressing over the condition of authenticity and turning into a useful space for the public life. The ownership is the State Development Corporation of Northem Westphalia, Municipal Association of Ruhr, Veva Real State, Ruhrkohle AG a German Coal Mining Corporation. Its land is distributed in four administration but the greater

part belong to Essen. The unemployment rate in Essen is the 11.9%, and the German average is the 6.2 % for September, 2015. In ten years the unemployment rate was reduced from 16.9% in February, 2005 to 12.5% in February 2015.

**Speicherstadt. Hamburg, Germany (code EGH1) (See Fig.9)**

It constituted the largest warehouses district in the world. It was created as custom free zone. It was dedicated to the stores of products but also to develop some manufacturing process. The building followed a neo-gothic design representative of the Hanoverian School. They are 11 buildings distributed in five and seven storeys. In 1991 it was recognized and protected in the condition of Hamburg heritage site. In 2015 it was registered in the World Heritage List as part of the ensemble composed by Kontorhaus District with Chilehaus. To achieve the reuse of this area to purposes of offices, ludic and residential, it was necessary the revaluation of the land from port activities to business, entertainment and residential. The financial support comes majority from the private sector with an amount of 8 billion of Euros.

**Warehouse of LVR-Industriemuseum. Oberhausen, Germany (code EGO1) (See Fig.10)**

The complex was designed under rational thought of the conception of the building developed by Peter Behrens, pioneer in the rationalism movement. It was the main warehouse of Metallurgy Company of Gutehoffnungshütte. The recuperation was made by regional administration and it is a central warehouse for the industrial museum of the region. It is associated to Industriemuseum LVR. It is a continuity of use.

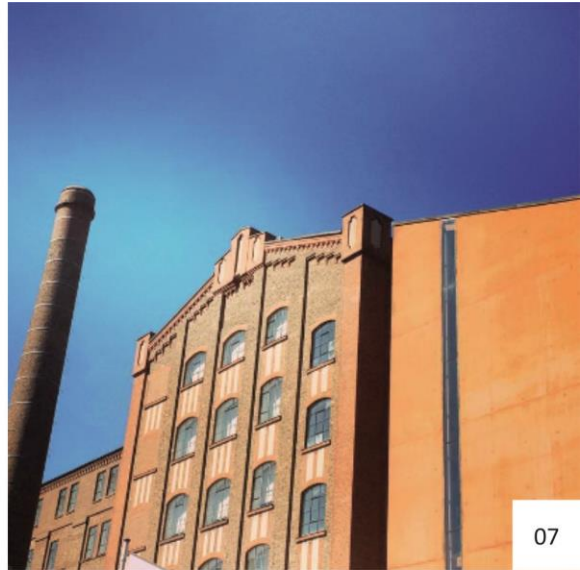
**Gasometer Oberhausen. Oberhausen, Germany (code EGO2) (See Fig.11)**

It was the largest deposit of gas in Europe with an effective volume of 347,000 cubic metres. The store of gas was a measure to save the excess of gas produced and don't required in the moment. This object is included in the Regional Route of the Ruhr as well as it is considered as an anchor point in the European Route of Industrial Heritage ERIH. Its major value is the fact that is regular industrial structure without strong relevance that is became in element of reference in the milestone of the regional industrial heritage. The reuse was oriented inside of the IBA Emscher Park project and it is an Exhibition Hall.





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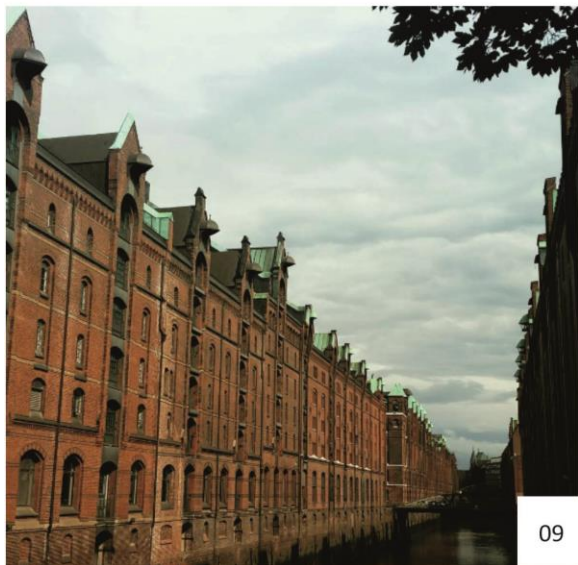
Fig. 6 Nordwestdeutsche Museum für IndustrieKultur. Delmenhorst, Germany  
Source: [www.museum.de](http://www.museum.de)

Fig. 7 Museum Küppersmühle. Duisburg, Germany.  
Source: Chris [www.instagram.com](http://www.instagram.com)

Fig. 8 Zollverein UNESCO World Heritage Site. Essen, Germany  
Source: Cahit T. [www.instagram.com](http://www.instagram.com)

Fig. 9 Speicherstadt. Hamburg, Germany  
Source: [countryatheart www.instagram.com](http://countryatheart.com)

Fig. 10 Warehouse of LVR-Industriemuseum. Oberhausen, Germany  
Source: [www.panoramio.com](http://www.panoramio.com)



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**Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery. Ferrara, Italy (code EIF1) (See Fig.12)**

It is located in a former Sugar Beet Mill that was built in 1900. It occupied a surface of 6200 m<sup>2</sup> in a vertical articulated structure. I was the most important sugar mill of the company Eridania S. A. The property was giving usufruct to the University of Ferrara in a term of 99 years. It was demolished buildings related with the indirect infrastructure. The actions developed over the complex are rehabilitation and renovation. The support for the project came from the European Funds for the Regional development, FESR.

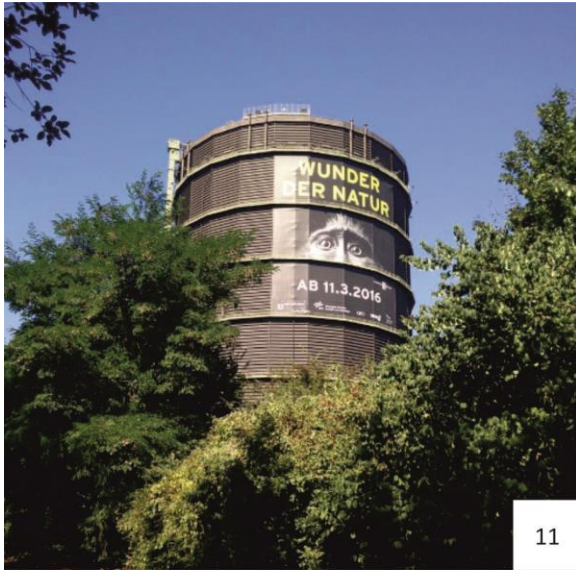
**Base coworking, MUDEC Museum, Scenery Workshop of the Scala Theatre. Milan, Italy (code EIM1) (See Fig.13)**

The Ansaldo Steelworks was the core for important industrial enterprise like Zust, AEG and Galileo Ferraris. After was a reconvered in warehouse for tramway and locomotive for the exportation. In 1990 the property passed to the Municipality of Milan. The uses of the building is shared among diverse institution Scala Theatre and private sector. The main activities developed in the interior are the Scenery Workshop of the Scala Theatre, Base Coworking and Exhibition Areas and a MUDEC Museum. The Museum was designed by the recognized architect David Chipperfield. The process of recuperation was developed in progressive way. First with a continuity of use as warehouse, dedicated to the Scala Theatre and them the inclusion of other alternative uses. There was not the present of a master plan and the action took placed as independent unit.

**Fondazione Arnaldo Pomodoro. Milan, Italy (code EIM2) (See Fig.14)**

Its production was oriented to the elaboration of hydraulic engines and pumps. Two engines produced here were located in the Niagara Fall. It is a building with a horizontal and compact configuration that covered 170000m<sup>2</sup>. The reconversion of the places was in the beginning destined for the hold the Foundation of Arnaldo Pomodoro. Nowadays it doesn't have a permanent use and its function oscillate in the frame of cultural and administrative.





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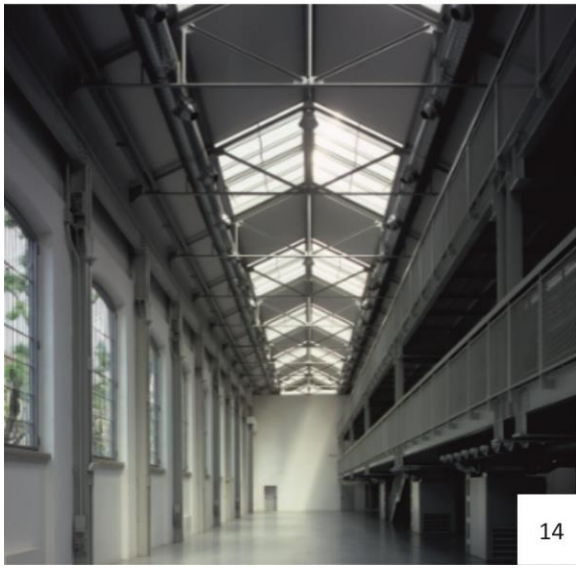
Fig. 11 Gasometer Oberhausen. Oberhausen, Germany  
Source: Max [www.instagram.com](http://www.instagram.com)

Fig. 12 Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery. Ferrara, Italy  
Source: [dinofracchia.photoshelter.com](http://dinofracchia.photoshelter.com)

Fig. 13 Base coworking, MUDEC Museum, Scenery Workshop of the Scala Theatre. Milan, Italy  
Source: Benedetta Palma [www.instagram.com](http://www.instagram.com)

Fig. 14 Fondazione Arnaldo Pomodoro. Milan, Italy  
Source: [www.cultureteatrali.org](http://www.cultureteatrali.org)

Fig. 15 Teatro e Silos Armani. Milan, Italy  
Source: Charlotte Cogliati [www.instagram.com](http://www.instagram.com)



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**Teatro e Silos Armani. Milan, Italy (code EIM3) (See Fig.15)**

It is a former Nestle Factory of Chocolate and the Silos. It is a building of 1950 and has a vertical compact configuration over a surface of 12000m<sup>2</sup>. The project was made by the Arch. Tadao Ando under an action of revitalization. From the total 4500 m<sup>2</sup> are dedicate to expositions and 2000 to theatre. Also the place count with a space for the memory of the former production. Other complementary uses are café shop and a space for work. The cost of the intervention was 50 million. The lines of the actuation is spatial continuity like a forum. The project cover the Nestle factory of chocolate and its warehouse. In the first is located the theatre that was the first intervention. The first part was made in 2000 that corresponds with the factory of chocolate and the second one was developed in the frame of the Expo Milan in 2015.

**Manifattura Tabacchi. Milan, Italy (code EIM4) (See Fig.16)**

It is located in a former Tobacco Manufactory built in 1929. It is an example of the eclecticism of the beginning of the XX Century. It belonged to the National Monopoly of the Tobacco. It has a configuration of several buildings with a tendency to articulated structure. It covers an extension of 760 000m<sup>2</sup>. The object present an architecture in eclectic style in the majority of the building. The entrance, it is designed following the Rationalism. The project is part of the general regional plan of the Lombardi. The transformation was possible due to the change of land use where the land was re-qualified from industrial use to Special Zone Z21 for use mixed. There is the cohabitation of the public and the private sector. The property is divided by object under diverse ownership. The private use are residential and commerce and the public one are Experimental Centre of Cinema, The civic school of cinema, the audio visual pole, the student resident, the temporary residence, the social residence and the centre for old people.

**Centro Tecnofin Servizi. Rovereto, Italy (code EIR1) (See Fig.17)**

It is located in the former Cotton factory of Rovereto, Cotonificio Roveretano, after Pirelli. Its production was dedicated to the cotton spinning for the elaboration of tyre and electric wire. It is a building with a compact horizontal configuration that covered an extension of 25 400 m<sup>2</sup>. The project of reconversion had the basis in the Master Plan developed in 1986 by Arch. Franco Mancuso, and architectural project of reconversion by Rolando Segatta in 1986 and other of new building, for the civic centre in 1990 by the Arch. Franco Mancuso. The intervention was motivate by the Provincial Administration of Trento. It was demolished part of the factory of no relevance like deposit and offices as well as it was built new buildings. The new functions

are addresses to business, laboratories and all the necessary infrastructure for a technological park. Also it was built a Civic centre.

**Progetto Manifattura. Rovereto, Italy (code EIR2)** (See Fig.18)

As well as the Tobacco Manufactory of Milan this project is located in the same type of infrastructure. It was built in 1857. It has a horizontal and articulated structure that covered 28 000 m<sup>2</sup>. The project was the construction of a development core, probably due to the influence of the project of the Centro Tecnofin Servizi in the former Cotton Mill. The space is already in use but the whole project should finished for 2018. It was created under the direction of a master plan and criteria of sustainability. The reuse followed the model of incubator of enterprise and it coordinated by the regional administration.

**University of Verona. Department of Enterprise Administration and Social Science. Verona, Italy, (code EIV1)** (See Fig.19)

It is located in a former bakery, Panificio della Caserma Santa Marta, built in 1863. It is an installation over 25 000 m<sup>2</sup> with a compact and vertical configuration. In 2015 the operation of reuse finished and it became the core of the department of Enterprise Administration and Social Science of the University of Verona. The amount of the inversion was 35 143 823 euros. The financial support came from the budget, the local administration as buy credit by the European Bank of Inversion, Unicredit and BEI. The operations over the building were restauration and adaptation of the space to the educational requirements. Also it is classified as a project of recuperation.

**Arsenale di Venezia. Venice, Italy (code EIVE1)** (See Fig.20)

It was a complex oriented to the construction of ships. It hosted the activities of shipyard and armoury. During the period of Early Middle Ages and the Modern Ages was property of the Republic of Venice. Its beginning are in XII and during its evolution was object of transformations, expansion and modernizations. Before the first Industrial Revolution, it was the largest complex in Europe. The innovation was in the mass construction of ships. The construction of the Arsenal was progressive as was conditioned by the process of modernization or enlarge of its capacity. It is a perfect example of overlapping of historical periods. The growth of the Arsenal was in direction of conquer the water land.



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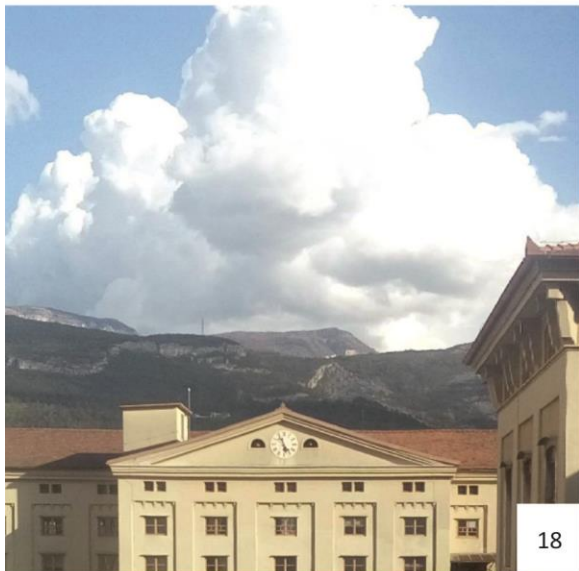
Fig.16 Manifattura Tabacchi. Milan, Italy  
Source: Luca Quadrio [www.instagram.de](http://www.instagram.de)

Fig.17 Centro Tecnofin Servizi. Rovereto, Italy  
Source: [www.trentinocorrierealpi.gelocal.it](http://www.trentinocorrierealpi.gelocal.it)

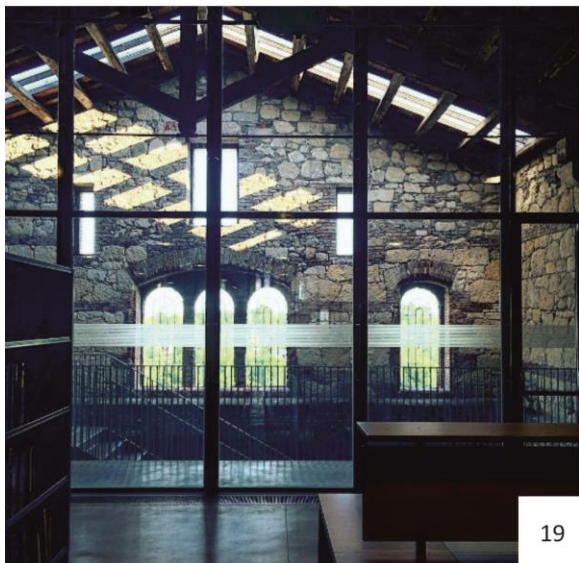
Fig. 18 Progetto Manifattura. Rovereto, Italy  
Source: saragamma [www.instagram.com](http://www.instagram.com)

Fig.19 University of Verona. Department of Enterprise Administration and Social Science. Verona, Italy,  
Source: Carlotta Righez

Fig. 20 Arsenale di Venezia. Venice, Italy  
Source: Eugenio Pellegrino [www.instagram.com](http://www.instagram.com)



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Its ship production contributed to the conquest of the Aegean Sea as well as the travels to North Europe. It is considered the first factory in the history. The same condition that motivated its development placed it in a state of obsolescence. The maritime trade requirements of the current society, demands larger infrastructures for the construction of ship. The activity of shipyard was transferred to mainland standstill the Arsenal production. The arsenal was working until the First World War. It is classified as a Historical Monument with National relevance. The arsenal of Venice is property of the Venice Administration in 2013. It was created an Association for its enhancing, under the name of Arsenale di Venezia S.p.A. It form is a public real state. A group of actions took places after 1980 in post the recuperation of the infrastructures. A great variety of agents have interacted with the structures. Function like educational, research, residential, cultural were performance in this facilities. This situation brought the consideration of an integral planning for the complex. In 2015 was made a new director plan for the whole complex.

**Manufaktura. Lodz, Poland (code EPLO1) (See Fig.21)**

It is located in the former Textile Factory of Izrael Poznański. It was built in 1877 and was working until 1992. It occupied an extension of 30 000m<sup>2</sup> organized in horizontal and articulated form. The action of reuse was developed by a foreign company which made a large inversion in the adaptation of the new activities. The main actuation is the Add on. It is a private property manages by a private investment. Inside of the installation there is a museum of the former production. The reuse is enclosed in operation like revival, renovation, conservation of the urban image. The place was the set for the movie the Promised Land about the Industrialization of the city. The operation had the goal of preserve the pre-existent image.

**OFF Piotrkowska, Lodz, Poland (EPLO2) (See Fig.22)**

Like in the case of Manufaktura, OFF Piotrkowska is placed in a former textile factory and also it was reuse with leisure and commercial activities. It covers a surface of 5 500m<sup>2</sup> in a vertical and articulated configuration. Diverse of the case of Manufaktura this project is the aggrupation of small investment in a single place. It is public property but the project is operated by OPG Orange Property Group, a Real Estate company. The key point of this intervention is the progressive intervention based on small unit that allow a diversity of potential markets. Also it is a viable solution for context where the financial supply is limited.

**Museum of the Electricity. Lisbon, Portugal (code EPLI1) (See Fig.23)**

It was a thermoelectric station that belong to *Companhias Reunidas de Gás e Electricidade*. It was the supply of power for the city of Lisbon. It was built in 1909 and it was working until 1972. The complex has a vertical articulated structure that covered a surface of 38 000 m<sup>2</sup>. It was the bigger power station of Portugal until the middle of XX. It was relevant in the process of modernization of the city of Lisbon and the inclusion of the tramway. The complex is classified as property of public interest (*Imóvel de Interesse Público*) from 1986. It was reuse as Museum of the Electricity and at the interior remains almost complete the machineries.

**LX Factory. Lisbon, Portugal (code EPLI2)** (See Fig.24)

In the same core of Lisbon, there is LX Factory. In the beginning it belong to the *Companhia de Fiação e Tecidos Lisbonense*, and after it was reconverted in a printing factory. It was considered one of the bigger manufactories of the city during XIX. It has a horizontal and articulated distribution that covered 23 000 m<sup>2</sup>. It was dedicated to the printed of the Journal. The reuse was in 2000, the main actuation was the installation. It is a core of multipurpose from library, small business, school for Art, bar etc. It is design under the concept of the collaborative productive spaces.

**Matadero Madrid. Madrid, Spain (code ESM1)** (See Fig.25)

It is located in the former Abattoir of Arganzuela. It was built in 1910 it was working until 1970. It has a horizontal and compact disposition that covers 165415 m<sup>2</sup>. The project of reuse is oriented to spaces of coworking, cultural centre and residential for artist. It brought the revitalization of a derelict sector as well as the extension of the centrality to this area. It is acquired in form buy by the Municipality. After the acquisition of the municipality the first project was to usufruct the space for private uses. But in 2003 the new administration included the Abattoir as part of the project of regeneration of this sector of the Municipality. IN 2005 began the operation.

**Rectorate of the University of Seville. Seville, Spain (code ESS1)** (See Fig.26)

It was the mean line of Tobacco in Europe and it origin was related with the first factory of tobacco in Europe. It constitute a master piece of industrial heritage from the period of Spain Antique Regimen. Its location is evidence of the economic system of the époque where the factories of tobacco where concentrated for reason of control in front of the Church of San Peter. The architectural style are Renaissance. It is a Cultural Interest Property declared in 1959

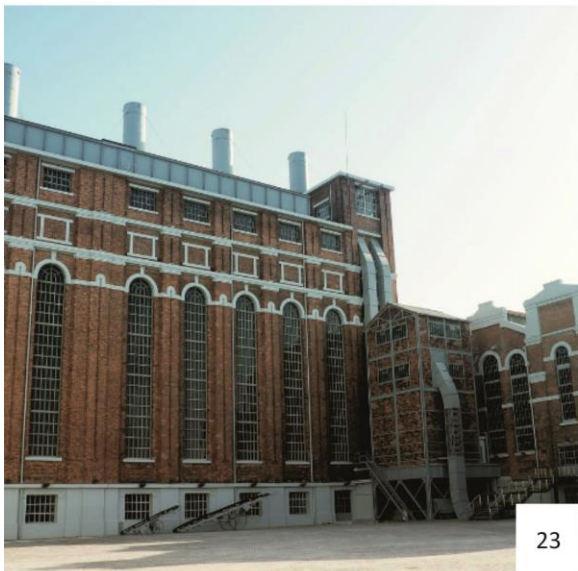




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Fig. 21 Manufaktura. Lodz, Poland  
Source: Marta Krawczyk [www.instagram.com](http://www.instagram.com)

Fig. 22 OFF Piotrkowska, Lodz, Poland  
Source: Anna Krella [www.instagram.com](http://www.instagram.com)

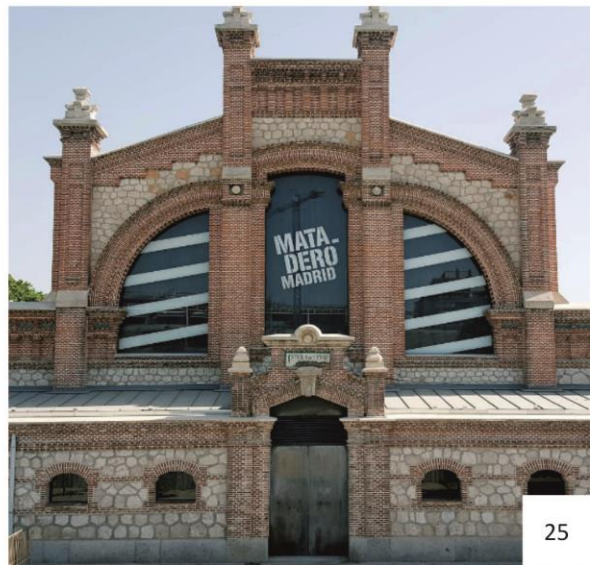
Fig. 23 Museum of the Electricity. Lisbon, Portugal  
Source: Janita Patrakim [www.instagram.com](http://www.instagram.com)

Fig. 24 LX Factory. Lisbon, Portugal  
Source: VMDB [www.instagram.com](http://www.instagram.com)

Fig. 25 Matadero Madrid. Madrid, Spain  
Source: Guille [www.instagram.com](http://www.instagram.com)



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after the reuse in facilities of the University. The adaptation of the activity of Rectorate, brought a transformation described as alteration to the interior space. The other factory of tobacco built for the relocation of the former Royal Tobacco was standstill in 2007. For 2009, it taken as facilities of the University of Seville. This evidence the tendency of generalization of success intervention followed the repercussion of experience before.

**Tate Modern. London, United Kingdom (code EUKL1) (See Fig.27)**

It is placed in the former power station of Bankside. It is a building that covers a surface of 9000m<sup>2</sup>. It is located in a waterfront. Like in the case of Museum of Electricity in Lisbon, this building was reuse in Centre of Contemporary Art. The difference between one project and the other is that in the case of Lisbon the interior was preserve and in the case of London the machinery was eliminated. The project was design by the architect Herzog and the Meuron well recognized in the world of the architecture. The actuation was majority installation however was added an addition volume in one side of the building. It is the second major attraction in London and it is the Museum of Modern Art more visit in the world and third in themes of Museum.

**The Old Vinyl Factory. London, United Kingdom. (code EUKL2) (See Fig.28)**

It is placed in the former Vinyl Factory, EMI buildings. It was built in 1907 and its production stopped in 1970. The production was dedicated to vinyl records, radio and other broadcasting equipment. The complex included administrative buildings, laboratories and production. It has an extension of 69 000m<sup>2</sup> and a vertical articulated organization. The building was renamed under The Old Vinyl Factory. In 2015, began the construction of the media college. The partnership of the project are University of Art of London, Sonos, Host Europe Group and Champ Cargosystem. The full program proposes 500 flats, museum, restaurant, open area and playgrounds. The ownership identified the place as a magnetic atmosphere and in this way brought activities that motivates a continuity of use. This is the case of the introduction of the media college in the sense of thematic continuity.

**Britannia Mills, Manchester, United Kingdom (code EUKM1) (See Fig.29)**

It is located in the former Britannia Mills dedicated to the production emery products. It was built in 1897 it was working until 1991. The infrastructure covers a surface of 610 000m<sup>2</sup> in a vertical compact configuration. The reuse was oriented to residential purposes. The building



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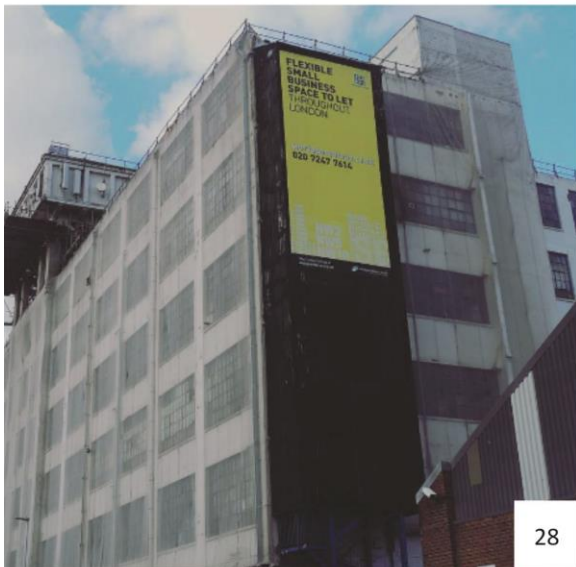
Fig.26 Rectorate of the University of Seville. Seville, Spain  
Source: [www.en.wikipedia.org](http://www.en.wikipedia.org)

Fig.27 Tate Modern. London, United Kingdom  
Source: Sam Salter [www.instagram.com](http://www.instagram.com)

Fig.28 The Old Vinyl Factory. London, United Kingdom  
Source: Yodashe Rbma [www.instagram.com](http://www.instagram.com)

Fig.29 Britannia Mills, Manchester, United Kingdom  
Source: [www.rightmove.co.uk](http://www.rightmove.co.uk)

Fig.30 Albert Mill, Manchester, United Kingdom  
Source: Zoe Misseri [www.instagram.com](http://www.instagram.com)



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contains four floors of residential use. It was adapted 125 apartments. The operation were restauration and renovation. The recuperation of this buildings are motivated the recuperation of other similar structures along the canal. The recuperation of the space as residential purpose closed the public access to the interior of the yard. The insertion of residential use over an industrial land brought the adaptation of the space to the human comfort reducing the acoustic contamination from the railway area.

**Albert Mill, Manchester, United Kingdom (code EUKM2) (See Fig.30)**

As in the case of Britannia Mills, this project was located in a former Textile Mill. It was built in 1869 and occupied a surface of 8000m<sup>2</sup>. It was a cotton spinning and weaving mill. It covered diverse stage of the production process. The use was oriented to residential purposes and the main operation was the installation. During the process that the project took place, in 1998 the spinning block was demolished however there good condition. The recuperation of this Mill is practice well expanded in United Kingdom due to the wide representation of this structure in the cities.

**Murray's Mills, Manchester, United Kingdom (code EUKM2) (See Fig.31)**

It is located in a former textile mill built in 1797 working until 1950. It covers a surface of 64 000m<sup>2</sup> in a vertical articulated structure. It was a cotton Mill. It is the oldest in the world that used steam power to the cotton spinning. It is under grade of protection II. In 1940 the building was reconverted in a bedding manufacture. In 1954 it was used like warehouse. During the sixties the building was reconverted by the light productions. It was demolished the bock in the Bengal Street. The financial support came from a grant of the Heritage Lottery Fund to cover the restauration. Also the North West Development Agency took the control of the space in 2003 and gave financial support for



Fig. 31 Murray Mill, Manchester London.

Source: Barney Ibbotson.  
[www.instagram.com](http://www.instagram.com)

the adaptation of new use. The new use are residential, hotel and offices. The partnership are Ancoats Urban Village Company, Manchester City Council, English Heritage, the Northwest Regional Development Agency and Heritage Lottery Fund.

### **2.3. Identification of tendency of new uses according diverse point of observations.**

The learning from the experience stored using the database allows to develop general overview of the reuse of vacant industrial heritage buildings as well as a closer approach particularities. The next subparts are oriented to identify trends of reuse of industrial buildings, as well as explored the potential that this method permits for the identification of potential function. In this way the analysis takes as method a multivariable comparative analysis. Also it is study the problematic from the position which function are potential for some type of industrial building as well as which type of industrial building are potential for some use.

#### **2.3.1. New uses in keeping the type of structure**

In this analysis are related the variables configuration, spatial organization and number of storeys. It is established set of indicators to study the repetition of use or wide diversity. This study are not contained all the possible configuration just those one that are predominant.

#### **Horizontal, compact and 1 to 2 storeys**

In the sample there is 7 items in the range of 1-2 storeys, all of them with horizontal configuration and two with articulated spatial organisation and 5 with compact one. It is majority the use in the classification of U36 Recreation, leisure and sport. Activities that required spatial continuity and big cover surfaces. The other actuation is related with space of work, offices, scientific centre and university. Places also flexible to be organized in continues spaces as well as subdivided. However in all case a prevalence of large continue surfaces over small rooms. In term of plurality of use, there is the trend to choose mono-functional activities. There is just one cases, the Matadero Madrid, which proposed a combination of activities joins office, leisure and residential. In all the case the reversibility is possible, due to the intervention profit of the image of industrial aesthetic. However in the majority of the cases there is demolition of some secondary structures. It is common to maintain the name of the former production of the company as a double name of the new institution. Some examples are Centro Tecnofin Serviçi Ex Cotonificio di Rovereto Ex Pirelli or Matadero Madrid former Matadero de Arganzuela.

Related with the type of actuation there is a prevalence of Installation. It means that the transformation will take place at the interior and the façade will continue with a similar urban image.

### **Vertical, compact and over 5 storeys**

There are 6 cases under this classification. In this classification there is a great diversity of function. There are concentrated over 34 Commerce, finance and professional and information services and U36 Recreation, leisure and Sport. But there are present also U22 industry and manufacturing, U35 Communitarian Services and U31 Storage. In the case of U22 Manufactory is located in shared space together with other activities. It is related to the sector of creative industries in the industrial design. This the case of Industry City a former Bus Terminal, a set of warehouse and manufacturing in the New York.

In the case U34, it is expressed in the concept of offices for coworking, centre of research and technological park. Also there are the use as academic space for university. If there structure has great capability to adapt to a wide variety of use, it is also evident that there are the vocation to office type activities. It is the competence of isolation and control of access that turn them into potential for functions that required this attribute. The COS varies from 3000 until 70 000 m<sup>2</sup>.

### **Vertical, articulated and 3 to 5 storeys**

The buildings with 3 to 5 storeys are 13 cases, and 7 of them are in articulated spatial organization. The majority are former Mills. In 5 of 7 cases the new uses appeared combined. The same space could admit the conjugation of activities oriented to U34 Commerce with U36 cultural and sportive activities or with U34 hotel, offices and U37 Residences. The medium is combined three diverse type of function. The main use are in the group of U34 Commerce, finance, professional and information services, with U36 Recreation, leisure, sport together a U35) Communitarian services.

Here is the uses according their present in the sample.

- 1) U34 Commerce, finance, professional and information services,

With: Offices, Hotel, commerce centre, restaurant, shop

- 2) U36 Recreation, leisure, sport

With; Museum, Sport centre, Cultural centre, Concert hall,

### 3) U35 University, other form of education

#### **Vertical, compact and 3 to 5 storeys**

Under this characteristic there are 6 cases. The predominant activities are in the sector of U36 Recreation, leisure, sport. The potential use are Museum, Exhibition hall and theatre. This used appeared always combined with others more like offices or space of coworking. The second tendency is the preference to mono-functions. Moreover the use of U37 residential. For this group it is predominant the use of Installation as actuation mode. However the actions at the interior place the space with a limited capacity of reversibility.

#### **2.3.2. New uses keeping the former use**

Following the classification of Major Group it is identified the recurrent uses.

#### **Food and Kindred Products (major group 20)**

There is prevalence of U35 Communitarian Services oriented to Educational activities. Some examples are Grands Moulins Université Paris 7 Denis Diderot in the former Grands Moulins, Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery and the University of Verona. Department of Enterprise Administration and Social Science.in the former Panificio della Caserma Santa Marta. Other tentative use is the U34 Coworking, U36 Cultural centre and U37 Residential. A singular use is the Helsinki Court House District where was reuse a whole complex for the production alcoholic beverage in multiuse. In all the case the actuation prevalence is the Installation.

#### **Motor freight transportation and Warehousing (Major group 42)**

In this section the former activities are related to the warehouse. Associated to this pre-existent activities, the new use are oriented to U36 Recreation, leisure, sport in frame of museum. Examples are the Museum Küppersmühle, Speicherstadt and the Teatro e Silos Armani, from great operation to other more discrete. Other possible are the coworking and the warehouse. According the COS, the inclusion of the activity could be mono functional for small dimension ore multifunctional for large ones.

### **Oil and Gas Extraction (Major Group 13)**

There is just one case for this reason it is not relevant for the analysis. However the solution continue be a possibility for other structures like this. It is the case of Gasometer of Oberhausen turn into Exhibition Hall.

### **Primary Metal Industries (Major Group 33)**

Like in the case before there is just one case. This time corresponds with the former Acciaierie Riva Calzoni in Milan reuse in Exhibition Hall.

### **Stone, Clay and Glass and Concrete Product (Major Group 32)**

In this classification there is one case. It is an emery Mill called Britannia Mills. It is a set of 6 building reuse wit Residential purposes.

### **Paper and Allied Product (Major group 26)**

There is one case that is the Dumas former Paper and Allied Product. The new use is oriented to Offices.

### **Textile Mill Products (Major Group 22)**

There is 7 cases in this classification. There are three tentative lines of reuse one oriented the technological part and incubator, the second addressed to cultural functions and the third related with residential activities. IN the first case there is two expression one Techonological Park and the second incubators or coworkings. The second line connected with cultural space are related with massive activities like the case of Manufaktura in Lodz, Poland and Nordwestdeutsche Museum für IndustrieKultur in Delmenhorst or small spaces like OFF Piotrkowska. Other functions are U37 Residential and it is principally linked with Mills structures.

### **Tobacco Product (Major Group 21)**

There is three cases. All of them are related to formative activities from facilities like the rectorate of University of Seville as the Porgetto Manifattura in Rovereto oriented to the sustainable studies that covered education, offices and manufacturing. In two cases the actuation is Installation and the other is combined with add on.

### **Printing, publishing and Allied Industries (major group 27)**

There is one case that is LX Factory former Companhia de Fiação e Tecidos Lisbonense. It an space of multiuse with place of work, sale and eating. It is a similar model of coworking under the principle of incubator of small enterprise. The actuation is the installation.

### **Electric, Gas, And Sanitary Services (Major group 49)**

In both case the reuse are in Museum. In the case of Museum of the Electricity former Station Tejo in Lisbon, the activity is associated the pre-existent production. The second one is oriented to Museum of Contemporary Art the Tate Modern former Station of Bankside in London. There are mono activities. In the first one the actuation was installation in the second one is predominant the installation however it was also applied add on.

### **Electronic and other electrical equipment and components (Major group 36)**

There is one case and it is dedicated to Commerce, Leisure and Sport from a former Vinyl Factory.

### **Transmission and Distribution Equipment transformer (Major group 36)**

The new use purposed in complex in this classification are made in progressive way and defined by diverse big functions. It is common the function of Museum of Contemporary Art mixed with other activities. The actuation are predominantly installations but it is also susceptible to admit add on, it means the incorporation of new volume.

### **Transportation Equipment (Major Group 37)**

There is one case. That is the Arsenal of Venice. The complex under this category are usually divided in several uses. The structure articulated allowed its performance like multicore. Educational, Cultural, Centre of Resource as well as small Business are the functions better adapted. One example is the case of the Arsenal of Venice, which integrates diverse interests.

#### **2.3.3. The industrial morphologies in keeping the potential new uses**

Before was analysis the potential use according the type of the former productive activity, in this time it is identified the potential scenario of industrial type according some use.

## **U22 Industry and Manufacturing**

The conversion or inclusion of productive activities in former industrial places, is available to be adapted to several industrial type. Warehouse, Steelworks or Tobacco Manufactory. In all cases the type of structure allow a multiple accessibility to the building giving the opportunity to divide the space for several productions. The scale of the new productive space is small, and are the expression of small productive core. Usually appear integrated with other function that completed the system like creation, production and retail.

It could cohabitate with U34 Commerce, finance, professional and information services that support the offices and commercial infrastructure. Also according the profile of the production it will be connected with U35 Community Services like University in the morphology of Incubator of Enterprise or Technological Park as well as with U36 Recreation, leisure, and sport for the cases of production addressed to the creative sector.

According the antiquity, there is represented structure from late XX until XIX Century. In the case of the operations, it is common installation with add on or put on. The format of investment appeared always mixed between public, with state, regional and local administration with the private, from small investment until great capitals. There is a tendency to a public property.

## **U31 transport, communication networks, storage, protective works**

This activity is usually as temporary use before the finally intervention of the space. However sometimes this use of the space as warehouse could be the last destination. This is the case of the Warehouse of LVR-Industriemuseum in the former Warehouse of Gutehoffnungshütte (GHH) that today save the collection of regional museum in the Ruhr.

## **U34 Commerce, finance, professional and information services and U35 Community Services**

The U34 with a representation of 15 cases, it is a sector of activities well expanded. It appeared predominantly in combination with other sectors in set of two sector of activities. One combination is U34 and U35 community services. Other is U34 with U36 Recreation, leisure and Sport and the other frequently is U34 with U37 Residential.

The combination of U34 with U35 are the majoritarian group, the industrial type tentative for this purpose are the one related with the Food and Kindred Products. However other like Textile

Mills and Transportation Equipment are also regularly required. In the favoured actuation is the installation that profit of the industrial atmosphere as an element of singularity. There are a tendency to public property with mixed investment.

In the case of U35 Community Services, the activity more required is the University facilities. From administration function until educational ones the industrial space are perfect to adapt this type of activities. The potential receptor are the space of former production in the sector of Food and Kindred Products. Mills, Bakery, Distilleries, Abattoir are some of the repertory exploited. It is easy to acclimatize to infrastructure built in XVIII until those one developed in the current times. The common actuation are the installation however other action like put on are utilized. This investment are favoured by the public sector. According the area of interest international regional organization could contributed in the construction of Technological Park. This is also common motivated with private sponsors. The dominant form is the property of the installation but other are possible like usufruct.

### **U36 Recreation, leisure, sport**

It is common to found this activity in combination with U34 Commerce, finance, professional and information services. The dominant morphologies of this sector is Museum and Exhibition Hall or Gallery. There is a great diversity of tentative industrial buildings type. It oscillated in equal representation among, power station, mills, warehouse and food production. There is two tendency in order of use, one an isolated use, like museum or gallery and the other the multiuse of diverse purposes. For the mono-function it is common facilities like power station or mills. There big building but with a tendency to be a mono structure. One main building is which dominated the space for mono activities.

In the case of a plurality of uses, there are two type of intervention. The great investment, private or mixed, it take usually complex, a system of big building where located in the way of individual units thematic uses. It tentative to be combined with U34 under commercial and gastronomic purposes.

The second type of intervention is the communitarian action. A space of manageable dimension with a tendency to 1 to 2 floors, with the possibility of multi accessibilities as well as the division in small unit. Usually is managed by a Real Estate that could belong to the public or private sector that offered the platform for small business profit of the infrastructure for a



mutual cooperation. The tentative infrastructure are former textile factories developed in XIX Century motivated for its largest representation in the cities.

### **U37 Residential**

The residential purpose it is well expanded in United Kingdom is the profit of former Mills as well as in other latitude related to former warehouses. It has a tendency to create space for the middle class, in form of loft however there is other experience like in Italy addressed to social housing in former Tobacco Manufacturing. It appears in scenario with there is a wide representation of a same type of industrial object that placed them in a frame without protection. The common actuation is the installation as well as the put on, the process to give a double façade to the building. The tentative morphologies are this one that are with a vertical configuration and between 3 and 5 storeys. It is also frequently the articulated spatial organization more that the compact due to the environmental comfort requirement. The investment is majoritarian private as well as the property.

The analysis of the cases through a thematic point of view allowed to find potential field of actuation. This variety of interventions could be organized in through the thinking of a morphological box to enlargement the view of alternative of combination.

### **2.4.Enlargement of the capabilities of the Database by the application of the morphological box.**

The analysis of the data contained in the database allowed a multidimensional approach. Adjusting the requirement of the observation is possible to have a variety of result. To achieve this flexibility of the database father that the simply accumulation of cases is possible to read the content of the platform through the organization of a Morphological box. The filtered result of the database could be presented like a system of alternative of combination. With this goal a short review to the morphological box tool, in term of characteristic and operability. Also it is showed an example of use.

#### **2.4.1. Characteristic of the morphological box**

The morphological box brings the possibility a support that allowed the creation of multiples alternatives. The morphological box is a tool based on the morphological analysis of non-quantifiable problems for the generation of multiple solutions in complex problematics. It was

developed by Fritz Zwicky, astrophysicist and aerospace scientist as a method to identify all possible relation among variables in multi-dimensional, non-quantifiable, problem complexes (Zwicky 1966, 1969 cited in General Morphological Analysis, 2002). It is a method well generalize in the diverse field of the research. Its structure is support in the method of analysis-synthesis to identify the potential solutions.

It is designed to display a wide amount of potential options. The tool is based on a grid structure. With a system of mono access. The advantage is the possibility of include an infinitive number of variables. The method, is similar to the typology analysis. The tool uses a matrix as platform for the organization of the variables. For each variables correspond a series of diverse performances or condition. This ones are associated to a unique cell in the matrix. By the operation of cross correlation of variables is generate potential options that open the spectrum of possibility to the researcher. The method can generated a number of variants such as the multiplication of the number of range per variables (General Morphological Analysis, 2002(.)).

For the reduction of the solutions to the coherent ones, it is followed a systematic process identified as Cross Consistency Assessment (CCA). The principles is based on the existence of pairs of conditions or performance of the variables mutually no-compatible. The analysis follows a logical and empiric judgement. It should not correspond necessary with the desirable state. The process of selection analysis synthesis is dilated and demand time however it is tested its effectiveness. It recommended to find complementary measure to reduce the solutions (General Morphological Analysis, 2002(.)).

#### **2.4.2. Relevance of the studies of possibilities**

The morphological box is commonly required in Europe as well as in United State for policy studies. Also it is employed in planning issues or the model of potential scenarios. In social, political or cognitive studies, the judgment are frequently used (General Morphological Analysis, 2002(.)). An example is the Swedish National Defence Research Agency (FOI), the used the tool to identified a possible options for the investment in term of planning, building, maintenance etc. Also it is applied to cases of product design. An example is the K8 Industridesign that employed the morphological box for the identification of design requirements (CREATIVE project, <http://www.diegm.uniud.it/>). In other hand, it is also pertinent in education. An example is the research of Isenmann and Zinn (2015) about the

identification of possible association among universities and centres of research for the education on sustainable development.

The reference in application covers diverse problematic such as Society, security and safety, commercial problematics, defence and academic research. In the last group, the thematises cover are sustainability program development, political position, investment decision, risk management, corporative strategy development, stakeholder position in energy sector, green façade design, scenario for eco-policies, poverty reduction strategies, design by process in the Alimentary sector and urban good governance. The institutions participants are universities around the world, research centres, governments, environmental and defence agencies as well as International organization like UN-Habitat (Project List 1995-2016, <http://www.swemorph.com/>).

In the case of the identification of potential use for vacant industrial heritage buildings, the structure of the morphological box contribute to generalize the result obtained particular experiences. In the next part will be explained the process of operation with the morphological box for the topic of the research.

### **2.4.3. Design and workability**

The way of work of the morphological box is perfectly adjusted to the database of potential use created. The requirement of a morphological box is to divide the problematic in variables and then identified the Assessment process the combination no potentials. The same structure is the one that the database follows. The variables that defined the problem are defined and structured by unit of analysis. The valuation of Assessment of the potential combination are the result of the compilation of cases and it segregation according the variables of interest.

After the filtered result of the database, the expression of the data is presented by specific cases. With the objective of generalized this result the database could be read it as a morphological box, where the alternatives of the variables are defined by the performance of the cases.

For example:

If it is interest to know the potential use for building with the former production:

Motor freight transportation and Warehousing (Major group 42)

There are five cases, Museum Küppersmühle, Speicherstadt, Peter Behrens Bau, Teatro e Silos Armani and Industry City. If the intention is a large exploration, it will be analysis all the cases, but also it could be introduced other indicators to adjust the box to Urban Area study. In this case could be added a range of number of population or densities. For example if it is take the number of inhab. in the range over 400 000 to 5 000 000 inhab. the cases of Peter Behrens Bau will not appear in the box due to the population of its Urban Area is under 400 000 inhab.

One time identified the correspondent scenario with the fixed variables, it is displayed the possibilities of uses. The data showed in the table is presented in lineal way. For one horizontal entrance of data correspond an indicator. The morphological box proposes to read the data no in a lineal way but as a set of indicators susceptible to archive diverse combinations.

In this way if in the former observation of the database, under lineal analysis, the activity of coworking can be manage just under private and public investment, the morphological box open the possibility to explorer other combination inside of the same selection. Thus it could be considered that for coworking also could be manage by just private, or just public. In the same way could combined the other indicator to create a wide variety of possibilities. Always from the base of the filter information of the database.

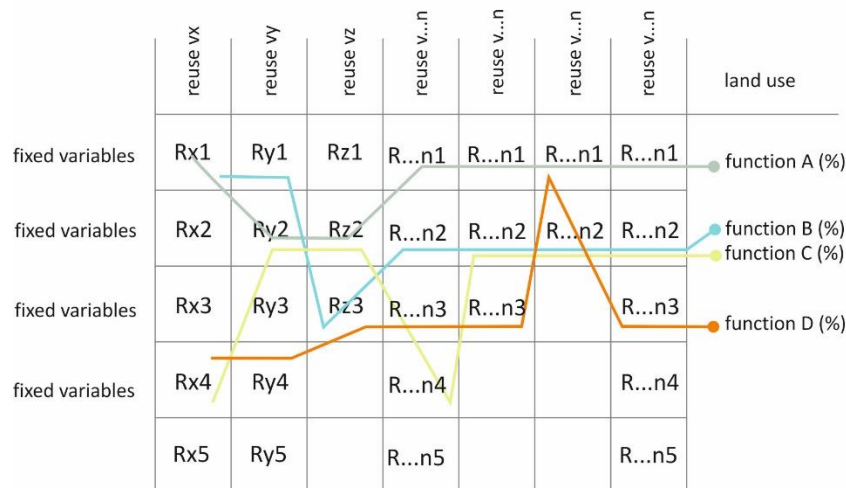


Fig. 32 Conceptual model of the morphological box exemplified in this cases of research.

Source: Author

The advantage of this structure is the accessibility to a simplified information of a multivariable complex problematic. The tool helps the decision marker to find the possible function and models of reuse through the identification of their scenario. In other hand, it is visualized other

combination not found in the sample. It is relevant to remember that the goal of the tool is identify potential use based on the experience that did not constituted the adequate one. To determine the adequate one, it is necessary to apply a second method that with evaluated the pertinence of the function for the specific requirement. The analysis could be also concentrate in the observation of short group of variables that could be considered relevant to some studies.

## **2.5. Methodology for the identification of potential use for vacant industrial heritage buildings.**

The methodology for the identification of potential use for vacant industrial heritage buildings is composed by a compendium of tools and method organized by a sequence of steps to archive progressive results. The potential users are the urban planning of the territory, admiration, civil organization, academics as well as Real Estate to identified potential scenario for the reuse of the vacant industrial buildings. It allows to create a portfolio of potential investment as well as priorities of actions.

### **The objectives**

The main goal is the identification of potential uses accumulated in the experiences around the world. It is the richness of the culture of exploitation of pre-existent structure the guidelines to recognize other potential uses, modes of exploitation and tendencies. In this way, the objectives are defined in function to open the scope of possibilities in the first moment and the identified the pertinence of these potential use according the needs and capabilities of the territory and the industrial objects.

### Secondary objectives

- Capability to analyse in both direction from the whole to the parties as well as from the parties to the whole.
- Capability to analyse the problematic in system organized in units of analysis: Urban Area, Vacant Industrial Building, Value and Reuse.
- Making the methodology flexible to identify diversity of use from a few fixed variables until a restricted characterization of cases
- High operating capacity of the methodology where the user could adjust the range of the variable performance according his interest of observation
- Capability of the tool to integrate a multi-criteria

- Progressive approach to the problematic with output of partial results
- Accessibility of the informatics platform for a wide spectrum of specialization with friendly software.
- Profiting of the common skills of the user in term of abilities already acquired like selection, characterization, filter, trend studies.
- Reducing the technique vocabulary in function to make accessible the content.
- Profiting of online pre-existent databases to complete the data
- Capability for the analysis multi-actors

### **The decision makers**

The flexibility of the methodology allows the configuration of individual or collective structures of decision makers. Besides, the participation of the type of decision makers could be permanent in the whole procedure or target according the area of specialization. Also, it is possible to have a dynamic structure in term of social inclusion as well as operative. However, it is relevant to underline that the variety of decision makers permit to achieve a more pertinent result.

### The individual and collective structure

This type of classification is related with the representative of the sample of decision makers. If it is the case of a sectorial group, like administration, academic, conservation institutions, or real estate, it is the cases of individual structure. The model will have a polarized view of the problematic making attention to their area of interest. In this cases it is suggested the consultation of experts overall in the part of identification of the fixed variables including the definition of the objectives for the valuation of the pertinence and the priorities.

A collective structure is this that included a representation of all stakeholders.

### Permanent and progressive participation

Permanent participation will depend on the property state of the object. If it is private object, the permanent participation should be displayed through the existent institution of decision, Monument, Urban planning, etc. If is a public property is operative in cases where the group of stakeholders is based on representative form, or the urban area corresponds to units around 5000 inhab. Also this form is objective in cases where the level of signification of the object is

local and the community interested constitute in a manageable measure. In this cases group of stakeholders based on representative form should covers the majority of the aspect of interest of the object: specialist (including academics), local administration, civil society, private sector and land planning. The stakeholder should be representative of the criteria of the social group that he belong.

In the cases of small urban areas or local signification, the public consultation in the moment of decisions as well as an open information of the process could be an adequate answers. It could be use the system of administrative subdivision of the territory with a hierarchy synthetic of the criteria from bottom up.

The progressive participation is connected with the use of target groups defined in function of the goals. These target groups will participate when there interest could be compromised.

### **The scopes**

The scopes of the identification of potential use varies in relation with the goals. The identification of potential use could be exploratory oriented to identify areas of potential development or for the regulation of the use of the land. The major goal could be the motivation of new investment in the territory. Other approach could be analytic, overall in studies of the interventions over heritage structures.

#### **2.5.1 Procedures**

The way to identify potential uses for vacant industrial heritage building is structured by stages.

##### **First stage**

Characterization of the Urban Area and the Vacant Industrial Heritage Buildings according the criteria selected. In this point it is possible to dismiss this variables considered without interest in the observation.

- Recollection of data according the variables to observe
- Application of the form for the characterization of Urban Area
- Application of the form for the characterization of Vacant Industrial Heritage Buildings

##### **Second stage**

Classification of the Urban Area and the Vacant Industrial Heritage Buildings according the fixed variables for the observation.

- Definition the fixed variables for the observation

Note: The fixed variables are related with the characteristic of the Urban Area and the Industrial Object. With minor number of fixed variables is wider the possibilities of use. With major number of fixed variables is more pertinent the use. Also variables generals like number of inhabitant or density, or zone of the city, or morphology of the building, or value allowed an abroad options. Other more precise like type of specific former function offer a restricted sample. It is recommended the multi-criteria analysis, combining variables of the building with other of the territory. Also it is possible to developed more than one selection of fixed variables with the goal of analysis diverse scenarios.

Example:

Scenario 1: Number of inhabitants and zone of the city in the case of the Urban Area with the variable of level of protection in the case of vacant industrial building.

Scenario 2: Dimension of the city with density per km<sup>2</sup> in the case of the Urban Area together with coefficient of occupation of land (COS) and the state of integrity in the case of vacant industrial building.

One time identified the variables of interest, it is necessary determined the grade of performance. This grade will be in relation with the characteristic of the Study cases.

Example:

Urban Area, City: Havana

- Number of inhabitants: 2 121 871 inhab.
- Density: 2 919 inhab/km<sup>2</sup>
- Zone of the city: centre
- Area of the settlement: 728,26 km<sup>2</sup>

Which this characterization the range of fixed variables could be:

- Number of inhabitants: 500 000 to 5 000 000 inhab.



- Density: 750- 5 000 inhab/km<sup>2</sup>
- Zone of the city: centre
- Area of the settlement: 500 -1500 km<sup>2</sup>

Vacant Industrial Object, Object: La Tropical brewery

- Coefficient of occupation of soil (COS) estimated in 40 000 m<sup>2</sup>
- Integrity of the object 4) remain the significant machinery
- Level of protection: National

Which this characterization the range of fixed variables could be:

- Coefficient of occupation of soil (COS) 20 000 to 60 000 m<sup>2</sup>
- Integrity of the object 4) remain the significant machinery
- Level of protection: National

For major precision of the range of interest, the variables should be study by a multidisciplinary group to determine the point of inflexion of the performance of the range around the world. There is an agreement among the countries either in quantitative variables.

### **Third stage**

Identification of the potential use.

The existent database elaborated for the purpose of this research is focus in samples located in cities in the frame of 500 000 inhab. to 5 000 000 inhab. for densities between 750 to 5000 inhab/km<sup>2</sup>. In this way, the content is compatibles with Urban Areas that present characteristics in this frame. For those one diverse, it is necessary and enlargement of sample according with the range of fixed variables defined before.

A) With the existent database

- In the **database of urban area**: Filter the fixed variables according the range defined. Record the codes of the corresponding Urban Areas. (Continent, Country, City)
- In the **database of vacant industrial heritage buildings**: filter the code of the potential urban scenarios determined in the Urban Area database. Then filter the sample by the fixed variables corresponding to vacant industrial heritage buildings. Record the code (Continent, Country, City, Number)

- In the **database of Reuse**: filter the code of the potential vacant industrial heritage buildings recorded before. The characteristics present in the resultant selection is the morphological box for the scenario fixed.
- B) Enlargement of the database
- Identification of samples corresponding with range of the fixed variables.
  - Characterization of the sample according the unit of analysis
  - Indexing of the items in the database

After this point, following the same paces explained in the case of pre-existent database.

#### **Four stage**

Valuation of the grade of pertinence of the potential use by the method of analysis by objectives. One time identified the potential use, it is necessary to value the compatibility with the needs and capabilities of the territory and the object. Thus it is necessary to identify the objectives of the territory and their priorities.

- A) Diagnostic of needs and capabilities the territory as well as the industrial object.
- B) Identification of the objectives of analysis
- C) Determination the priorities of this objective
- D) Valuation the correspondence of the new use in function of the objectives
- E) Identification of the potential use with a correspondence over 50%
- F) Valuation of the answer of the new use to the priority objectives
- G) Classification of the grade of pertinence of the potential use
- H) Under 50% low level of pertinence
- I) Between 50 to 70% medium level of pertinence
- J) Over 70% high level of pertinence

#### **2.5.2. The data collection and tools**

For the data collection in the characterisation process the sources are deposit in diverse spheres, urban planning, economic, statistic, protection law of monuments etc. this offered from the beginning a systemic analysis of the problematic.

For the elaboration of the database, the data collection came from sources available online. For this reason it is relevant to identify the sample according term of accessibility to make viable the procedure.

For the analysis of pertinence of the potential use the sources should be oriented cover a wider spectrum from legislation, land use, statistic, level of protection of the objects, reports etc. The major should be primary sources in the way to have a pertinent approach. However pre-existent studies are well received with the goal of systematizing the knowledge.

It is relevant the credibility of the sources but also the operative accessibility to the information. In this way, it is suggested databases where the information is correlated with these one published by primary sources.

For data about the Urban Area

- <http://www.citypopulation.de/> Global information about the cities and the population.
- <http://maps.eea.europa.eu/EEABasicviewer/v3/?appid=976fca4b674c48bb914b8b949fb6960b> Regional database for urban and statistic studies using a cartography communication for Europe.
- <http://www.arcgis.com/home/item.html?id=976fca4b674c48bb914b8b949fb6960b> Urban Atlas for Europe
- <http://ec.europa.eu/eurostat> Regional information about statistic indicator like demography, economic, etc of European Union
- <http://ec.europa.eu/eurostat/web/lucas/overview> Regional information about land use and land cover in European Union
- <https://www.wolframalpha.com> computational knowledge engine for comparative analysis of data by statistic indicators
- <http://www.oecd-ilibrary.org/> Global data of a select group in the world about urban statistics
- <http://www.europeandataportal.eu/> Statistic data about employment in European Union
- CEPAL regional data about economics indicators for Latino America and Caribbean.

For information about the condition of protection of the industrial objects with the reference of the sources:

- <http://whc.unesco.org/en/list/> Global database of the properties with Outstanding value of the Humankind
- [www.wikidata.org](http://www.wikidata.org) Database of objects where appear the classification as Cultural Interest Property
- [https://en.wikipedia.org/wiki/List\\_of\\_heritage\\_registers](https://en.wikipedia.org/wiki/List_of_heritage_registers) List of national organization in charge of the conservation of the heritage in diverse countries.

### **The tools compendium**

- Form for the characterization of Urban Area
- Form for the characterization of Vacant Industrial Heritage Objects
- Database of Urban Area for the index of the item
- Database of Vacant Industrial Heritage Objects and Value for the index of the item
- Database of Reuse for the index of the item (See Appendix 6. Database of Reuse)
- Tool of morphological box for the identification of potential use.
- Method of the analysis for objective for the determination of the grade of pertinence of the potential use.

### **2.5.3. Partial expected result and valuation of the methodology**

The methodology is designed with the goal to offered partial output of the problematic. In this way, for the case of the characterization of the urban area and the Industrial Objects constitute a record of the condition of the study case for the moment of the analysis. It the modelling of the scenario where the object is located.

For the cases of the database of cases, it is a platform that could be utilized for the analysis of potential use for Urban Areas and Industrial Object that correspond with the same range of fixed variables.

The definition of potential uses, constitute a result with the capability to be use to diverse interest like portfolio of potential inversion, or prediction of scenarios for land use studies, etc.

The pertinent grade of the potential use is a result that could help to define the priorities of inversion over the industrial heritage, as well as the identification of non-desirable function over the structures.

## **The weakness and strengths of the methodology**

The goal of the methodology is to open the scenario of possibilities by the profit of the learning of the experience. Under this precept it is considered its weakness and strengthens according data collection, sample, operative capacity and credibility of the result.

### Data collection

The major strengthens in the data collection that the methodology offered is the simplifying of the variables and indicators to common platform. The expression of the collection of data divided in unit of analysis, criteria and variables, permits a multi-criteria analysis. Also it is effective in the case that some information will be no available did not impede the operability of the methodology. Besides the subdivision by unit of analysis contribute to the collection of data in multidisciplinary groups focus in their field of studies.

A point of weakness is the availability to data that used a language that is not understandable by the user. This limited the access to the data. The global analysis has the limitation of the geography position that depend on accessible data by internet. Other restriction is the organization of the sources and the producer around the countries. Some data are registered in National Statistic centre in some context and in other in the level of local administration. Also it is difficult the accessibility to data of the land use by cartography. Some database supplied this information like LUCAS that belong to Eurostat for the cities of European Union. Besides in term of variables, there is not a consensus in the indicators and classification of the variables around the countries. Some regional organization works in the creation of standard systems and homologation of indicators. This is the cases of ONU, CEPAL, Eurostat, EOCED, TICCIH and UNESCO. Finally, however there is the representation TICCIH in the countries that selected for the sample, it is commonly that did not exist a record of the cases of the industrial buildings reused as well as could be not a website of the national dependency.

### Sample

The strength is in the own nature of the methodology. The value of a repository of practices bring an accessibility of a wide spectrum of possibilities. A wide group of cases permit a diversity of scenarios. For avoid the weakness of the sample it is important to look for experience in context with compromise with the conservation of the heritage and the territorial

development. Also it is relevant that the sample correspond with the range of the fixed variables of the study cases. Otherwise, the result will be not compatible.

### Operative capacity

The more important element is to profit of skills that the majority of the society has for default. Selection, characterization, filter comparative studies are operation commonly in the daily life. Also the use of term farther for technique language as more was possible. Besides it to take advantage of the common computing skills like word and excel. In other hand the structure of the methodology divided in stages allowed to overlap steps, example the definition of objective and priorities with the recollection of data. Also the flexibility of the structure allows to adapt it to the interest of the user.

The weakness in operative capacity is in the integration of the database. It is necessary in future research to integrate them. Thus it is required do steps that could be reduce in time and operations.

### Credibility of the result

The credibility of the result is depend on credibility of the sources that support the database. Also in the selection of context with commitment in the conservation of the heritage and the territorial development. Besides, in the way that the stakeholder group or the consultation of sources that covered the interest of diverse actor permit more pertinent result.

The weakness is in the identification of the range of the fixed variables and in the subjective valuation of the correspondence with the objectives. In this way it is suggested to use always as part of the fixed variables the number of inhabitant, density and city zones. This element describe in general way the present of a diversity of scenario. In the case of the subjectivity, this could be correct with a representative group or sources that correspond with multiple interests.

## **Partial conclusion**

For the analysis of cases to profit of the experience stored in term of reuse of vacant industrial heritage buildings, it was created a method for the systematic analysis of the cases. This process allowed the characterization of the context as well as the industrial object. The tool used was the Form that contributed the registered of the items in independent support that could be used for other research. Also the same expression of tool was profited for the characterization of the industrial object. It allowed an approach to the object from thematic like industrial object, value or operation of reuse. Together the use of a database as a tool for the comparative analysis offered a flexible structure for the multivariable analysis. It was possible to cross variables from the Urban Area with other of reuse.

With the application of this method was identified the tendency of use according diverse point of observation. It was analysis de potential use keeping the industrial composition and also the potential use keeping the former production. Besides it was identified which industrial structure are more potential for determining uses. The identification of this tendencies represents a first approach to the definition of new use for structure according defined variables.

Besides, it was study the tool of the morphological box for the generalization of the results. The morphological box present an adequate correspondence with the database and it position of observation permit enlarge the capability of the database generalizing the results in the same way that open the spaces to others combinations.

Finally, with the state of art together with analysis of studies cases, was possible to design a methodology that compile the tools and methods in the definition of potential uses through the experience of cases. This methodology will be tested out with the application of the study cases of the industrial along the Almendares River.





## **CHAPTER III**

Determination of potential uses for the vacant industrial heritage buildings along Almdares River



## **Abstract**

This chapter has the goal to apply “the methodology for the identification of potential use for vacant industrial heritage buildings” to a concrete case of study. With this aim, it is selected the area of the Almendares River axes, due to its strong past linked with the historical evolution of the Havana city. The axes of the river, is a repository of the traces of the industrial evolution from the XVI until nowadays. Also it is the place of confluence of diverse social groups as well as conditions of habitability. Its position South-North, cross the zone of the city from residential neighbourhood of XIX under criteria of city garden and other from XX under the North American style of the urban suburb until workers neighbourhoods and small piece of informal settlements. Also this area is the only Metropolitan Park of the City, element that marked the morphology of the productive activities in the area.

This chapter is divided in six moments. The first is associated to the delimitation of the area of study. The second is related with the characterization of the urban area as well as the third to the characterization of the vacant industrial objects. The fourth is oriented to the classification of the Urban Area and the Vacant industrial object in function the fixed variables for the observation of the cases. The fifth is connected to the application of the morphological box for identification of potential new uses. The sixth is oriented to the evaluation of grade of pertinence of the potential uses according the needs and capabilities of the contexts. This last step, due to its illustrative purpose, it is applied just to the cases of La Tropical Brewery.

## Résumé

Le chapitre a pour but d'appliquer "la méthodologie pour l'identification des utilisations potentielles pour les industriels bâtiments patrimoniaux vacants" à un cas concret de l'étude. A cette fin, il est sélectionné la zone de la rivière Almendares, en raison de fortes relations avec l'évolution historique de la ville de La Havane. L'axe de la rivière, est un référentiel des traces de l'évolution de la XVI de l'industrie Jusqu'à nos jours. Egalement, il est le lieu de confluence de divers groupes sociaux et des conditions d'habitabilité. Sa position Sud-Nord, traverser la zone de la ville de quartier résidentiel du XIX selon les critères de jardin de ville et d'autres de XX sous le style nord-américain de la banlieue urbaine jusqu'à ce que les quartiers ouvriers et petit morceau de quartiers informels. De plus, cette région est le seul parc métropolitain de la ville, l'élément qui a marqué la morphologie des activités productives dans cette zone.

Ce chapitre est divisé en six moments. Le premier est lié à la délimitation de la zone d'étude. La seconde est liée à la caractérisation de la zone urbaine, ainsi que la troisième à la caractérisation des objets industriels vacants. Le quatrième est orienté à la classification de la zone urbaine et l'objet industriel vacant en fonction des variables fixes pour l'observation des cas. Le cinquième est relié à l'application de la boîte morphologique pour identifier de nouvelles utilisations potentielles. Le sixième est orienté à la valorisation du degré de pertinence des utilisations potentielles selon les besoins et les capacités des contextes. Cette dernière étape, en raison de son but illustratif, il est appliqué juste pour le cas de brasserie La Tropical.

### **3.1. Delimitation of the area of study**

The delimitation of the area of study followed an approach from the general to the specific. It comprises the analysis of the Habana City, context that support the objects. The goal is to understand the formation of the diverse zones from the functional, morphological, economic, social and political aspects. A second part is addressed to identify the functional role of the Almendares River, area of study, through the historical path. Finally, a third part dedicated to the physical and administrative delimitation of the area and the potential vacant industrial buildings to reuse.

#### **3.1.1. Havana: human settlement and industrial city**

The city of Havana is the capital of Cuba. It is located in the North-western part of the country. Its current borders were defined in the political-administrative division of 1975, moment that was declared a 'Habana City' Province separated of the great 'Havana' Province. The city is classified as metropolis, with a permanent population of 2,12 million of inhabitants and it is the major one of the country. It is the centre of the political, administrative, financial and economic power of the country.

The foundational process of the villa was result of the colonization by Spanish Crown. The first foundational core in Havana, was placed in the South cost of the country and was established in 1514 (Pichardo, 1986,38-39). In the north part, the first human settlement was located in the border of the Casiguaguas or Chorrera River, after known under the name of Almendares. The main reason for the placement was the existence of fresh water for the village. But a change of the role, oriented to provide security to the Battleship Army of the Spanish Crown, caused the relocation of the population to the current area in 1519, surrounding the Havana bay. The city was designed under defensive criteria. A system of fortification located in harmony with the potential topography provided an efficient military system. The first productive activities were oriented to the search of gold that rapidly were used up. The creation of the system of Spanish Battleship and Army in early XVI Century for the trade between Spain and the Colonies, selected the Havana city as pivot point for the distribution and store of good as well as reparation and construction of ships. From the 1561, the Havana was recognized as capital of the Country. In the beginning the main activity of the city was oriented to supply the infrastructure to the Battleship Army in term of construction of ship, food and Tabaco (Gavira, 1976 cited in Lopez, Naranjo, 1996, 185). The planning of the villa was based on a regular structure that characterized for a prolongation of the Spanish late mediaeval during the process

of conquest and after for renaissance urbanism during the period of colony (See Fig. 1). The protagonist was an urban fabric based on the octagonal structure that went over the city borders to regulate some form of use of the agriculture land. The structure of the city was composed by main axles connecting open spaces in the form of squares. This structure is an evidence of the transfer of knowhow by the colonizers from their experience in during the conquest of the Iberian Peninsula (Bielza, 2002 (.)). The Havana was conceived as a polycentric system of squares around which were located, in heterogenic composition, the political, military, educational, religious and commercial powers. This heterogenic structure was distinctive of the case of Cuba, not equal for the other American colonies with a poli-functional major square (López, Naranjo, 1996, 188). A city wall protected the villa as well as chain that close the bay. The major population was located inside of the city wall and just the productive land was located out site. In the other side of bay other settlements were founded like Guanabacoa in 1554, Jesus del Monte in 1558 and Regla in 1689.

About the infrastructure, the supply of water, came by the use of a water ditch that brought water from the Almendares River. The path of this infrastructure influenced in the orientation of the street. It was used as an administrative border to divide the Havana North from the Habana South where was located the Mexican natives in an attempt to segregate the population. For the end of XVII Century the inside city was completed and were authorized the creation of town council founding other human settlements like Marianao (1724). The Havana had a poli-foundational structure that converted it in a polycentric city.

The Havana port became the most important of the Spanish colonies in America, and the city turned into a relevant economic pole (Friedlaender, 1978, 2). For the end of XVI Century, it was created smelting for the production of artillery as well as carpentry for the construction of the furniture for the noble families in Spain. For XVIII several restrictions from the Spain to Cuba limited the trade and growth of the economy. In 1762, the English conquered the city that open the free trade to the European market and in 1763 the city return to the Spanish control. The economic growth result of the free trade, sugar and Tabaco production, settled a local oligarchy interested in the exteriorities of the life, the city, the culture and leisure.

The XVIII with the development of the sugar industry western part of the country, the Havana and Cuba entered in the international market. The city was the receptor of immigration of tradesmen, artist, historian, scientists, politicians as well as noble entrepreneurs from Spain, England, Italy, France and United State. The new ideas about the urbanism, the life and the

economic brought the introduction of other urban uses like theatre, circus, cafes, libraries, clubs, universities and colleges (Coyula, Rigol, 2005, 29). The capacity of the traditional city was insufficient to answer to the demand of population growth and the new political needs of the flowering class. The city was expanding along the historical path, Calzada del Monte (Forrest Street), Calzada de Puentes Grandes (Great Brigde Street) taking place the apparition of new settlements. The first populations outside of the wall, were the lower social group. This area was characterized by the existence of productive activities like sawmills, draw beef production and abattoirs (Capablanca, 1985 cited in López, Naranjo, 1996, 191).

The city for the new economic class was characterized for the investment of the economic benefits from the sugar industry. The planning was regulated under an instrument in mode of ordinances. It occupied the land before destined to agriculture and manufacture purpose. A belt of military operations separated the city outside the wall from it. At the end of XIX, the city present a consolidated structure with compact monumental organization that leaves space, in form of island, for the construction of parks and avenues. The expansion of the city was designed by military engineers. The morphology followed a compact structure with the resource of the portal in the main axles, three to four storeys with high height among the floors. A mixed land used were residential, educational, leisure and culture cohabitated (See Fig. 2).

At the same time, during the beginning of XIX Century, other human settlements were designed in areas distant from the compact zone following a better sanitary conditions and in the form of holiday house. These urbanizations were organized according and octagonal pattern where built land interspersing with parks and markers. Main axles organized the places in zones. One example was the Cerro neighbourhood. Its land was the transit of the water system for the city: first with the Royal ditch, after with the Fernando VII Aqueduct and finally the Albear aqueduct (Coyula, Rigol, 2005, 30). It was the place for the location of a large number of industries that brought the creation workers neighbourhood. The change in the social fabric of the area together with an epidemic of yellow fever provoked the decadence of the neighbourhood that loss the attractive for the higher class. To answer to a demand of better place to live for the higher and medium classes, other urbanization like Carmelo (1859), Vedado (1860), Medina (1883) and Rebollo (1988), were created following a structure of garden city (Coyula, Rigol, 2005, 31). It was the first time that a Cuban settlement introduced the three in the streets. The building was separated one from the other by a perimeter hall and a garden was located in the beginning of the lot. For the cases of the pre-existent structure of

the city with a marked residential character, its land use was changed and introduced other structure like productive, educational and hospitals (See Fig. 3).

For the half of XIX Century, the development of the city outside of the wall was relevant and conducted to the displacement cultural and economic core outside of wall. The number of inhabitants outside (40,454 inhab) was almost equivalent with the inhabitant inside the wall (39,080 inhab.) (Coyula, Rigol, 2005, 29). In the end of XIX, the city wall was demolished. A cultural and ludic zone was design as transition between the zones, inside and outside of the walls. It was stablished regularizations of height, density and scale under a mixed of land use with the purpose of harmonize the urban image (Luzón, Baila and Sardaña, 1990 in Lopez, Naranjo, 1996, 192). At the same time, the area corresponds with maritime border, was opened to the urbanization. The expansion of the city was favoured due to the introduction of the McAdam system of pavement as well as a development in diverse form of transportation. The common transportation system, favoured the technological innovation for the central areas or zone where the high class where located.

The beginning of the XX was the establishment of the Republic with the independency from the Spanish Crown. The city had 250000 inhab. distributed in 10 km<sup>2</sup> (Lopez, Naranjo, 1996, 180). But the country was under the domination of the interests of United State that brought a period of Neo-colony. The composition of the city answered to the concepts of growth that reigned in North American models. This period brought the modernization of infrastructure. Some of them were the introduction of electric tramway, the sewage system, the project for the water front and an efficient system of garbage collection. The Havana city was a field of introduction and training of the technological innovations. During the period of the Spanish Colony as well as the period of Neo-colony, was common that the technologic being trailed in Cuba, before to be expanded to the inland. In 1794, was introduced the first steam machine for the production of sugar in Cuba, in 1819 it was produced the first steam ship in Latin American. For 1837, the steam machine was used in the railway system before that in many province in Spain. Other actions were in 1848 the lighting street by gas, in 1851 the telegrapher, 1862 the public transportation with animal traction, 1881 telephone service and 1890 electric lighting street.

In other hand, other architecture themes occupied the lots that before was residential. A monumental architecture conquered the urban scenario. A change of the land use to tertiary uses from a residential fabric. Also the inclusion of other productive sector from the secondary





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Fig. 1 Map of the foundational city of Havana in 1576.  
Source: Map and planes of Santo Domingo, 4 in García, 2008. 320

Fig. 2 View of the city of XIX corresponding with the expansion out of the city wall.  
Source: Diego Isaid [www.instagram.com](http://www.instagram.com)

Fig. 3 Aerial view of Havana of the fortification of the XVIII and the neighbourhood of XIX Century, Vedado.  
Source: Unseen Pictures, Ltd., 2014



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industry as well as hotels, casino, theatres, offices cinema (Coyula, Rigol, 2005, 34). In the Aesthetic subject, the difference between the noble Spanish class and the Cuban oligarchy was expressed in the selection of the stylist resource, ones for the traditional Spanish form and the other looking for other European styles as a symbolic marked of their present in the city. During the beginning of the XX Century, several plans were designed for the modernization of the city with the construction of public spaces the complete the empty land. The neighbourhood like Vedado is consolidated under the ideal of the North-American style of life with the inclusion of cinema, hospitals, height building, big commerce, offices and radio station. The expansion of the city followed the West and South directions went over the limit of the Almendares River to create other residential neighbourhood for the higher class. A mono-functional character of dormitory cities oriented to the upper class. Miramar is clear example of a structure based on New York pattern, block of 200 per 100 m. the new growth involved the pre-existent urbanization combining the urban structure. Industry, worker settlement, colonial fabric and new development got together (Rallo, 1985 cited in Lopez and Naranjo, 1996, 198). Highways to potential the automobile displacement and connect the new urbanizations. This routes were the used for the location of industries in the secondary sector. It is the expression of the dispersion of the American models.

After the triumph of the Revolution, the effort were concentrated in the balance of the national territory more than the development of the capital. In this way the urban actions, were oriented in three main lines: one the construction of social housing, communitarian infrastructure like kindergarten, school and sport areas and the creation of the industrial districts. In the Eastern part of the city, was built two new settlement under the principles of the modern movement and the social housing. In both cases mono-functional territories similar to the structure of dormitory cities. In the South part, industrial districts along the axles of communication. Others social urbanization were constructed completing the urban fabric and avoiding the expansion of the city.

The Havana city is the place a wide diversity of population, scenarios and practices. Its configuration is marked by economic, political and social relations that model a diverse strategies of land use and morphology. A first moment is referred to the foundational villas under the Spanish Crown and the city inside the wall with defensive purpose and a poli-functional structure. The second state is determined for the creation of settlements outside of the wall city to answer the needs of a new local social group defined by the economic power but diverse to the Spanish noble class that was located inside of the wall. A third state

corresponded with the establishment of the Republic under the domain of United State. The structure of the city loss the character of poli-centralities and turn into a specialization of zones (Gavira, 1996 cited in Lopez, Naranjo, 1996, 191). Fourth it was during the period of the revolution with the creation of the industrial district and the social housing.

### **3.1.2. Area of study: The vacant industrial heritage buildings along the Almendares River. Administrative and functional borders.**

The area of study is structure by the course of the Almendares River. This zone, was from the beginning, related with the development of the city. It was the first place where was located the foundational settlement of Havana city, in the north part of the territory, due to the accessibility to fresh water and the interest of the Colonizer in the quest for gold.

In 1592, the waters of the river was the supply for the city. The Husillo dam as part of the Royal Ditch was the first aqueduct developed by European in America that brought he water from Almendares River built in 1592 as a commemoration to the discovery of America (See Fig. 4). The dam was created with the goal of elevated the level of the water to achieve the transportation of the water by a gravitational system. The integrity state is partial due to the human action during 1989. Time after it was the construction of the aqueduct of Fernando VII that also took the waters from the river but its design did not work in an efficient way. During XIX a third water system was built by Albear that it worked with a gravitational system and took the water from the wellspring of the river. The mouth of the river finishes in a form a little bay, that it is potential for the protection of ships. For this characteristic it was located a fortified tower in 1646 called Santa Dorotea de la Luna, to control the possible settlement of pirates and corsairs (Zardoya, 2008,65).

The relevance of the water was not just as water supply for citizen and agriculture purposes, also it was a means of transportation of goods as well as a power source for the location of proto industry in the borders of the river. From XVI, there is reference to the present of sugar mill, sawmills, lime furnaces, tiled furnaces for the supply of raw material to the city. An example is the San Andres Trapiche (Sugar mill) located in the South-eastern part of the river that was the first location of the Toledo Sugar Mill.

During the XIX Century diverse manufactures with a great demand of water in its production process were established. This is the case of the La Moderna S.A. Paper Mill in 1837, in the area of Puentes Grandes. This factory passed by many period of expansion and overlapping of the pre-existent facilities. In 1859, it was stablished a Gin distillery in the western bank of the

river near to the mouth (Plan of the Havana city, 1904 cited in Zardoya, 2008, 66). Also a series of manufactories oriented to the production of beverages or derivatives like the New Factory of Ice S.A., in 1881, property of the Company Verenger, Negra and Cía. Also the La Tropical Brewery under the same holder (Jiménez, 2014, 470). Moreover La International brewery S. A founded in 1911. In 1894 figured the present of a factory of animal charcoal near to the street 21.

From the beginning of XX Century, it was placed a factory of Cement homonymic with the Almendares River. Also there was a factory of mosaics. For 1905 an Electric Station for the power supply for the tramway as well as a deposit of tramways, but its function was change and in 1913 it passed to the ownership of the Domestic Oil Factory, El Cocinero (See Fig.5) (Llorach, 2002 cited in Zardoya, 2008, 66). Other infrastructure derivative from the industrial activity was the construction of a Sport areas, in this cases related with the baseball, well known as Pedro Marrero with a capacity for 15 000 places. Also it was placed a manufactory of juices called Jugos Bandel and Fantoques, a Factory of pneumatics under the name Goodrich S.A. and other of production of Co<sub>2</sub>, and other products for fire (See Fig.6).

Nevertheless, the river has four connection to cross it. Two of them are bridge one gyratory and the other elevated. The other two cross are tunnels under waters that was constructed in 1953 and 1958 (Quintana, 2001, 13). Part of the infrastructure that surrounds the area of the rivers is a park, well known as the Woodland of Havana. In the proximities was created a Zoology and Forrest Park. During the revolutionary period, it was created an attraction park, with recreational equipment oriented to spectacle, events and the leisure of the children.

The Almendares River is a the most important superficial water course with a length of 49,8km and a river basin of 403,2 km<sup>2</sup> however its weight is small as well as the deep. It begins in the Bejucal Madruga Coliseo Mountain in an elevation of 80 m (ONEI, 2007, (,)). It is just navigable a distant or 3.5 km from the mouth. Nevertheless it is subject of current reference for the inhabitants of Havana. The Cuban poet, Dulce Maria Loynaz, Miguel de Cervantes Prize, in her poem entitled "Al Almendares" (To Almendares) expressed her sense of belonging to this place as symbolic reference with the motherland and her blood (See Fig. 7).

Nowadays, the majority productive structures disappeared due to the urbanization of the area for residential propose during the XIX and XX Century (See Fig.8). In other cases remains part of the traces of the activities like administrative and residential buildings, line quarry and chimneys. The major industries constructed at the end of the XIX Century and continued its





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Fig. 4 Remains of the Royal ditch, in Husillo.  
Source: Joaquin Rodríguez Portal [www.panoramio.com](http://www.panoramio.com)

Fig.5 View in direction south to the Almendares River Area from the mouth. It is possible to observe the chimney of the Electric Station of Tramways after Domestic Oil Factory.  
Source: Brian Ely [www.instagram.com](http://www.instagram.com)



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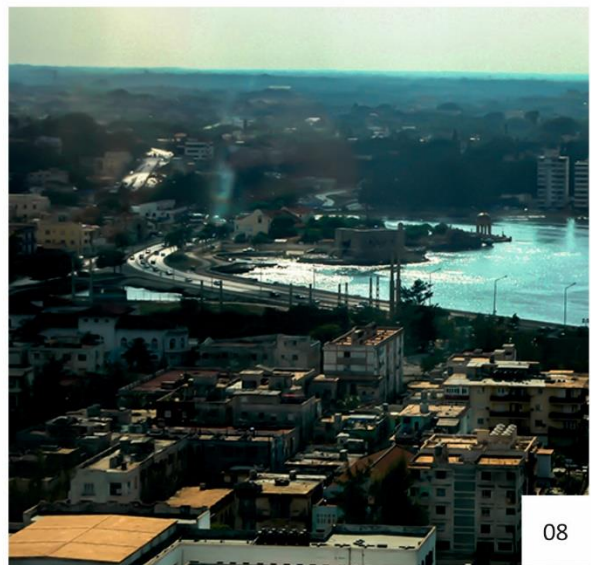
Fig.6 Portion of a plan of the Havana, where is evidence of the industries in the area.  
Source: Plano de la Habana. Cuba Magazine Tourístico. 1951

Fig. 7 Afro Cuban religious practices in the Almendares Forrest.  
Source: Sandra [www.instagram.com](http://www.instagram.com)

Fig. 8 Aerial view of Almendares River from the position of the mouth. Here is presented the neighbourhoods of XIX and XX Century corresponding with Vedado and Miramar.  
Source: Alfredo [www.instagram.com](http://www.instagram.com)



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production during the XX Century are not working any more with the initial use. Their facilities are employed in other activities that not correspond with the capacity of the building to admitted use more adequate. An analysis more precise is developed in the point corresponds with the Diagnostic of the area of study and the objects. This objects are the New Factory of Ice S.A. and the "La Tropical" Brewery the "La International" Brewery S. A. and the Modern Factory of Paper ".

### **Administrative and functional borders**

(See Appendix 7. List of objects, foundation, existence, current use and integrity state)

The area of study is structures by the axes of the Almedares River. The objects of intervention are the vacant buildings contained in its surrounds. With this goal, it is listed the numbers of industrial building identified in the historical evolution which are classified according its existence, former use, current use and the integrity condition.

The analysis of this variables showed that from a total of 21 units, there are just present of 12 objects. The others were demolished during the constructive evolution of the city under residential land use. The ensemble that remains, just the catchment pond of the Albear Aqueduct, Jugos Bandel and Fantoche, Deposit of Tramway and the Production of Co2 continue in operation with a continuity of use. Combining the variables of type of use and the condition of integrity, there are three scenarios. First type is when just remains some aleatory components of the object and they are without use. This is the case of Husillo dam and the San Andres sugar mill. The second case, is when there is the building almost without machinery and they were reuse in an efficient way. This is the case of the Electric Station for Tramway turned into cultural centre. The third scenario, is when, in the same condition of integrity that the case before, the objects are underuse. This the situation of the rest of the object. An exception is the case of Almedares Cement factory where it was left the administrative building and today is use for residential purpose. In conclusion, it is considered with potential condition for the reuse those object that are in an integrity state of 3, where the building almost without machinery remains and the current use is not efficient. The objects of study are the La Moderna S.A. paper mill, New Factory of Ice S.A., La Tropical brewery that belonged to same company that the factory of ice and La Internacional brewery S. A (See Fig. 9).

The area of study is delimitedated in two scale, one: a macro frame corresponding with the needs of the territory, and which information is registered in the Director Plan, Statistics Data and



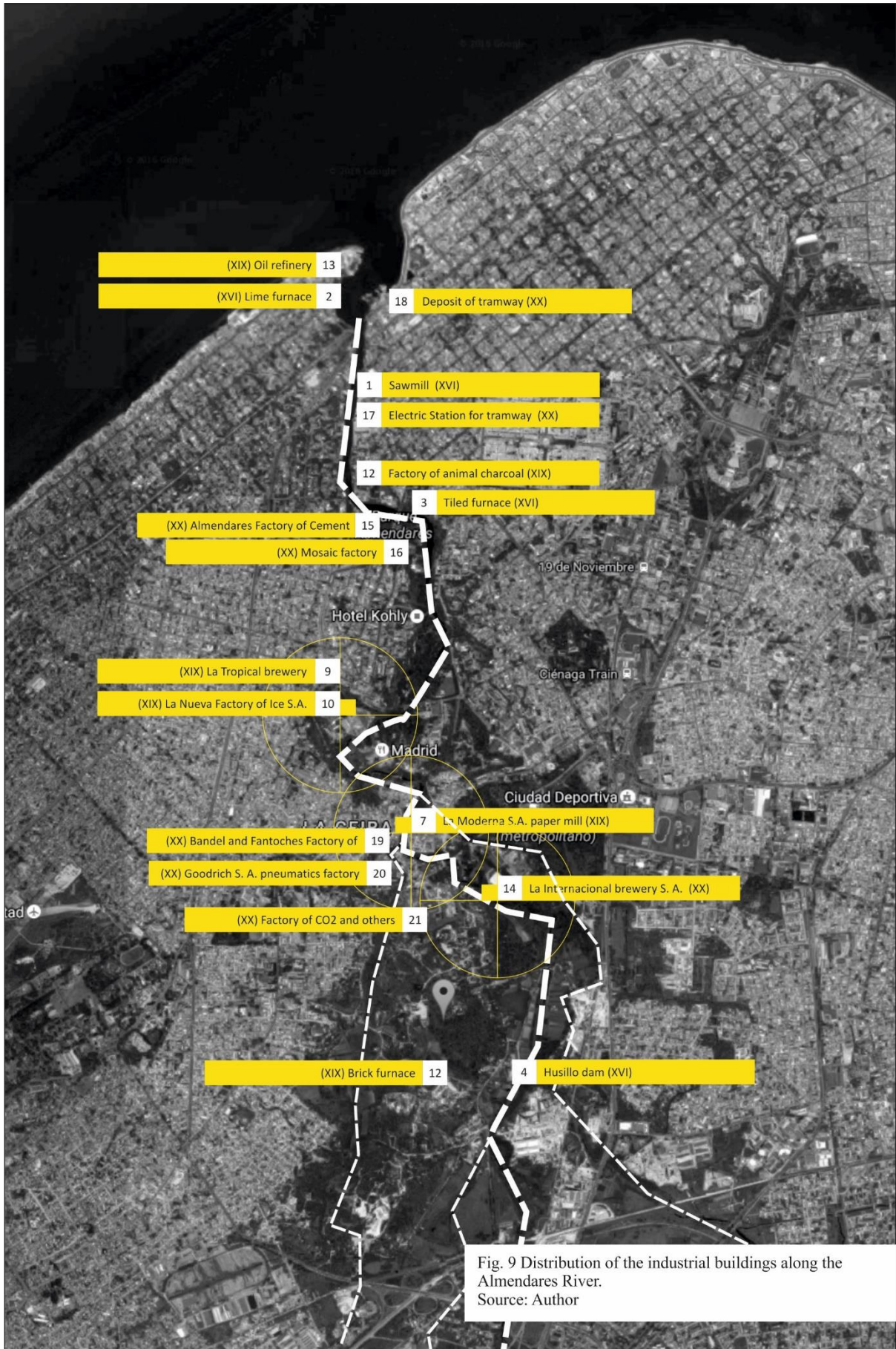


Fig. 9 Distribution of the industrial buildings along the Almendares River.  
Source: Author

Policies. The second scale is a micro approach corresponding with the municipalities<sup>1</sup> related and making a close view to 1km surrounding the object, and responded to morphological functional analysis of the segment.

The politic-administrative division of the area of study cover the municipalities of Plaza de la Revolution, Playa, Marianao and Cerro. The axes of the river work as a natural border for the delimitation of the municipalities. In this way, diverse scenarios are presented in each of them. This diversity is also observed inside of the same structure. This area is regulated and managed by the municipal administration. In the case of the area of intervention that corresponded with the industrial buildings, their limit is identified with the borders of their property. All the ensemble belong to the State, public ownership and the administration are subordinated to their Ministries. For the case of the La Internacional brewery S. A. and the New Factory of Ice S.A. and La Tropical brewery buildings, they are registered in the Ministry of Alimentary Industry and the La Moderna S.A. paper mill in the Ministry of Industries. In the case of the New Factory of Ice S.A. and La Tropical brewery buildings, they had associated a park called the Gardens of La Tropical as well as a baseball station called Pedro Marrero. According with the attribution of responsibilities of the Ministries, these spaces were transferred to the Ministry of Culture and the Ministry of Sport.

Other operator is the State budget Association for the management of the Metropolitan Park created in 1990, for the integral management of the Almendares axes. Under its administration is the Almendares Park, the Forrest Park and the two gardens before associated to the La Internacional brewery S. A and La Tropical brewery that today belong to the administration of the Metropolitan Park. The place is the scenario administratively fragmented that limits the integral management.

### **3.2. Characterization of the Urban Area**

For the characterization of the area of study is applied the criteria corresponding with the Urban Area Classification. It is analysed the structure from a macro in the aspects of administrative, geography, Demography, morphology and economic as well as in a micro level regarding the morphological and functional aspects.

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<sup>1</sup> The Municipality has a dual position, is the extension of the function of the State in a geography space limited by social and economic relations and it is the representation of a group of population in front the rest of the nation. It is charge to answers the basic need of the population settled. (Padrón, 2013, 22)



### **3.2.1. Macro analysis. Level of Havana city**

(See Appendix 8. Limits of Habana, plaza de la Revolución, Playa, Marianao y Cerro)

Havana is divided in 15 municipalities. The area per municipalities tends to growth as farther as being from the centres of the city. Thus, the municipalities with a major density are located near to the foundational centres. This is the case of Centre Havana with 40,71 inhab./km<sup>2</sup>, Old Havana with 19,679.2 inhab./km<sup>2</sup>, 10 de Octubre with 16,399.4 inhab./km<sup>2</sup>, Cerro with 12,170.2 inhab./km<sup>2</sup> and Plaza de la Revolución with 11,936.4 inhab./km<sup>2</sup>. It is represented all the economic sectors such as Industry, trade, tourism, Transportation, administrative and other services (ONEI, 2015, ()). The population has a tendency to reduce from 2,14 million in 2009 to 2,09 million of inhabitants in 2015. There is a proportion among the men and women with 947 men per 1000 women. It is a population with an aging trend. The population in work age from 15 until 59, is 1 346 429 inhab. that represents the 64.1 % of the total of population. The trend of change from 2002 is an increase of 0.4%, not significant. This together with a aging of the population where the group under 14 years old got reduced in 4% in the way that the group over 60 years old increased in the same amount (ONEI, 2015, ()).

The life expectation of the population is of 77,4 years old from the period of 2011 until 2013. It increase from 1977 in 5 years. In relation with the country is 1 year inferior. For 2014, the immigration to the capital, from other provinces, was 18 317 inhab. in front of and emigration, principally to other countries, of 10 902 inhab., the majority in work age. In 2014, from a total of 1 346 429 inhab. in worker age (from 15-59) was working 856 473 inhab. that represents the 63% of the active population and the 40% of the total of population of the city. It means that each wage should support the expense of 2 people and the half of the cost of the other. About the employment, for 2014 there is 1 001 953 inhabitants in job posts. It represents an increase from 2010 that was 899 496 inhab. But a review to the data of 2013, it showed the existence of 1 180 376 inhabitants working. In relation with 2010 the rise of employment is 11% but in relation with 2013, there is a reduction of 16%. According the National Office of Statistic of Cuba, the rate of unemployment is 2% corresponding with 20 769 inhab. It is interesting to observe that the number unemployment declared is minor that the difference of job posts of among 2013 and 2014, corresponding with 178423 job posts. The profile of worker that was more affected are the workers in position of direction with 70%. However the over 50% are also professionals with 54%, administrative with 52% and service workers with 51% (ONEI, 2015, ()).

### Administrative criteria

- 1) Administrative level: capital

Havana is the capital of the country.

- 2) Local governance representation: yes (1)

The politic-administrative organization of the Havana is composed by a Provincial Government and 15 Municipal Governments. Each of them have juridical personality in front the law. Besides there are a provincial and a municipal representation of the Assembly of People Power. Also there is representation of the Communist Party of Cuba, where its local representation has total action of its power in the scope of their territoriality.

### Geography criteria

- 3) Water front: yes (1)

The city is located in the Caribbean Sea, and its development is around the Havana bay, with a tendency to growth in direction to the Western part.

- 4) River: yes (1)

There is four rivers but not relevant. The biggest one is the Almendares River.

### Demography criteria

- 5) Number of inhabitants: 2 121 871 inhab.
- 6) Density: 2 919 inhab/km<sup>2</sup>
- 7) Population growth: decrease
- 8) Per cent of the active population: 61% (1346429 inhab.)
- 9) Dominant age group: population between 16 and y60 year old
- 10) Per cent of women: 52% (1 106 414 inhab.)

### Morphological criteria

- 11) Area of the settlement: 728,26 km<sup>2</sup>
- 12) Type of urban structure: continues
- 13) Morphology of the growth: Draughtboard
- 14) Organization of centralities: polycentric

### Economic criteria

- 15) Dominant economic sector: secondary industry, biotechnology
- 16) PIB per capita: 7010 euro (6288 dollars)
- 17) Proximity to potential market: more than 5km
- 18) Estimation of the population potential of the market: 88220 inhab. Artemisa and Guines population.

### **3.2.2. Micro analysis. Level of the municipalities and surrounding the objects within 1 km.**

(See Appendix 9. Border of the area of 1km around the objects)

The micro analysis is concentrated in the level of municipalities but also making a closer approach to the area corresponding with 1km around the objects.

#### Morphological criteria

##### 1) Zone of the city: centre

The area is located in the zone that corresponds with the settlements developed during the XIX and XX Century. They are the municipalities of Plaza de Revolution, Playa, Marianao and Cerro. It the transition among the municipalities and a visual division of the periods of growth of the city. The area cover spaces of centralities until spaces of periphery in its organization North-South. Nevertheless, it is the only Metropolitan Park of the city, and in this way is charge of relevance for the functional structure.

For the case of Plaza de la Revolution, it was founded in XIX with the urbanizations of Carmelo (1859), Vedado (1860), Medina (1883) and Rebollo (1988) as well as Nuevo Vedado during the early XX Century. It is a zone of centrality of the city. In the case of Cerro, it is an urbanization founded in the beginning of XIX Century, looking for hygienist criteria addressed to the higher class, entering in decadence for the end XIX Century due to epidemics as well as the change of the social composition by the introduction of factories, conducted the area to an overcrowding. It is also other centrality of the city however the animation core is located distant from the area of study. In the case of Playa, is a settlement developed during the beginning of XX Century under the American Style of Urbanism, a fabric favourable for the car use, with a residential trend of the land. And the last is the case of Marianao founded in XVIII Century and developing until nowadays, with a mixed urban fabrics where worker and medium class neighbourhoods alternate. It is also other pole of centrality of the city.

A close view to the area of 1km around the objects is a space delimited with two corridors of centralities one in Marianao and the other in Vedado. However, the structure of the city turn the attention outside of the area being left for occasional frequency of use. (See Appendix 10. Morphology of the urban area of the context of the Almendares River)

- 2) Coefficient of built land per lot (COS): between 20 and 85%.

In the area there is a great diversity of coefficient of occupation of the land (COS). In the Eastern part of the river the occupation is from 33 until 85% direction North to South. In the western part the COS oscillates between 20 and 60%. It means a lack of open spaces in the South part with and intensive use of the land.

In the area comprised by 1km around the object the north western part are occupied with higher COS. Also it is trend that the belt around the metropolitan park in the south western part be potential to informal settlement due to the isolation with the rest of the territory.

- 3) Predominant storeys: 1-2 levels

The levels storeys oscillates between 1 and 21 levels but there is the tendency to low height with an average of 1-2 levels also inside of the micro area.

- 4) Disposition among buildings: abutment and sanitary corridor. Predominant sanitary corridor also inside of the micro area.

In the case of Plaza de la Revolution and Playa, they have a semi-compact structure with sanitary corridors and gardens as well as trees in the streets. For the case of Cerro it is a compact structure with abutment, it means that the building are connected one with the other by the lateral walls. The interior of the block is open with yard but the predominance is a high occupation of the land. For the case of Marianao, there is a mixture of morphologies from semi-compact to compact structure. The areas close to the foundational core as well as the worker neighbourhoods has a compact expression with an abutment disposition of the buildings. For the areas built during XX Century, oriented to the middle class the structure is semi-compact and presents sanitary corridor.

#### Functional criteria

- 5) Type of land use: mixed.

It constitutes a system of centralities where is located a large infrastructure of cultural, educational, commercial, administrative and health services. But the location of these poles are located in the borders of the area of study.

- 6) Dominant use: U32 water and waste treatment, U36 Recreation, leisure, sport and U37 residential.

Even though the mixture of the land use, the urban fabric in the area limited for 1km surrounding the object has a tendency to residential and industrial purposes.

7) Proximity to infrastructure of mobility: from 1km to 5km

The distant to nodal points of mobility varied from 1km to 5km. It is an area well serviced in term of mobility infrastructure. It is crossed by the itineraries of common transportation in the north and the south part. The limitation in the mobility in the axes North South where there is almost not itineraries of common transportation. However there is the system of road infrastructure developed. The order of the street in the horizontal axes are of first order, it means ways of high mobility. But it is not the case of the vertical axes, where there is just one road of first order and the rest are third level.

In the area of 1 km surrounding the objects, the distant to ways of high intensity are no longer that 0.5 km, that correspond with a walkable distant.

8) Type of infrastructure of mobility in the proximity: railway, bus lines,

The types of infrastructure of mobility are bus lines, majority public subsidiary service. Also there is two lines of railway one for population and the other for merchandises. There is not any form of maritime mobility even though if the river is navigable in a significant length.

### **3.3. Characterization of vacant industrial heritage building**

The characterization of the Vacant Industrial Object is made in function of the variables identified in the first chapter. It is study the La tropical Brewery together with La Nueva Ice Factory due to both belong to the same complex. Also it is characterized the Paper Mill factory and the La Internacional Brewery S.A. In this subdivision, appears just the whole characterization of La tropical Brewery and La Nueva Ice Factory. About the other industrial buildings following appear their descriptions but their characterization are in the appendices.

#### **La tropical Brewery and La Nueva Ice Factory**

The Tropical Brewery belonged to the company of La Nueva Ice Factory S. A. In 1889 the company decided buy a land in the border of the Almendares River. The owners of La Nueva Ice Factory S. A in association with Vernger Negra and Co. founded La Tropical Brewery. The enterprise repaired the dam in the Almendares rivers (See Fig. 10) (Zardoya, 2008, 60)(Jimenez, 2014, 469-471).

The structure of the factory is composed by production plant, workshop, warehouse and laboratory. The factory produced the four type of malted beverage, Tropical Oscura Excelsior, Cristal Palatino, Tívoli and Maltina Tívoli. The product received the grand prize of International Exposition of London 1896 and Bruxelles 1897. For 1897 the factory growth and new building were added for warehouse and other production line with the capacity of 250 daily box.

Besides, the product achieved the grand prize of the International Exposition to the Progress, Paris in 1912 and the golden medal in the Exposition of Agriculture and Industries in Havana in 1904. In 1906 it was developed other enlargement, substitutions of material of the buildings from wooden to brick as well as new foundations (Hevia, 1998, 9) (See Fig.11).

In 1913, the growth of the production and the model of business of control all the part of the productive process brought the construction of an Electric Station and a line for the production of bottles. As part of the factory a group of recreational infrastructure complete the productive complex. In 1920 the industry was electrified and during 1925 to 1926 it is finished the construction and consolidation of the factory for answers to the rise of the production capacity (See Fig. 12)(Hevia, 1998, 9).

In 1929 it was built a baseball stadium under the name of La Tropical today Pedro Marrero. This infrastructure was the core for the Central American and Caribbean Games in 1940 and it had the capacity for 15 000 posts. Also this installation were the permanent place for the national team (See Fig. 13). Also it counted with gardens and dance hall, with a design integrated with the nature. It was built in 1904 and it was structured with four buildings dedicated to restaurant, cafeteria and dance hall. The place was well known for the performance of Spanish tradition due to the origin of the owners. It was and continues being popular for the inhabitants (Machado, n.d. 88). For the end of 1954 other modifications addressed to enlargement of the factory (Hevia, 1998, 10) (See Fig. 14).

For 1958 the enterprise sold four brand of beer, La Tropical, Cristal, Tropical 50 and Maltina. For 1960 the company was nationalized by the Cuban State and the name was changed to Pedro Marrero Brewery in honour to one of its workers martyr of the Revolution. However the population continued calling the factory for the former name (Machado, n.d. 88). In 1995 the factory stop for capital reparation. But the arriving of economic crisis in Cuba after the collision of the Socialist block, the factory standstill (Hevia, 1998, 11).



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Fig. 10 View of the La Tropical Brewery and the La Nueva Factory of Ice from the yard.  
Source: [www.univision.com](http://www.univision.com)

Fig. 11 Tag of the Tropical Beer where appears some of the prizes.  
Source: [www.elcubanointransigente.com](http://www.elcubanointransigente.com)

Fig. 12 View of all complex of La Tropical Brewery and the La Nueva Factory of Ice  
Source: [www.elnuevoherald.com](http://www.elnuevoherald.com)

Fig. 13 Baseball Stadium of La Tropical Brewery  
Source: [desdemipalcodefanatico.wordpress.com](http://desdemipalcodefanatico.wordpress.com)

Fig. 14 Garden of La Tropical Brewery  
Source: [www.atlasobscura.com](http://www.atlasobscura.com)



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## **General data**

Current name: Cervecería Pedro Marrero y Jardines de La Tropical

Former name: La Tropical brewery

Year of built: 1888

Year of standstill: 1995

## **Functional criteria**

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Manufacturing (Division D)
- 2) Specific: Food and Kindred Products (Major division 20)
- 3) Part of an industrial complex: yes (1)
- 4) Transportation infrastructure associated: any

## **Morphological criteria**

- 5) Coefficient of occupation of soil (COS) estimated in 40 000 m<sup>2</sup>
- 6) Number of storeys: 3-5
- 7) Configuration: vertical,
- 8) Spatial organization: articulated
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)
- 11) Type of structure: skeleton
- 12) Spacing of the structure: no data

## **State of the object before the intervention criteria**

- 13) Technical condition: good
- 14) Integrity of the object: 1 4) remain the significant machinery
- 15) Contamination of the land: no (0)

## **Value criteria:**

- 1) Declaration of protection: yes (1)
- 2) Level of protection: National
- 3) Singularity: representative



- 4) Type of value: historical, social, technique or and scientific

### **Observations**

In the interior of the factory there is a place of interpretation of its history. Singular machinery are conserved as part of the collection. The industry maintain the relevant machinery that allow read the productive process. There were a continuity as the social traces due to the last workers were descendent of the former workers. The other infrastructures continue in uses.

### **La Moderna Paper Mill**

It was founded in 1934 in the Husillo farm with machinery made in United State. The ownership was a Spanish entrepreneur called Jesus Azqueda. For the beginning it had a 276 workers. In 1951 achieved to be the third major Paper Mill of Cuba. The factory was stand stilled during the nineties. In 1960 the complex and the company was nationalized. Its name changed for Cuban Paper Mill. Nowadays it is standstill and the space use for the purpose of warehouse. The technical state of the building is good, it presents a spatial organisation compact under a configuration with tendency to the vertical. It facilities are distributed in two main areas one oriented with productive sector and the other with indirect infrastructure (Jimenez, 2014, 482-283). The river cross the industrial area. The waste of this production was one of the main cause of the contamination of the river. The industry has a structure in form of skeleton that correspond with the spatial continuity. The historical value of the building are presented in each element of the complex. It count with piece that transit all the history of the industry. One example is the main machinery date from 1892 (Fornés, 2009, 87).

### **La Internacional Brewery**

The International Brebery S. A. was founded in 1911. Like in the case of La tropical Brewery, La Internacional counted with their own recreational infrastructure of gardens and baseball stadium. The most important brand was La Polar, name that overlapped the prestigious of the Company. The gardens were commonly the scenario of traditional Spanish dance from Asturias ,54). In 1960 the company and all the properties related with the production were nationalized by the Cuba State. It was renamed with the name of Miguel Angel Oramas, martyr of the



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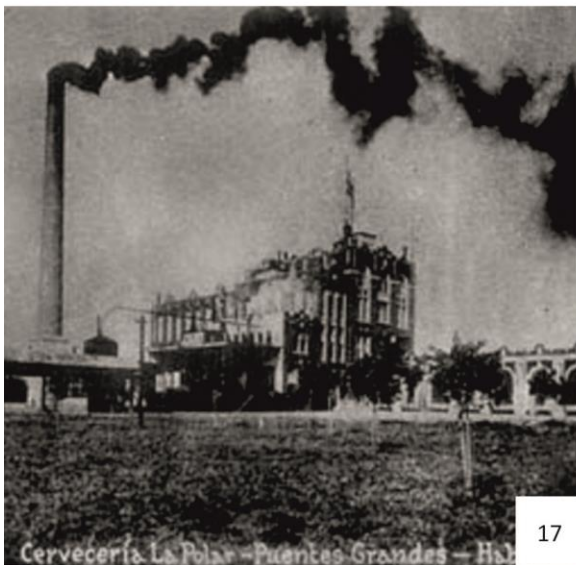
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Fig. 15 View of La Moderna Paper Mill From the River  
Source: [www.juankamiloxr.com](http://www.juankamiloxr.com)

Fig. 16 View to La Moderna Paper Mill  
Source: [www.cubanet.org](http://www.cubanet.org)

Fig. 17 View of all complex of La Tropical Brewery and the La Nueva Factory of Ice  
Source: [www.elnuevoherald.com](http://www.elnuevoherald.com)

Fig. 18 Baseball Stadium of La International Brewery  
Source: [www.flickr.com](http://www.flickr.com)



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Cervecería La Polar - Puentes Grandes - H.C.



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revolution (Jimenez, 2014, 192-193). For 1998 continued production but time after it was stop. In morphological criteria the buildings has a vertical configuration in an articulated spatial organization. The structure is skeleton that answered to the requirement of wide spaces. The Polar beer was one of the most famous in Cuba. It slogan was "the beer of the people".

### **3.4. Classification of the urban area and the vacant industrial heritage building**

The step of classification of the Urban Area as well as the Industrial Type, defined the frame of possibilities of potential use. In the way that more variables are fixed the scope of possibilities according the database get reduced. For a wider perspective of options the number of variables to stablish as dominants should be minor. The selection of the variables could change in function of the interest of the user. However it is suggest the fixed of number of inhabitant and zone of the city as permanent ones due to the relevance that they have in the definition of diverse scenarios. In other hand in term of economic interests gross domestic product GDP (PIB) or work active population should be considered due to the limit number of items incorporated in the database the fixed variables will be a few.

For the case of the Urban Area is considered the number of inhabitants, density and the city zone.

#### **Macro criteria**

Number of inhabitants: 500 000 to 5 000 000 inhab.

Density: range of 5000 to 500 inhab/km<sup>2</sup>

#### **Micro criteria**

Zone of the city: centre

For the classification of the industrial building is fixed the general function, the configuration and the spatial organization. Other indicator that result relevant is the state of protection of the object. However the short sample and the lack of accessible data, it is decided to answer to this point in the part related with the evaluation of the pertinence of the potential use.

#### La Tropical Brewery (2082 Malt Beverages)

- General function: Manufacturing (Division D)
- Specific: Food and Kindred Products (Major division 20)

- Configuration: vertical
- Spatial organization: articulated

La Moderna S.A. Paper Mill (2621 Paper Mills)

- General function: Manufacturing (Division D)
- Specific: Paper and Allied Products (Major division 26)
- Configuration: vertical
- Spatial organization: compact

New Factory of Ice S.A. (2097 Manufactured Ice)

- General function: Manufacturing (Division D)
- Specific: Food and Kindred Products (Major division 20)
- Configuration: vertical
- Spatial organization: articulated

La Internacional Brewery S. A. (2082 Malt Beverages)

General function: Manufacturing (Division D)  
 Specific: Food and Kindred Products (Major division 20)  
 Configuration: vertical  
 Spatial organization: articulated

The international Brewery S. A., the New Factory of Ice S.A. and the La Tropical Brewery present the same classification. Thus it is necessary to determine potential use for just two types. Fixed variables are introduced in database of Urban Area to identify the items of coincidence. Then the code of the Urban Area is introduced in the table of Industrial Type to filter the items that share the similar characteristic of urban environment. One time selected, it fixed the variables correspond with the industrial classification. Thus, it is displayed the result of potential uses and possible mode of performance.

Type A. It corresponds with La Moderna S.A. Paper Mill (2621 Paper Mills)

- General function: Manufacturing (Division D)
- Specific: Paper and Allied Products (Major division 26)
- Configuration: vertical

- Spatial organization: articulated

Type B. It corresponds with La Tropical Brewery (2082 Malt Beverages), New Factory of Ice S.A. (2097 Manufactured Ice), La Internacional Brewery S. A. (2082 Malt Beverages)

- General function: Manufacturing (Division D)
- Specific: Food and Kindred Products (Major division 20)
- Configuration: vertical
- Spatial organization: articulated

### **3.5. Potential use for vacant industrial heritage buildings**

According the classification is enlist the following uses. With the morphological box, it is possible to analysis the frame of possibilities of use and way of intervention. This could be combine in diverse form according the needs and capabilities of the context and the territory. For the scope of this research, the study is concentrated in the identification of the use and the exemplification of practices.

#### **Type A. It corresponds with La Moderna S.A. Paper Mill (2621 Paper Mills)**

Potential Uses, general classification: U34 Commerce, finance, and professional and information services

Potential Uses, specific classification:

U34 Offices

The correspondence with the database offered just one cases that is the Dumas former Usine du papiers peint Dumas. The type of actuation is Installation, there is not significant change in the facades and it is conserve the former name. It is possible the reversibility and the demolition were no relevant. It is an investment public between the local administration and the state. It in under public property and the investment is national. The intervention is addressed to a target group but have territorial scope.

The identification of the former use as a fixed variable restricts the scope of possibilities. For a wider options it is possible to limit the fixed variables to morphological ones without enter

in the type of former production. However in the case of a largest database the variables of former use could offered the most potential uses.

**Type B. It corresponds with La Tropical Brewery (2082 Malt Beverages), New Factory of Ice S.A. (2097 Manufactured Ice), La Internacional Brewery S. A. (2082 Malt Beverages) (See Appendix 11. Morphological box for the Type B)**

Potential Uses, general classification: U22 industry and manufacturing U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.

Potential Uses, specific classification:

U220 Industry and manufacturing: Manufactory light and product industry

U341 Commerce: Commercial centre

U342 Financial, professional and information services: Offices in structure of Coworking

U350 Community services: Educational Centre in structure of University, Communitarian centre in term of multifunctional space for the cultural support of the society.

U361 Amenities, museums, leisure: Museum, Gallery, Cultural Centre

U362: Sport: Sport Centre

U370 Residential: Housing

For Urban Areas with population among 500 000 to 5 000 0000 inhabitants with a density between 1000 to 5000 inhab./ km<sup>2</sup> in zones of centre areas the tendency of new uses found a wide variety in the group of U361 Amenities, museums and leisure. However according the need of the territory and the market other functions are also well developed like Offices or Housing.

It is two from of included a new function in term of use. One the mono function, the space is reuse with one activity and the second one, is the balance adaptation of diverse uses that share the space with the same predominance. In the case of industrial buildings of great dimensions predominate the tendency to multi purposes spaces over the mono function. But this is a performance more characteristic of the current time that the first incursions.

In the cases of Manufactory light end product industry, it is present the action of adaptation of other industrial process to pre-existent structures. This is well known in industrial term as reconversion. The tendency of new production profit of the well location in function of

communications as well as the pre-existent of a capacity of charge in technical infrastructure, like electrical network, gas, water, sewage etc. that reduces the cost of implantation of a new industrial activity. One example is the Scenery Workshop of the Scala Theatre located in the former Ansaldo electric transformer factory in Milan.

For the use of Commerce centre, it is practice well displayed around the world. Usually the type of intervention follows the form of space for rent where the retail activities belong to small business. In other cases, it is the concept of department store. One example is the Manufaktura Complex, former Cotton Mill located in Lodz. It hold 125 stores together with other entertainment.

For the use of Offices, commonly answers the existence of a potential area in the context oriented to the financial or commercial business. The space used to be organized by a Real Estate holder. An example are the Speicherstat, in Hamburg, today the core of business together with cultural services. Other tendency well spread is the structure of coworking. Principally oriented to the sector of creative industries and it is composed by a continue spaces where is provided the basic infrastructure for an environment of work of mutual help. An example is the former Ansaldo, today the core for Base, a coworking space oriented to the youth creatives in Milan.

In the cases of communitarian services, a use recurrent is the adaptation of the space to educational program. The themes of University or other high educational facilities is commonly incorporated. Examples like the former Royal Tobacco Factory in Seville built in XIX Century, turned into the Rectorate of the University of Seville in 1950, or the Old Vinyl Factory built in XX Century in London, reuse as Technical College, space that shares with Residential and Commercial purpose as well as the former Tobacco Factory in Milan transformed in Interactive Museum of the Cinema. Besides, least frequent, it is use also to support the Administration facilities, like the Helsinki Courthouse in the former Alki headquarters with factories and warehouse.

For Amenities, museums, leisure group, the recurrent uses are Exhibition Hall or Gallery, Museum and Cultural Centre. The gallery or exhibition hall are oriented principally to the exposition of contemporary art that requires big spaces for the installations like the case of the Tate Modern in the former Bankside Power Station or the Küppersmühle, Centre for Modern and Contemporary Art located in in a former Warehouse, in the inner port of Duisburg. Also

it is used as places for events. The Museum are oriented to topics like Industry culture, Region, Ethnography or Art. In the case of the Industrial and regional museum are usually located in places of a wide signification like the regional museum of Ruhr in Essen former Zollverein Complex recognized as World Heritage Site.

For Sport activities could be found associated to University facilities, Park Areas or as to civic purposed. This is the case of Helsinki Courthouse District, former Alki headquarters which count with a sport centre in the former Salmisaari plant.

For the case of residential use, it is function represented in the countries where the reuse of industrial building is a common practice. From small building to large complex the residential use find their expression to get fixed. It is common to find the reuse of former Mills to Residential purpose in Europe as well as from former warehouses in North America. Examples are the former Britannia Mills turned into 125 apartments and the former Albert Mill with 21 loft and the Murray's Mill with 130 apartments in Manchester.

#### Correspondence with the land use for the area

In the majority of the cases there is a correspondence with the land use of the area. The characteristic of central areas stimulated the requalification of the land use due to the value Real Estate market. In some cases, the non-requalification of the land, is employed as an instrument for the protection of the industrial heritage in front of the aggressive action of demolition.

This is the cases of the city of Hamburg and the Speicherstadt. This area was under the national law for the developed of port activities, instrument that allowed stop the demolition and the privatization of part of the warehouse buildings.

#### Type of actuation

The more expanding actuation is the Installation. The actions are concentrate to adapt the interior the requirements of the new program. The main transformation are in term of spatial continuity. Functions like residential or university required the subdivision of the space in mirror areas. According the solution of the project the perception of continuity could perceive.

Other actuation is the Add on. This appears where the architectural program has an activity that required a high specialized technical infrastructure. It could be the cases of amphitheatre or



swimming pool. Also it could take place when it is an intension of call attention over the object usually justified under the criteria of renovation of the image of the building, the less the signature of the architect or for an economic operation to attract other market susceptible of visit the building due to its expression.

### Planning the intervention

In the majority of the case the intervention is the result of an architectural project. This project could be developed for the whole building or partial. In this way is possible to find experience where the project was developed in different moments. This suppose a risk of incompatibilities among functions and integrity of the whole image and conception of the object. In other line, there is the use of master plan for the case of largest infrastructure. A plan is created from the beginning where is defined the main use of the space as well as the line for the intervention. Then by a progressive approach, the intervention is corrected to don't miss the sense of belonging of the population as well as the perception of the former use. This happen in intervention where the capital of inversion is limited and the ownership is shared amount diverse interest.

### Significant change of the façade and morphology

The resource of maintain the façade is crucial for the continuity of the identity of the territory. Secondary transformation could be developed without represent a modification of the urban image. Normally the changes are motivated due to the current requirements for the operation of the function in term of accessibility, energy, security. In this tone, the main modification are oriented to the inclusion of lift, emergent stairs, ramps as well as the substitution of the system of windows.

For use associated with creative activities like coworking spaces, art exhibitions, there is the tendency to maintain also the fabric atmosphere. Thus the modification are oriented to turn in operative the space making stress in operation of reutilization.

### Remains of the former name

Similar to the before point the conservation of the former name or activity is oriented to an intention to strengthen the identity of the area. The resource is used in diverse ways and it will depend also on the collective memory. From the full name like Zollverien Steelwork Complex-

Museum Ruhr or Ex- Ansaldo for Base, Museum MUDEC etc., or the ex Manifattura Tabacchi for the Fondazione Centro Sperimentale di Cinematografia to just the terminology of the activity like Manufaktura Shopping Centre in the case of the former Poznanski's company Cotton Mill in Lodz.

### Reversibility

The building for the moment of the intervention in the majority of the cases were without significant machineries. For those that had them, it was removed and just a few ones were left in representative ways. From the point of the view of the building, the intention to maintain the industrial image, there is a tendency to used light structure, based on a lineal structure that allows the possible reversibility. This could happen in use where the spatial continuity was conserved. For those like residential use where the space was intensive subdivided the reversibility should be analysis in casuistic way. However in the majority of the cases are partial.

### Demolition

According of the grade of protection of the object the action of demolition are more or less intense. A common practices in the exterior of the complex is the demolition of indirect infrastructure associated to secondary functions like warehouses, control of access, laboratories etc. Also in the interior of the building the structure created to support machineries like middle levels, control and monitoring rooms and vertical subdivisions. This practices should be considered according the protection scope of the object, the environmental image, the integrity and authenticity of the places. The parties of the object should be classified in a plan where determined the role of each component and the scope of modification.

### Storage of the element removed and the Existence of a centre of interpretation or museum

However is recommended by the Burra Chapter to store the element that are removed this practices did not take places either in this places under World Heritage List. The main reason is that the buildings loss before the intervention the majority of the machinery. During the intervention just this machineries significant are located at the interior as an environmental object. But they are commonly displaced from their original position and without other elements to help in the comprehension of the former use.

### Type of financial support, Property and Tenure of the land

In the case of great infrastructure with a relevant value for the history and identity of the territory, it is common the existence of public property. The investment in the reuse according the level of significance could come from the State combine with the regional and local administration and the tenure of the land is in property.

In the cases of relevant objects but are without a classification as monument as well as those one with values, limit to local significance or sectorial one, the investment varies according the administrative initiative over the territory and the land market. Usually this is the frame of mixed inversions or private sector. If it is a land with high value in the market due to the centrality or the present in the context of other actuation of reuse that validate the feasibility of the inversion, the investment is private, usually management by Real Estate in condition of private property. If the ownership is the Administration or the State and they did count with the resource for the investment, it is common the rental or usufruct of the infrastructure. This is the cases of the Speicherstat in Hamburg, public property by the provincial administration and mixed investment majoritarian private or the Base Coworking in Ansaldo Milan, which is a public property by the local administration, in condition of usufruct with an mixed private and public investment.

If there is the interest to develop a specific use, the investment could come for international regional unions, by the state or by a specific productive sector.

### Public target and answering to a need

The public target as well as the answering to a need depend on the type of function, property condition as well as the type of investment. It is a public property and an administrative or State investment, the activity will be addressed to satisfied contextual goal of development, like creation of job post, educational etc. this activities will work with a budget by the administration or the State. Usually it is addressed to a wide public. In the cases of public property with mixed or private investment, the interest will be in a balance between satisfaction of local need and economic growth. The target public will be sectorial or age group. In the case of private property, it will be drive by individual interest, and the accessibility to the use will correspond with the target market.

### **3.6. Evaluation of the relevance of the potential use for La Tropical Brewery.**

One time identified the potential uses by the application of the morphological box is required the evaluation of the pertinence of the proposals in relation with the site. With this goal, it is applied the Method of evaluation for objectives. It allows the analysis the correspondence among the potential uses and the needs and capabilities of the context and the objects. In this way, it is necessary to develop the following steps.

#### **Method for the evaluation by objectives**

1. Determination of objectives according territorial needs and capacities.
  - Diagnostic of Urban Area and Vacant Industrial Heritage Building
  - Priority of objectives
2. Evaluation of the potential use according the objectives
3. Selection of the potential use with positive impact over 50 per cent
4. Analysis of the group according the correspondence with the priority objectives
5. Classification the potential use according the grade of pertinence.

#### **3.6.1. Diagnostic of objectives**

The diagnostic of the site covering politic-administrative, urban, economic, social and environmental problems and capabilities as well as the legal and heritage protection viability. The main sources were the current Legislation, the Statistic National Data, Urban Regulation, the inventory of the National Commission of Monument as well as the director Plans and Methodological Guide of the National Institute of Urban Planning. Also it is based on the aerial observation of the Satellite image of the territory provided by Google.

#### **Politic-administrative and institutional frame**

The area is a natural border used to establish the limits of the administrative actions. This was the result of the condition that the river supposed for the growth of the city in the past. In this way, there is four local governances to manage the land that has the competence and the responsibility to answer the basic problematic of the local population. Besides, there is a plurality of form of ownership that deal with the land. All the land is public property but the

ownership is distributed among ministries and provincial and local administration. The industrial land belong to the State, and it is fractionated in Ministry of Culture, Sport, Alimentary Industry and Industries. Also for the operation of area is acting the Metropolitan Park. This one has the potentiality to be the integrative institution to coordinate the space of action of the pluralities of ownerships.

The extension and flexibility of the social or enterprise object of the public enterprise allows the use their means and properties in condition of rent or usufruct for the development of alternative activities that contribute to the sustainability of the enterprise and the territory (Cuba. Ministry of Economic and Planning, 2013, 110-113)

Also the Law No.118 for the Foreign Investment promotes the foreign investment oriented to the development of profitable activities in favour for the access to new technologies, external funding, new markets, placing local products in international chains, to achieve a positive impact in the domestic industry and for the sustainable growth of the nation. It also protect the foreign investment of process of expropriation, open financial movement. Opened to all economic sector with exception of the Healthy and Educational Services as well as military (Cuba. Assembly People Power, 2014,176-180).

Also in the Law decree of 227/02 of the Civil Code established the possibility of transfer of public properties just in case that contribute with the development of the country and don't affect the social, political and economic principles of the State. Beside it allowed the possibility of hire or usufruct of public properties and means (Rodriguez, <http://www.eumed.net/>).

Other form of organization possible is the cooperative. It is an organization with economic or social objectives, oriented to the goods or services production by the collective management. (Cuba, Assembly of People Power, 2012, 249-251) Also the self-employment, promote in the exploration of alternative form of economic to contribute to the domestic economic of Cuban families (Cuba, Council of State, 2007, 73-80).

Needs: foreign funding, mutual help, economic sustainability, domestic economic, cooperation inter-entities, self-employment, local development

Capabilities:

Property form: Usufruct of the properties, hire of properties, foreign, transfer of properties among public entities, cooperative

Form of association: Public enterprise, mixed enterprise with foreign funding, private with foreign enterprise

## **Urban**

The change in the structure of occupation of the land from one part of the river and the other is significant. In the eastern part is placed the municipalities of Plaza de l Revolution and Cerro. In the Western part of the river there are the Municipalities of Playa and Marianao. In the Eastern part the densities oscillate between 11000 to 13000 inhab./km<sup>2</sup>, different that in the other side where the densities move from 5000 to 6000 inhab./km<sup>2</sup>. However, a close observation to the diversity of occupation of the land, it is possible to identify that inside of the same density, divergent approach to the occupation of the land (ONEI, 2015, (.)).

For the Eastern part, the Municipality of Cerro, occupies an area of 10.19 km<sup>2</sup> with a population of 124 012 inhab. and a density of 12170 inhab./km<sup>2</sup> with a tendency to increase in 0.25 per cent in comparison of 2012. It presents a coefficient of occupation of the land (COS) estimated in 85% of the lot under a structure of compact block. In the case of Plaza de la Revolution, is located beside Cerro. It has a population of 146 340 inhab. distributed in an area of 12.26 km<sup>2</sup>. Plaza, in contrast with Cerro, has density of 11936 inhab./km<sup>2</sup> with tendency to reduce in 0,3 per cent in comparison with 2012. The coefficient of occupation of the land (COS) is the 35% of the lot (ONEI, 2015, (.)).

In the Western side of the river, there are the municipalities of Playa in the North and Marianao in the South part. For the first one, corresponds with a settlement with low coefficient of occupation of land (COS). The area occupies 23.17 km<sup>2</sup> with a population of 136168 inhab. and a density of 5036 inhab/km<sup>2</sup> increased in a 0.37% from 2012. Its coefficient of occupation of land (COS) is 20%. It is from the four Municipalities the one with the lower density and COS. The last area, Marianao, is organized in a territory of 35.81km<sup>2</sup>, with a population of 180373 inhab. and a density of 5876 inhab/km<sup>2</sup> increased in a 0.12% from 2012. It coefficient of occupation of land (COS) is 66% (ONEI, 2015, (.)).

Area, Population, Density, COS					
Municipality	Area (km2)	Population (inhab.)	Density (inhab/km2)	Density trend (%)	COS (%)
Playa	23.17	136168	5036	plus 0.37	20
Marianao	35.81	180373	5876	plus 0.12	66
Plaza de la Revolución	12.26	146340	11936	minus 0.3	35
Cerro	10.19	124012	12170	plus 0.25	85

Table. 1 Data of Area, population, density and COS.

Source: Author

The proportion between the densities of the Municipalities, from North over South part, corresponds with an indicators of 0.85 times for the cases of Playa over Marianao and 0.98 times for Plaza over Cerro. However the diversity in the morphologies before showed, there is in both side of the river a similar indicator of growth of the density. From Nord to South, there is an increase of the density that constitutes a difference with tendency of occupation of the land in cities. Usually in the way that the settlements are father from the centralities of the city the density decrease. But in the case of Havana due to the polycentric structure, makes that the cores built earlier presented a higher occupation even if they are located distant from the more attractive area of the city. Different situation happens if it is compared the both side of the river. The density of Plaza over Playa and the density of Cerro over Marianao has a proportion of twice one over the other. It will be pertinent for other cities to justify this scenario from the point of view of the direction of growth of the city from East to West, however in the case of Havana, once, it is in the foundational structure the argumentation to support the existence of a heterogenic density of the land.

Density Relation						
		(inhab/km2)		(inhab/km2)		
M1	Playa	5036	M3	Plaza	11936	2.36
M2	Marianao	5876	M4	Cerro	12170	2.07
		0.85			0.98	

Table. 2 Density Relation North South and East over West.

Source: Author

Needs: production of housing, public space and green areas, efficient use of the land,

Capabilities: open spaces, a market for housing, a demand of activities in open space,

## Functional structure

(See Appendix 12: Structure functional by Municipalities)

An analysis to the distribution and satisfaction of the urban equipment related to Health, Education, Green Areas, Sport and Culture, evidence an unbalance in the distribution of the services. The municipality of Plaza is the best supported with wide infrastructure. It is the area with the major cultural, sportive and park equipment. In the same tone is Playa the best serviced in term of Educational structures. In the case of the green space the municipality with the major green area is Cerro, however it is related to no qualified space and just count with 47 parks. The municipality with a worth condition in infrastructure is Cerro and Mariano. The last one, present the structure but are not in operation. The unbalance is so accentuated that there is 23 municipal cultural house per 100 000 inhab. in Plaza in contrast with 1 per 200 000 inhab. in Mariano.

Related with primary unit of medical assistance there is 40 units per 10000 inhab, in Playa and 24 unit in Plaza, but in the case of Mariano and Cerro, there is 8 and 11 respectively. There installation could be resulted inside of the residential fabric. In the case of the aging population just in Playa there is 4 centres, but in the rest of the Municipalities there are just one. Nevertheless, the infrastructure for the recreation of the aging people is insufficient.

Health unit per 10000 inhab.			
	Primary unit	Inhabitant	per 10000
Playa	545	136168	40
Marianao	150	180373	8
Plaza	352	146340	24
Cerro	142	124012	11

Table 3. Balance of the distribution of the health assistance

Sources: Author

Needs: Western part museum, library, sport places, aging population centre,

Capabilities: market for recreational and sport functions.



## **Accessibility and mobility**

The site is located in the centre city but its growth to the South cross the diverse zone of the city. In the North are located the routes to connected the North western part of the city with the centre. It is dedicate to the people mobility. In other form, in the South part, it is located the infrastructure of mobility preferred dedicated to the transportation of merchandises. There a lack of infrastructure cover the direction North-South of the site as well as enough accessibility point from the West-East part and the eastern one.

Needs: mobility routes Nord-South distribution homogeny of accessibility points in the direction West-East.

Capacities: infrastructure of mobility that allows the displacement of great amount of population. Control of access in the site.

## **Social**

(See Appendix 13. Profile of worker in employment)

The area is composed by a wide representation of social groups that vary in term of ages, cultural levels, religion practices and ways of life. It is a population with an aging trend. From the frame of the whole city, the population in work age (15-59 years old), is 1 346 429 inhab. that represents the 64.1 % of the total of population. The trend from 2002 is an increase of 0.4%. This situation, together with the reduction of the group under 14 years old in 4% and the increase of group over 60 years old in the same amount present a future panorama where is necessary create the condition for basic function of life for a population majority over 60 years old (ONEI, 2015, (.)). Thus, the unbalance of the society, asks for the creation of alternative form of work, where young and old population could work together as well as satisfied its social necessities is function that contributes to the generational interchange and not the segregation. It is necessary to existence of accessible infrastructure that reduce distant of displacement.

From the point of view of the educational level of the society, in the level of the municipalities, there is the major concentration of labours in areas like Marianao and Cerro, and more concentration of technicians in Playa and Plaza de la Revolution. The reason of this non-balance, has its argumentation in the existence of worker neighbourhood in Marianao like Ceiba (1726), Jesus María (1907) and Pogoloti (1910) and Cerro from XIX, like the Canal

along the aqueduct line of Fernando XVII. In the other way, the neighbourhood of Plaza de la Revolución and Playa were oriented in its beginning to a middle and higher class. However the change of the social structure with the Revolution the traces of a past with social segregation continue in the present. Also it was accentuated with the plan of university formation developed in the beginning of the Revolution period where young population of the countryside were located in the area of Playa. There is 43 technicians per 100 inhab. in Plaza and 27 technicians per 100 inhab. in Playa in contrast with Marianao that there is 5 technicians per 100 inhab. and Cerro with 12 technicians per 100 inhab. Other interesting situation is that in Plaza 6 inhab. per 100 work like in administrative or direction work. However the educational level of the society increase after 1959, with a 99% of the population can write and read. The indicator of educational level of the population is high (ONEI, 2015, ()).

In other hand, there a wide diversity of practice of life. Proportional to the deepness in the residential fabric farther from the axes or nodes of centralities, the ways of life is expressed in diverse. In the case of the municipality of Plaza and Playa, there is a tendency of remain in the interior of the building, the public spaces I related with collective practices like cultural activities, play, sport, recreation etc. The private ones are performance in the interior of the housing. For the cases of Playa where the individual house is typical, the social unit of the block. In the case of Plaza, where there is a prevalence to buildings in high, the social unit is the building. Near to the proximities of the river, in the North part of Plaza, the visual isolation of the place strengthen the emplacement of informal settlements. This settlement, called El Fanguito, had its existence before of the Revolution Period. In places where the level of overcrowding is higher, and the population needs to externalize its private life, there is a tendency of the projection of private life to the public space. Private practice that could include some religious practices. Similar situation happens in the Municipality of Marianao and Cerro that due to the same cause the private life is displayed in the public space. Thus, the answer goes in two direction, one the reduction of overcrowding in a long term and the other, the creation of infrastructure to balance the social needs of the population like studying, sharing and working. Near to the rivers in the South-Eastern part due to of the same characteristic of isolation and centrality, there is the formation of informal settlements.

Related with the religious practice, in the Municipalities of Plaza and Playa, it takes place in the interior of the house, where the separation among building allows a certain privacy. But in the cases of Marianao and Cerro, the reason of overcrowding provokes the externalization of

the practice that takes the public space as part of it. In general way, the Afro Cuban religion need of forest for the development of its practices speciality linked with some specific species of tree. The growth of the city and the lack of green spaces, overlap the religious practice with the brown field. The centrality of the Metropolitan Park, turns into the favourable places for the performance of this events. It is required the coexistence multiplicity of use of the space. There is a high sense of belonging to the place.

Needs: generational integration, cultural plurality, work form for an aging population, reduce of the distant of displacement for basic service, work post for technician and labours, space for study, space for work, space for student and worker accommodation,

Capabilities: diversity of interest, multi-generation groups, high educational level, professional competences, technique competences, sense of belonging

### **Economic and active worker population**

The dependency of population no-working age and children over the ones in working age in the four municipalities, has a media between 500 until 630 inhab. that don't work per 1000 that work. This demonstrated the necessity of job post with better quality in term wages and opportunities of development to cover the basic needs of the rest of the family. The municipality that show the most un-balance situation is Plaza de la Revolution, in the second position at territorial level (ONEI, 2015, (,)).

Dependency of the no working population over the working											
Habana		1346429	550								
		15-59	dependency			*	15-59		dependency		
M1	Playa	113291	570	plus		M3	Plaza	89095	633	plus	
M2	Marianao	87370	528	minus		M4	Cerro	78445	560	plus	

Table 4. Dependency of the no working population over the working age one.

Source: Author

The rate of the intern and extern migratory balance of the country per municipalities is positives. Per 1000 inhabitants here is a positive rate between 5.2 until 7.2 almost twice the rate of the province (ONEI, 2015, (,)).

Rate of migratory balance					
		per 1000 inh.			per 1000inh.
M1	Playa	7.1	M3	Plaza	5.2
M2	Marianao	6.5	M4	Cerro	7.2

Table 5. Rate of migratory balance

Source: Author

The enterprise structure of the area evidence a nature prevalence public ones with a total of 762 enterprises with an amount of 279 are budgeted. It represents the 0.36%. In relation with structure of the city, in this four municipalities are located the 0,53% of the total of enterprise. Other form of production like cooperative, it representation for 2014 is not relevant. The rate of cooperative structure per 100 public enterprises is the 1.3. From the point of view spatial distribution, the municipalities in the north are the major receptor of public and budgeted expression. The relation between the North part and the total of the area is 78% of total of enterprise, 83% of the Public expression and 81% of the budgeted one. In the case of Cooperative form, the scenario is inverse. In the South municipalities are contained the 91% of the enterprise. It is important to underline that this analysis did not count other form of the private sector due to the lack of data. Nevertheless, the present of a better urban morphology, a mixture of land use as well as a higher density of form of transportation, made the territory of the North the centre of enterprise attraction. It is objective in the developed of the territory the necessity to find a balance of structure between the North and the South human cores (ONEI, 2015, (.)). (See Appendix 14. Distribution of enterprise)

Relation of the enterprise representation					
		total	Public	Budget	Cooperative
M1+M3	North	635	634	227	1
M2+M4	South	169	128	52	10
North/Total		78	83	81	9

Table 6. Relation among municipalities in the representation of enterprise type

Source: Author

Nevertheless, from 2010 until 2014 there was an increase of income by tax in three of the municipalities of the area: Playa, Marianao and Plaza de la Revolución. In the municipalities of Playa and Marianao the increase was between 61 to 81% over the incomes in 2010. The cause of the increase is due to the Law-decree No.288 that modifies the General Law No.65 of 1988 about the Housing where was allowed the sale and buy of housing (Cuba. Council of State, 2011, 360-361)

Income by Tax in 2014 and trend of growth respect 2010							
Havana		17629.8	plus 13				
		MM CUP	trend growth %			MM CUP	trend growth %
M1	Playa	3502.2	plus 81	M3	Plaza	7302.2	plus 6
M2	Marianao	299.3	plus 61	M4	Cerro	544.8	minus 21

Table 7. Balance of the income by tax between 2010 and 2014

Source: Author

An approach to the unemployment situation, in the four Municipalities happens similar compartments. The potential unemployment rate, calculated with the formula workers over active population between 15 and 59 years old, oscillates between 23% and 27%, with an average of 25%. It indicates twice over the potential unemployment rate of the Havana city.

Rate of potential unemployment in 2014					
		15-59			
		workers	inhab.	Rate %	over provincial rate %
M1	Playa	85027	113291	25	12
M2	Marianao	64175	87370	27	14
M3	Plaza	69030	89095	23	10
M4	Cerro	58349	78445	26	13
Havana		1180376	1346429	13	

Table 8. Rate of potential unemployment in 2014

Source: Author

Needs: job post over 90 000, potential of other forms of organization of the work like cooperative and self-employment, balance distribution of public enterprise in the territory, quality of the job post to support 2,5 times the financial cost of life of a person.

Capabilities: around 91620 human resource available,

### Productive structure

The major economic sector of the area is concentrate in activities addressed to the tourism and the biotechnical and pharmaceutic industry. This sectors are located in the municipalities of Playa and Plaza, in the North of the territory. For the South part, it are located manufactories, moreover in the Municipality of Cerro. In the four areas the common activities are Graphic, Food, Beverage and Tabaco industries. However the Manufactory production doesn't achieve indicators of relevance.

In the country the areas of potential inversion are more related with the secondary and tertiary industry. A focus in the secondary industry is observed in the national production is limited. With the goal to find relevant areas of industrial development, it is studied the importation of product by the country. It is taken two years as the basis for the comparison, 2008 as the result before the global financial and economic crisis, and the 2014, as the media year of tendency of the recuperation of the crisis. Thus is analysis the per cent of increase or decrease in relation with 2008. Also is analysed in relation with 2013 to identify the deficiency of the national industry as well as the financial capacity of the country. A global analysis of the volume of importation, the importation in 2014 is 91% of the amount imported in 2008, and 88% of the amount in 2013. It means that there is a recuperation of the importation due to a lack of national supply. In relation with 2013, it demonstrated with the reduction of the importation in a 3% limitation of the financial capacity. In the case of Manufactory products, in 2014 was spent 1 134 266 thousand of pesos in materials, 1 978 073 thousand of pesos in machineries and transportation equipment and 741 301 thousand of pesos in diverse objects. A zoom in the last group, the major expenditure is in products like clothes and accessories with 80 197 thousand of pesos, shoes with 102 472 thousand of pesos, instrument scientific with 202 956 thousand of pesos, component for packing and tap made of plastic as well as furniture with 35 377 thousand of pesos and architectural components with 53 381 thousand of pesos. Other products constitute expenditures around 10 000 thousand of pesos, estimated in 500 000 euros per year (ONEI, 2015, (.)).

Needs: secondary industry sector, clothes, accessories and shoes products, architectural components.

Capacities: skills in the sector of beverage and Tabaco, graphic and alimentary industries, financial capacity to invest in manufactories to cover the national demand.

## **Environment**

Annually is spent a budget of 26 327 thousand of Cuban pesos (CUP), estimated in 94 3384 euros in preservation of the forest and the quality of the water in the Metropolitan Park (ONEI, 2015, (.)). The major problematic related with environment is the contamination of the water of Almendares River. The main cause are the waste of industrial and domestic precedence. The more relevant issue is the risk that the Vento catchment area have with the present of contaminant productions. In the case of the domestic waste comes from the bad technical state

of the sewage system and the present of informal settlements. Thus, in the Director Plan of the Havana City, proposes the progressive sanitation of the water with the measure of incorporating plant of efficient waste treatment related to the industry in the sector and the not incorporation in the land use of any contaminant industrial production or informal settlement (GeoHabana, 2004,54).

Needs: treatment of waste plant, formalization of informal settlements, elimination the activities that affect the quality of the water.

Capacities: clean activities or industrial production in the land use

### **3.6.2. Identification of the objectives**

The objectives for the evaluation were determined by the diagnostic to the area of study and the consultation of the current legislation. They are divided in two main groups, the first oriented to the answering the needs of the context and the second addressed to the capabilities of the context and the objects to admit this uses.

#### **Answering to territorial needs**

##### Urban

1. Using efficient land and the infrastructure (Efficient land use)
2. Developing of program with social impact like housings, museum, libraries, public space and green areas. (Housing, cultural and public spaces)
3. Developing infrastructure for the third age. (Third age)
4. Opening of axes of accessibility to the area in the direction east-west. (Accessibility)
5. Reducing distant to basic services (Reducing distant)

##### Social

1. Motivating the generational integration, cultural plurality (Plurality)
2. Creating job places for the aging population, technician and labours (Target job posts)
3. Creating space for studying, working, for students and worker accommodations (Life facilities)

##### Economic

1. Finding foreign investment (Foreign investment)
2. Contributing to the growth of the domestic economic (domestic economic growth)
3. Creating self-sufficient economics. (self-sufficient)
4. Generating job posts with a high quality in term of wages and stability. Around 90 000 post with a retribution of 2.5 the cost of life of a person (high quality of job post and large amount)
5. Favouing alternative form of work based on the mutual help, like cooperative, private and public sector (mutual work)
6. Creating of manufacture production in sector like secondary industry sector, clothes, accessories and shoes products, architectural components (manufacture production)
7. Balancing the public enterprise in the area (balance public sector)

### Environmental

1. Formalizing the intervention in the site (formalizing intervention)
2. Reducing the impact of contamination over the river (reducing contamination)

### **Capabilities of the context and the object**

#### Urban

- 1) Tolerance to the reception a large amount of population (Large amount of population)
- 2) Compatibility with cultural, recreational and sportive activities and use of open spaces (Compatibility with cultural, sportive use)
- 3) Controlling access to the site (Controlling access)
- 4) High mobility for the displacement of large amount of population to the site (High mobility)

#### Social

- 1) Acceptation of the cohabitation of diversities interests and multi-generation groups (Cohabitation of interest)
- 2) High quality of human resource with a high concentration of professional and labours (High quality of human resource)
- 3) Strong sense of belonging (Belonging)

#### Economic



- 1) Availability of around 91620 human resource (Human resource)
- 2) Tradition and skills in the sector of beverage and Tabaco, graphic and alimentary industries (skills)
- 3) Financial capacity to invest in manufactories to cover the national demand (financial capacity for manufacture)

#### Environmental

- 1) Tolerance to just clean activities or industrial production in the land use. (clean use)

#### Legal

- 1) Possible form of property in condition of usufruct, hiring, foreign, transferring of properties among public entities (Form of property)
- 2) Possible form of association in public enterprise, mixed enterprise with foreign funding, private with foreign enterprise, self-employment, cooperative (Form of association)

#### Architectural

- 1) Alternative of actuation in Amalgamation, Add on or Installation form. (Intervention)
- 2) Flexible organization (flexible)

#### Heritage protection

- 1) Reversibility of the intervention (Reversibility)
- 2) No invasive demolition (No demolition)
- 3) Storage of the element removed (Storage)
- 4) Existence of a centre of interpretation or museum (Interpretation)
- 5) Wide public target (Wide public)

#### **Ponderation of objectives**

The National Methodological Guide for the General Plan for Territorial and Urban Planning of Cuba, expresses five key questions to value the transformation in the territory. The first question answers to economic and social needs as well as environmental requirements. The second one, is oriented to the dimension of the activity where is determined the capacity of the function and the quantity. The other is referred with the level of priority of the need, the fourth

with the correspondence of the activity in the type of land and the last one with the visual expression. Thus, in term of evaluation it is should be considered the adjustment with the territorial needs, dimension of the activity, priority, compatibility with the land and the form as essential to identify the adequate ones (Padrón, 2013,3-4) Other from the point of view of the heritage should be considered like ethic to the past, perception of the precedent activities, mechanism for the interpretation of the history of the object and the reversibility of the intervention.

In term of priorities, there is a preference of uses that promote the economic viability without budget of the State as well as an efficient use of the land. Other relevant objectives is the generation of growth of the domestic economic. From the social point of view, the focus is over the representation of the population in the space, creating the activities that favour the integration, cultural and generational. From the heritage protection, continued the sense of belonging, the recognition of the precedent activity by the continuity of vocation of the space. From the point of view of the environment the no contamination of the area and the efficient use of the territorial resources.

### **3.6.3. Evaluation of the potential uses according the objectives**

For the evaluation of potential use, the objectives are organized following the form of a table that registers the correspondence of the potential uses with the needs and the capabilities. This part of the research, has a demonstrative goal. In this way, the analysis of pertinence will be apply just to one industrial object. The one chosen is the La Tropical Brewery to illustrate the method.

The evaluation of the pertinence is measure with the value of 0, 1 and 2. For the case of the territorial needs, 0 corresponds when there is not or almost not answer to the problematic. For 1 is when this a possible to answer and in for 2 when the answer is direct. The capability analysis, 0 correspond when is not compatible with the tolerance of the site. In the case of 1 is referred when it is acceptable the use but it doesn't use in efficient way the resource of the territory and 2 when it is compatible in term of tolerance of use and efficient exploitation of the resources of the territory. The priority objectives are marked with yellow borders and are analysing in a second moment.

The potential use identified in the Morphological box according the urban classification and the industrial type, were 1) Museum, 2) Coworking, 3) Housing 4) Manufacture 5) Cultural centre 6)Commercial centre 7)University 8) Sport centre 9) Gallery 10) Communitarian centre.

The steps are the followed:

- Evaluation of the answer to the territorial needs in 0,1 or 2.
- Evaluation of the tolerance and exploitation of the capabilities of the case of study in 0,1 or 2.

### **Answering to territorial needs**

(See Appendix 15. Pertinence of the potential use to answer to the territorial needs. La Tropical Brewery.)

In this point, the potential uses with a wider scope of answering were the coworking, manufactory, cultural centre, university and communitarian gallery. A second groups was integrated by sport centre, commercial centre, housing and gallery. A third one composed by Museum.

The potential use with the higher result is the coworking. The strengths of this use are in its vocation to the plurality. It allows an efficient use of the land and brings accessibility to the site. It tolerance to be admit other complementary functions permits including small local services that contributes to the reducing of the distant to basis activities. It is an activity with the characteristic that could be adapted to the needs of the target groups. Also, it creates a common space of opportunities for all citizens. Its milestone is placed in the directed relation with the growth of the domestic economic based on the mutual group.

It is an activity that doesn't need be support by the State and is self-sufficient. This type of structure bring a large amount of job post where the quality of job post will depend on the own performance of the production of each business. It is a use with intrinsic vocation for the flexibility and the integrity.

In the cases of the lower result corresponds with the use of Museum. It main weaknesses are in the efficiency use of the land, the limit amount of job posts and its dependency to State budget. In the case of the efficient use of the land, the location of mono function like museum, that also constitutes non frequent activity, in a context with a great number of problematic to

resolve, represents a low efficiency. The place is used with low frequency and in just a moment of the day. From the point of view of generation of job posts, the Museum function has a restricted scope of human resources in terms of specialization as well as number of job posts. Also this activity is supported by the State. Alternative forms of association could suppose a limitation of accessibility to the function due to the increase of the prices. The non-self-sufficiency of the activity brings more than answers to other problems. Low result, does not mean the impossibility of application of this type of use. But it showed the weak points that require creative solutions to rise them.

### **Tolerance and exploitation of the capabilities**

(See Appendix 16. Pertinence of the potential use with the capabilities of the context and the object.)

In the case of the Capabilities, the potential uses were joint in three groups. In the first group were coworking, university, communitarian centre and cultural centre. In the second group were Museum, manufactory, commercial centre, sport centre and gallery. In the third was housing.

The potential use with higher result was coworking. The strong points were in the cohabitation of interests, contribution to the sense of belonging, use of human resources and skills as well as the flexibility in intervention form and the reversibility. In terms of tolerance, the use of coworking has a flexible nature. It is perfect to be model in the frame of the possibilities of the place. Type of form of organization, property, limitation of intervention, clean use and more, doesn't limit the well performance of the use.

From the side of the exploitation of the local resources, this is a use that values the great amount of population as potential market, the availability of human resource in diverse educational level and skills in the way to diversify the field of action of the possible enterprise as well as the accessibility and mobility to the site.

The activity with the lower result is the housing. In the model of Cuban society it is possible three forms of housing, one built and sold by private or mixed enterprise, second built by the State and given in condition of usufruct or subsidy and third built by private, state or mixed and rent. In this way is oriented to a limit public. In terms of tolerance of the site, this use is possible however it is not so flexible in the way of intervention and tolerance with other uses. Its major limitation is oriented to the low exploitation of the capabilities of the site. It is restricted to a limit

amount of population, doesn't exploit the capability of accessibility and mobility for large population groups. The relevant restriction is the non-exploitation of the human resource.

### **Selection of the potential use with positive impact over 50 per cent**

To determine this score, it is equal all indicator and calculate the per cent in relation with the maximum score that is 74. The potential uses over 50% of correspondence show the one with a positive impact over the site. Achieving this range it is the co-working, manufacture, cultural centre, commercial centre, university, sport centre and communitarian centre. Under this criteria it is museum, housing and gallery. The use with the higher score is coworking followed by cultural centre and university.

Potential use	Need	Capability	Total	V/T %
1 Museum	9	25	34	45
2 Coworking	26	35	61	82
3 Housing	13	12	25	33
4 Manufacture	24	27	51	68
5 Cultural centre	27	31	58	78
6 Commercial centre	17	23	40	54
7 University	20	33	53	71
8 Sport centre	19	26	45	60
9 Gallery	12	24	36	48
10 Communitarian centre	21	31	52	70
Total	34	40	74	100

Table. 9 Potential use over 50 % of pertinence.

Source: Author

### **Analysis of the group according the correspondence with the priority objectives**

(See Appendix 17. Correspondence with the priority objectives)

For the satisfaction of the priority, it is took the group of potential use over 50% of correspondence identified before. It is calculated their score in relation with the priority objectives. It is equalled the per cent in relation with the maximum score that is 18. The result showed that the potential uses more pertinent for La Tropical Brewery are the coworking and the cultural centre following by the university and the cultural centre.

	Potential use	Need	Capability	Total	V/T %
1	Museum	9	25	34	45
2	Coworking	26	35	61	82
3	Housing	13	12	25	33
4	Manufacture	24	27	51	68
5	Cultural centre	27	31	58	78
6	Commercial centre	18	23	41	55
7	University	20	33	53	71
8	Sport centre	19	26	45	60
9	Gallery	12	24	36	48
10	Communitarian centre	21	31	52	70
	Total	34	40	74	100

	First group
	Second group
	Third group

Table 10. Per cent of correspondence with the priorities objectives.

Source: Author.

### **Classification the potential use according the grade of pertinence.**

The analysis of correspondence in relation with the territorial needs and the capabilities of the site, achieves to determining the potential uses more pertinent for the site. The ones under or equal 50% have a low level of pertinence, between 50 to 70% present a medium grade of pertinence, over 70% a high grade of pertinence. Thus is listed from more to less grade of pertinence the potential uses.

#### High grade of pertinence

- 1) Coworking (94%)
- 2) Cultural centre (88%)
- 3) University (72%)
- 4) Manufacture (72%)

#### Medium grade of pertinence

- 1) Communitarian centre (61%)
- 2) Commercial centre (55%)

#### Low grade of pertinence

- 1) Sport centre (50%)

The process of evaluation of the pertinence of potential use help to precise the process of selection of new use for vacant industrial buildings. From 10 potential uses the sample was delimited in four potential uses with high pertinence. The use of the method allows a systematic and progressive approach to the selection of the new use.





## Partial Conclusion

The application of the methodology for the identification new use uses for vacant industrial heritage buildings, gave the guidelines to integrate dimensions and interests in a complex problematic. It contributed to a systematic and progressive approach to the result.

It was characterized the urban context and the vacant industrial heritage buildings along the Almendares River. This allowed the standardization of the attributes of the study cases in the same language that the sample in the database. With this was possible to determine the classification of the Urban Area and the Vacant Industrial Object according fixed variables of interest. It was determined two types: type A. corresponding with Manufacturing, Paper and Allied Products, vertical and articulated and the type B. Manufacturing, Food and Kindred Products, vertical and articulated. For the first case was related one potential use. This limitation was conditioned due to the use of the fixed variable of Specific Former Use that restricted the sample.

In the cases of the type B. the representation was wider. It was identified 10 potential uses. They included use in five general category of classification U22 industry and manufacturing U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential, with the wider representation in the classification U36 Amenities, leisure and sport. The usability of this tool reduced the grade of uncertainty in the selection of new use.

Then the application of the analysis of the relevance of the potential uses according needs and capabilities of the context and the object, to the cases of La Tropical Brewery, showed the present of four potential uses with a correspondence over 70% that correspond with Co-working (94%), Cultural centre (88%), University (72%) and Manufacture (72%). It demonstrated the capability of the methodology to determine potential uses for specific object and context.

The result of this chapter is the characterization of the context and the objects. Also a diagnostic of the needs and capacities as well as the relation of potential uses available to be reconsider if the needs and capacities of the context and object change. Nevertheless, a relation of new use with a graduation of level of pertinence.

The application of this methodology favoured a multidimensional analysis of the problematic of the reuse of vacant industrial heritage buildings. Besides, it brought the possibility of integrate interests and ponder them according the priorities. It represent an alternative way to arrives to the definition of new uses.

## **GENERAL CONCLUSION**



The reuse of vacant industrial heritage building is a pertinent problem for the current society. The large number of vacant industrial buildings overtakes the capacity of the decision maker. The current instrument related with the reuse did not offer the tools to determining the potential new function and valuated its pertinence with the context and the object. Nevertheless the long path already cover of intervention in derelict industrial buildings show the tentative way. In this tone this thesis profited of the experience gained in the practices of reuse to build a methodology for the identification of potential use for vacant industrial heritage building.

In the first chapter it was determined the variables that participated in the problematic. The problem was divided in unit of analysis that allowed to have a simplification by an approach in system. Urban Area, Vacant Industrial Heritage Object, Value and Reuse were studies and synthetized in variables. This variables were measured by indicators with the goal to have a common characterization of cases. This result constituted the basement for the comparative analysis of cases. The variables identified represented the complexity of the problematic.

In the second chapter the research achieved three goals. It was built a method for the comparative analysis of cases. This method was used in the characterization of the context and the object. The characterization allowed to measure of the subject by indicators. With this data was possible to synthetized the cases to the same language. Thus, the method served to have cross multivariable analysis by the utilization of a database. This analysis led to the identification of tendencies in the assignation of new use. The platform of variables contributed to observe the assignation of new use by morphological characteristic of the vacant industrial heritage object and also by the former production. In this chapter was explored the capability of the method to identify potential structure keeping the new use. The result demonstrated the present of tendencies related with type of use, the mono functional or multifunctional inclusion, the favoured type of industrial building for some type of use or investment. The identification of tendencies signified a basement for exploratory studies of the potential of the industrial structure of the territory in front of the reuse.

Besides, the method created for the comparative analysis demonstrated to be compatible with the morphological box as a mechanism to generalize the result of the practices. The literature review together with the comparison of studies cases, created the basis for the design of methodology for the identification of potential use for vacant industrial heritage buildings by

the resource of the experience gained. It was designed in a compendium five tool and two methods with progressive output.

This methodology was applied to the study case of the vacant industrial heritage buildings along to the Almendares River. It was characterized the Urban Area from a macro and micro level of analysis. It was characterized the vacant industrial heritage buildings along the Almendares River. This characterization represented a result that could be used in other researches. Then it was classified according a fixed variables declared the urban area and the industrial buildings. This classification served to contextualize the result of the database according similar characteristics between the study cases and the samples. The methodology gave ten potential uses to be applied to the cases. By the illustration of the case of La Tropical Brewery, it was valuated the pertinence grade of the proposal of potential uses. It was determined the grade of compatibility of the potential uses with the territory and the object. The result constituted initial approach to the problematic of the determination of use and represented a portfolio of possibilities of intervention over the vacant industrial heritage buildings along the Almendares River.

The application of the methodology to the vacant industrial heritage building along the Almendares Rivers, demonstrated the possibility of identifying potential uses by the systematization of the practices. It was proved in the identification of potential uses with a grade of compatibility over 70 %. Also, it showed that it is possible to generalized results of particulars practices. Besides, it showed the richness of creativity form of interventions that constitute a resource of demonstrated value.

A critical analysis to the methodology determine that it achieved its objective. It is possible to identify with it, potential use for vacant industrial heritage buildings. It offered an adequate sample of use already adjusted to the relevant variables fixed. Its main contributions are the simplification of the problematic to unit of analysis, criteria and variables, that permit a cross observation of the problematic. The division by unit of analysis give the space for the multidisciplinary work, the variety of the database constitutes a repository of practices where learn.

The integration of the characteristic of the context and the object as well as the analysis by objectives, permitted to have an efficient methodology to offer answer over the vacant industrial building in the territory, valuate the pertinence of the potential uses. It is a

methodology that could be applied partially to get intermedia result like the characterization, or the evaluation of proposal of uses by objectives.

It is other step more in the research of the identification of potential uses. It connects diverse approach to the problem from the object, from the context and from the value and from the reuse. It is an ensemble of method and tools that integrates the state of art around the problematic in a unique system to identify potential use for vacant industrial heritage buildings.

## **RECOMMENDATIONS**



Future research should work in the inclusion of a database that incorporate variables of impact to stablished cross analysis keeping result expected. Also it should be together with a temporal analysis to observe the performance of the variables of impact in the time. Besides, it should be determined the range of the fixed variables that represented point of inflexion of the comportment of the context or the object. Moreover, it should be identified the level of relevance of the variables in the modelling of the contexts.

In other hand, it is recommended to support the methodology in a platform that integrated the diverse tools with the aim of save time by operative steps. Besides, it could be interesting the comparative analysis of models of tendencies. Finally the creation of graphic models that served as a tool to fast analysis of the potential use over the territory.



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## **APPENDIXES**





## Appendix 1

Form for the characterization of urban area

(Complementary information of 2.1.1. The Form, tool for the characterization)

Source: Author

### FORM FOR THE CHARACTERIZATION OF URBAN AREA

(Code)

**Macro level:** Correspond with the level of the city, and describes the general characteristics of the settlement according administrative, geography, demography and morphological criteria.

Administrative, geography, demography, morphological and economic criteria

#### Administrative criteria

- 1) Administrative level: capital, capital of province, secondary city, towns
- 2) Local governance representation: yes (1)/ no (0)

#### Geography criteria

- 3) Water front: yes (1)/ no (0)
- 4) River: yes (1)/ no (0)

#### Demography criteria

- 5) Number of inhabitants: expressed in inhab.
- 6) Density: expressed in inhab/km<sup>2</sup>
- 7) Population growth: increase, decrease, maintained
- 8) Per cent of the active population: population between 16 and 60 year old.
- 9) Dominant age group: population minor of 16 year old, population between 16 and 50 year old, population over 50 year old.
- 10) Per cent of women: expressed in per cent

#### Morphological criteria

- 11) Area of the settlement: expressed in km<sup>2</sup>
- 12) Type of urban structure: continues, discontinues
- 13) Morphology of the growth: Draughtboard, radial, disperse, along ways,
- 14) Organization of centralities: monocentric, hierarchical, polycentric

#### Economic criteria

- 15) Dominant economic sector: financial services, cultural service, tourism, light industry, heavy industry, agriculture
- 16) PIB per capita: expressed in Euro
- 17) Proximity to potential market: until 1km, 1-5km, more than 5km expressed in km
- 18) Estimation of the population potential of the market: expressed in inhab.

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**Micro level:** corresponds with the level of the area in 1 km surrounding the object.

#### Morphological criteria

- 1) Zone of the city: historical city, centre, intermedia zone, periphery
- 2) Coefficient of built land per lot (COS): expressed in per cent
- 3) Predominant storeys: 1-2 level, 3-5 level, 5-10 level, more of 10 levels
- 4) Disposition among buildings: abutment, sanitary corridor

### Functional criteria

- 5) Type of land use: mono-functional or mixed
  - 6) Dominant use: U14 Mining and quarrying, U21 Energy production, U31 transport, communication networks, storage, protective works, U32 water and waste treatment, U33 Construction, U34 Commerce, finance, business, U35 Community services, U36 Recreation, leisure, sport and U37 residential.
  - 7) Proximity to infrastructure of mobility: expressed in linear km.
  - 8) Type of infrastructure of mobility in the proximity: railway, metro, tramway, bus lines, ship, others
- 

### **Bibliography**

## Appendix 2

Form for the characterization of vacant industrial buildings

(Complementary information of 2.1.1. The Form, tool for the characterization)

Source: Author

### FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

(Code)

#### INDUSTRY TYPE

##### General data

Current name: it corresponds with the name associated with the current activities.

Former name: it corresponds with the name of the former enterprise or the name commonly used for identifying the object.

Year of built: expressed in year (YYYY)

Year of standstill: expressed in year (YYYY)

##### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: correspond with the first level of classification, SIC
- 2) Specific: correspond with the second level of classification SIC
- 3) Part of an industrial complex: yes (1)/ no (0)
- 4) Transportation infrastructure associated: railway, port, highway, airport, any

##### Morphological criteria

- 5) Coefficient of occupation of soil (COS) it correspond with the built up area. Data is estimated by the image of google map.
- 6) Number of storeys: 1-2, 3-5, over 5
- 7) Configuration: vertical, horizontal, mixed
- 8) Spatial organization: compact, disperse, articulated
- 9) Singularity stylistic: yes (1)/ no (0)
- 10) Spatial continuity: yes (1)/ no (0)
- 11) Type of structure: skeleton, load-bearing wall, mixed
- 12) Spacing of the structure: Indicated in meter per meter

##### State of the object before the intervention criteria

- 13) Technical condition: good, regular, bad
- 14) Integrity of the object: 1) demolition of the building and remains of the urban pattern 2) randomly selection of elements, in the majority of the cases due to its visual impact in the landscape like chimneys, part of the façade or machineries. The last ones could remain in the original position or redistributed in arbitrary way 3) dismantling of the machinery and remain almost empty buildings 4) remain the significant machinery 5) remain machinery
- 15) Contamination of the land: yes (1)/ no (0)

---

#### VALUE

##### Value criteria:

- 1) Declaration of protection: yes (1)/ no (0)
- 2) Level of protection: World Heritage List, National, Local, or non-recognized.
- 3) Singularity: master piece/ representative
- 4) Type of value: historical, social, technique or and scientific, aesthetic

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 1) General: Units (U): Second level of classification U14 Mining and quarrying, U15 Other primary production U21 Energy production, U22 industry and manufacturing U31 transport, communication networks, storage, protective works, U32 water and waste treatment, U33 Construction, U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.
- 2) Specific: correspond with the third level of Eurostat Classification System. Consult reference.
- 3) Year: expressed in year (YYYY)
- 4) Continuity of use: Yes (1)/ no (0)
- 5) Correspondence with the land use for the area: Yes (1)/ no (0)

### **Architectural Intervention criteria:**

- 6) Type of actuation: Amalgamation, Add on, inside to out, Put on, Installation.
- 7) Planning of the intervention: Yes (1)/ no (0)
- 8) Significant change of the façade and morphology: Yes (1)/ no (0)

### **Ethic of value criteria:**

- 9) Remains of the former name: Yes (1)/ no (0)
- 10) Reversibility: Possible, partial, non-reversible
- 11) Demolition: Yes (1)/ no (0)
- 12) Storage of the element removed: Yes (1)/ no (0)
- 13) Existence of a centre of interpretation or museum: yes (1)/ o (0)

### **Investment criteria:**

- 14) Type of financial support: State, Administration local, Administration Regional, Private, Mixed, Communitarian, Sectorial, Spontaneous initiative.
- 15) Property: Public, Private
- 16) Tenure of the land: Property, rental, usufruct, illegal
- 17) Location of the investment: national or foreign

### **Social criteria:**

- 18) Job post: Amount of job posts generated with the new activities
- 19) Public target: wide, sectorial, age group, former worker,
- 20) Answer to a need: territorial, local, individual

### **Observations**

### **Bibliography**

### Appendix 3

State Commitment in relation with the representation of TICCIH, the UNESCO Convention of 1972, 2003 and d2005, as well as UN-Habitat

(Complementary information of 2.2.1. Delimitation of the sample)

Source: Author by data complicated in UNESCO website.

#### EUROPE AND EURASIA

		State commitment					
			UNESCO			UN-Habitat	
Continent	Country	TICCIH	1972	2003	2005	Report	
1	Europe	Austria	1	1992	2009	2006	0
2	Europe	Croatia	1	1992	2005	2006	0
3	Europe	Czech Republic	1	1993	2009	2010	1
4	Europe	Denmark	1	1979	2009	2006	0
5	Europe	Estonia	1	1995	2006	2006	0
6	Europe	Finland	1	1987	2013	2006	1
7	Europe	France	1	1975	2006	2006	1
8	Europe	Germany	1	1976	2013	2007	1
9	Europe	Italy	1	1978	2007	2007	0
10	Europe	Greece	1	1981	2007	2007	0
11	Europe	Hungary	1	1985	2006	2008	0
12	Europe	Latvia	1	1995	2005	2007	0
13	Europe	Netherlands	1	1992	2012	2009	1
14	Europe	Norway	1	1977	2007	2007	1
15	Europe	Poland	1	1976	2011	2007	0
16	Europe	Portugal	1	1980	2008	2007	0
17	Europe	Rumania	1	0	2006	2006	0
18	Europe	Slovenia	1	1992	2008	2006	0
19	Europe	Spain	1	1982	2006	2006	
20	Europe	Sweden	1	1985	2011	2006	0
21	Europe	Switzeland	1	1975	2008	2008	1
22	Europe	United Kingdom	1	1984	0	2007	0
23	Europe Asia	Russia	1	1988	0	0	0
24	Europe Asia	Turkey	1	1983	2006	0	1

#### AUSTRALIA

		State commitment					
			UNESCO			UN-Habitat	
Continent	Country	TICCIH	1972	2003	2005	Report	
1	Australia	Australia	1	1974	0	0	2009

## AMERICA

		State commitment					
			UNESCO			UN-Habitat	
Continent	Country	TICCIH	1972	2003	2005	Report	
1	America	Argentina	1	1978	2006	2008	0
2	America	Brazil	1	1977	2006	2007	1
3	America	Canada	1	1976	0	2005	0
4	America	Chile	1	1980	2008	2007	1
5	America	Colombia	1	1983	2008	2013	0
6	America	Cuba	1	1981	2007	2007	1
7	America	Guatemala	1	1979	2006	2006	0
8	America	Mexico	1	1984	2005	2005	1
9	America	Peru	1	1982	2005	2006	1
10	America	USA	1	1973	0	0	1

## Appendix 4

Sample for the comparative analysis

(Complementary information for 2.2.2. Representative of the sample)

Reference database				
Code				
UA	IB	Continent	Country	city
USNY	EA USA 1	America	United States	New York
EFH	EFH1	Europe	Finland	Helsinki
EFIL	EFILF1	Europe	France	Ile de France
EFLI	EFL1	Europe	France	Lille
EFP	EFP1	Europe	France	Paris
EGDE	EGDE1	Europe	Germany	Delmenhorst
EGDU	EGDU1	Europe	Germany	Duisburg
EGE	EGE1	Europe	Germany	Essen
EGH	EGH1	Europe	Germany	Hamburg
EGO	EGO1	Europe	Germany	Oberhausen
EGO	EGO2	Europe	Germany	Oberhausen
EIF	EIF1	Europe	Italy	Ferrara
EIM	EIM1	Europe	Italy	Milan
EIM	EIM2	Europe	Italy	Milan
EIM	EIM3	Europe	Italy	Milan
EIM	EIM4	Europe	Italy	Milan
EIR	EIR1	Europe	Italy	Rovereto
EIR	EIR2	Europe	Italy	Rovereto
EIV	EIV1	Europe	Italy	Verona
EIVE	EIVE1	Europe	Italy	Venice
EPLO	EPLO1	Europe	Poland	Lodz
EPLO	EPLO1	Europe	Poland	Lodz
EPLI	EPLI1	Europe	Portugal	Lisbon
EPLI	EPLI2	Europe	Portugal	Lisbon
ESM	ESM	Europe	Spain	Madrid
ESS	ESS	Europe	Spain	Seville
EUKL	EUKL1	Europe	United Kingdom	London
EUKL	EUKL2	Europe	United Kingdom	London
EUKM	EUKM1	Europe	United Kingdom	Manchester
EUKM	EUKM2	Europe	United Kingdom	Manchester
EUKM	EUKM3	Europe	United Kingdom	Manchester

**Appendix 5.**  
Compendium of form of the cases of the database  
(Complementary information of 2.2.3. General Description of the cases



# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Industry city. New York, USA. (code AUSNY1)**

## General data

- 16) Current name: Industry city
- 17) Former name: Bush Terminal
- 18) Year of built: 1890
- 19) Year of standstill: no data

## Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 20) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 21) Specific: Motor freight transportation and Warehousing (Major group 42)
- 22) Part of an industrial complex: yes (1)/
- 23) Transportation infrastructure associated: railway, port,

## Morphological criteria

- 24) Coefficient of occupation of soil (COS) 2 800 m2
- 25) Number of storeys: over 5
- 26) Configuration: vertical,
- 27) Spatial organization: compact,
- 28) Singularity stylistic: no (0)
- 29) Spatial continuity: yes (1)/
- 30) Type of structure: skeleton,
- 31) Spacing of the structure: no data

## State of the object before the intervention criteria

- 32) Technical condition: good,
- 33) Integrity of the object: 4) remain the significant machinery
- 34) Contamination of the land: no (1)

Observations:

Intermodal shipping together with warehousing as well as manufacturing complex located in the Brooklyn. This was the first infrastructure of this type in New York. It is the first North American integral complex that joint Manufacturing, store and shipping. The Bush Terminal was recalled in the middle of 1980 due to it was bought by Industry City Associates which maintained the same uses. The project as a creative space began at 2009. Also other uses as Centre of Research in Surgery are located in the installation. In 2011 it was made a master plan for the complex. The land as well as the water was contaminated but the state payed a great grant to revitalize the environmental conditions.

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## VALUE

### Value criteria:

- 5) Declaration of protection: no data
  - 6) Level of protection: no data
  - 7) Singularity: master piece/
  - 8) Type of value: historical, social, technique or and scientific,
- 

## ADAPTIVE REUSE

### Functional criteria:

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 21) General: U22 industry and manufacturing, U34 Commerce, finance, professional and information services
- 22) Specific:
  - U22 Domestic Industrial Product
  - U34 Offices in concept of coworking
  - U34 Centre of Research in Surgery
- 23) Year: 2009
- 24) Continuity of use: Yes (1)/
- 25) Correspondence with the land use for the area: Yes (1)/

### Architectural Intervention criteria:

- 26) Type of actuation: Installation.
- 27) Planning of the intervention: Yes (1)/
- 28) Significant change of the façade and morphology: no (0)

### Ethic of value criteria:

- 29) Remains of the former name: Yes (1)/
- 30) Reversibility: Possible,
- 31) Demolition: no (0)
- 32) Storage of the element removed: no (0)
- 33) Existence of a centre of interpretation or museum: no (0)

### Investment criteria:

- 34) Type of financial support: Private,
- 35) Property: Private
- 36) Tenure of the land: Property
- 37) Location of the investment: National

### Social criteria:

- 38) Job post: no data
- 39) Public target: wide,
- 40) Answer to a need: local

## Bibliography

Inside IC Industry City <http://industrycity.com/> (accessed July 24, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Industry city. New York, USA. (code AUSNY1)**

## General data

- 35) Current name: Industry city
- 36) Former name: Bush Terminal
- 37) Year of built: 1890
- 38) Year of standstill: no data

## Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 39) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 40) Specific: Motor freight transportation and Warehousing (Major group 42)
- 41) Part of an industrial complex: yes (1)/
- 42) Transportation infrastructure associated: railway, port,

## Morphological criteria

- 43) Coefficient of occupation of soil (COS) 2 800 m<sup>2</sup>
- 44) Number of storeys: over 5
- 45) Configuration: vertical,
- 46) Spatial organization: compact,
- 47) Singularity stylistic: no (0)
- 48) Spatial continuity: yes (1)/
- 49) Type of structure: skeleton,
- 50) Spacing of the structure: no data

## State of the object before the intervention criteria

- 51) Technical condition: good,
- 52) Integrity of the object: 4) remain the significant machinery
- 53) Contamination of the land: no (1)

Observations:

Intermodal shipping together with warehousing as well as manufacturing complex located in the Brooklyn. This was the first infrastructure of this type in New York. It is the first North American integral complex that joint Manufacturing, store and shipping. The Bush Terminal was recalled in the middle of 1980 due to it was bought by Industry City Associates which maintained the same uses. The project as a creative space began at 2009. Also other uses as Centre of Research in Surgery are located in the installation. In 2011 it was made a master plan for the complex. The land as well as the water was contaminated but the state payed a great grant to revitalize the environmental conditions.

---

## VALUE

### Value criteria:

- 9) Declaration of protection: no data
  - 10) Level of protection: no data
  - 11) Singularity: master piece/
  - 12) Type of value: historical, social, technique or and scientific,
- 

## ADAPTIVE REUSE

### Functional criteria:

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 41) General: U22 industry and manufacturing, U34 Commerce, finance, professional and information services
- 42) Specific:
  - U22 Domestic Industrial Product
  - U34 Offices in concept of coworking
  - U34 Centre of Research in Surgery
- 43) Year: 2009
- 44) Continuity of use: Yes (1)/
- 45) Correspondence with the land use for the area: Yes (1)/

### Architectural Intervention criteria:

- 46) Type of actuation: Installation.
- 47) Planning of the intervention: Yes (1)/
- 48) Significant change of the façade and morphology: no (0)

### Ethic of value criteria:

- 49) Remains of the former name: Yes (1)/
- 50) Reversibility: Possible,
- 51) Demolition: no (0)
- 52) Storage of the element removed: no (0)
- 53) Existence of a centre of interpretation or museum: no (0)

### Investment criteria:

- 54) Type of financial support: Private,
- 55) Property: Private
- 56) Tenure of the land: Property
- 57) Location of the investment: National

### Social criteria:

- 58) Job post: no data
- 59) Public target: wide,
- 60) Answer to a need: local

## Bibliography

Inside IC Industry City <http://industrycity.com/> (accessed July 24, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

## Helsinki Courthouse District. Helsinki, Finland (code EFH1)

### General data

- 54) Current name: Helsinki Courthouse District
- 55) Former name: Salmisaari plant, Alki headquarters
- 56) Year of built: 1937
- 57) Year of standstill: 1998

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 58) General: Manufacturing (Division D)
- 59) Specific: Food And Kindred Products (Major Group 22)
- 60) Part of an industrial complex: yes (1)
- 61) Transportation infrastructure associated: port,

### Morphological criteria

- 62) Coefficient of occupation of soil (COS) 47 000 m<sup>2</sup>
- 63) Number of storeys: over 5
- 64) Configuration: vertical
- 65) Spatial organization: articulated
- 66) Singularity stylistic: no (0)
- 67) Spatial continuity: yes (1)/
- 68) Type of structure: skeleton,
- 69) Spacing of the structure: no data

### State of the object before the intervention criteria

- 70) Technical condition: good,
- 71) Integrity of the object: 4) remain the significant machinery
- 72) Contamination of the land: no (0)

Observations:

Its production was dedicated to alcoholic beverages. The company was founded in 1932 and it was a national monopoly. The installations counted with administration, factories, and warehouses.

---

## VALUE

### Value criteria:

- 13) Declaration of protection: no data
- 14) Level of protection: no data
- 15) Singularity: representative
- 16) Type of value: historical,

---

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 61) General: Units (U): U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and
- 62) Specific:
  - U34 Offices
  - U34 Restaurant, cafeterias
  - U35 Courthouse
  - U36 Gallery
- 63) Year: 2004
- 64) Continuity of use: no (0)
- 65) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 66) Type of actuation: Installation.
- 67) Planning of the intervention: Yes (1)/
- 68) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 69) Remains of the former name: no (0)
- 70) Reversibility: Possible,
- 71) Demolition: Yes (1)
- 72) Storage of the element removed: no (0)
- 73) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 74) Type of financial support: Administration local, Private
- 75) Property: Public
- 76) Tenure of the land: Property
- 77) Location of the investment: National

### **Social criteria:**

- 78) Job post: 60 000
- 79) Public target: sectorial
- 80) Answer to a need: territorial

### **Observations:**

The modification was made under a concept of cost of life for concrete structures. The new use is not limit to communitarian services, also cafeterias, offices, commerce, galleries, and sport shared the same structure. The cost of the project of 60 euros per m2. The court of Justice occupied the third part of the space. The success of this experience called the attention of public opinion which begins to considered project like this in similar thematic structures.

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Spirit of adventure. Helsinki's new courthouse has an atmosphere like no other. But then, it did start out as a distillery. The guardian (accessed July 23, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Euratechnologies. Lille, France (code EFLI1)**

## General data

- 73) Current name: Euratechnologies
- 74) Former name: Le Blan-Lafont Cotton Mill
- 75) Year of built: 1900
- 76) Year of standstill: 1989

## Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Manufacturing (Division D)
- 2) Specific: Textile Mill Products ( Major Group 22)
- 3) Part of an industrial complex: yes (1)/
- 4) Transportation infrastructure associated: railway, berth,

## Morphological criteria

- 5) Coefficient of occupation of soil (COS) 24000m<sup>2</sup>
- 6) Number of storeys: over 5
- 7) Configuration: vertical,
- 8) Spatial organization: compact,
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)/
- 11) Type of structure: skeleton,
- 12) Spacing of the structure: no data

## State of the object before the intervention criteria

- 13) Technical condition: regular,
- 14) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 15) Contamination of the land: no (0)

---

## VALUE

### Value criteria:

- 17) Declaration of protection: yes (1)/
- 18) Level of protection:, National
- 19) Singularity: representative
- 20) Type of value: historical

It is Historic Monument in 1999.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 81) General: Units (U): U34 Commerce, finance, professional and information services, U35 Communitarian services
- 82) Specific:
  - U 34 Technological Park
  - U 35 Educational, University
- 83) Year: 2009
- 84) Continuity of use: Yes (1)/
- 85) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 86) Type of actuation: Installation.
- 87) Planning of the intervention: Yes (1)/
- 88) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 89) Remains of the former name: no (0)
- 90) Reversibility:., partial,
- 91) Demolition: Yes (1)/
- 92) Storage of the element removed: no (0)
- 93) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 94) Type of financial support: Public and Private
- 95) Property: Public
- 96) Tenure of the land: Property,
- 97) Location of the investment: National

### **Social criteria:**

- 98) Job post: 1100 post
- 99) Public target: sectorial,
- 100) Answer to a need: territorial,

Observations: Among the new use there are media centre, theatre and the Faculty of Law. Also offices of computing science like Microsoft and Capgemini. The intervention followed an initiative began in Lille with the location of core for the development of the science. First it was the Eurosanité and then the Euratechnologies experience in the former Blanc Cotton Mill. The operations are defined as reconversion. It was invested 1 142 euros per square meter.

### **Bibliography**

Euratechnologies - usines le blan-lafont.Architopik  
[http://architopik.lemoniteur.fr/index.php/realisation-architecture/euratechnologies\\_usines\\_le\\_blan\\_lafont/1899](http://architopik.lemoniteur.fr/index.php/realisation-architecture/euratechnologies_usines_le_blan_lafont/1899) (accessed July 4, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Dumas. Montreuil, France. (code EFM1)**

### General data

- 77) Current name: Dumas
- 78) Former name: Usine du papiers peints Dumas
- 79) Year of built: 1913
- 80) Year of standstill: no data

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 81) General: Manufacturing (Division D)
- 82) Specific: Paper and Allied Product ( Major group 26)
- 83) Part of an industrial complex: no (0)
- 84) Transportation infrastructure associated: highway,

### Morphological criteria

- 85) Coefficient of occupation of soil (COS) 5 600 m<sup>2</sup>
- 86) Number of storeys: over 5
- 87) Configuration: vertical,
- 88) Spatial organization: articulated
- 89) Singularity stylistic: no (0)
- 90) Spatial continuity: yes (1)/
- 91) Type of structure: skeleton,
- 92) Spacing of the structure: no data

### State of the object before the intervention criteria

- 93) Technical condition: good,
- 94) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 95) Contamination of the land: no (0)

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## VALUE

### Value criteria:

- 21) Declaration of protection: yes (1)
- 22) Level of protection: National
- 23) Singularity: representative
- 24) Type of value: historical,

It was classified as monument historic.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 101) General: Units (U): U34 Commerce, finance, professional and information services,
- 102) Specific: U34 Offices
- 103) Year: 1985
- 104) Continuity of use: Yes (1)/
- 105) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 106) Type of actuation: Installation.
- 107) Planning of the intervention: Yes (1)/
- 108) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 109) Remains of the former name: Yes (1)
- 110) Reversibility: Possible,
- 111) Demolition: no (0)
- 112) Storage of the element removed: no (0)
- 113) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 114) Type of financial support: State, Administration local,
- 115) Property: Public,
- 116) Tenure of the land: Property,
- 117) Location of the investment: national

### **Social criteria:**

- 118) Job post: no data
- 119) Public target: age group,
- 120) Answer to a need: territorial,

The reconversion was an answer of the government to the problem of unemployment.

### **Bibliography**

Dumas Montreuil Atlas du Patrimoine de la Seine Saint Denis [http://www.atlas-patrimoine93.fr/pg-html/bases\\_doc/inventaire/fiche.php?idfic=048inv044](http://www.atlas-patrimoine93.fr/pg-html/bases_doc/inventaire/fiche.php?idfic=048inv044) (accessed July 6, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Grands Moulins Université Paris 7 Denis Diderot. Paris, France (code EFP1)**

### General data

- 96) Current name: Grands Moulins
- 97) Former name: Université Paris 7 Denis Diderot
- 98) Year of built: 1921
- 99) Year of standstill: 1996

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 100) General: Manufacturing (Division D)
- 101) Specific: Food and Kindred Products (Major Group 22)
- 102) Part of an industrial complex: yes (1)/
- 103) Transportation infrastructure associated: railway, port,

### Morphological criteria

- 104) Coefficient of occupation of soil (COS) around 13000 m2
- 105) Number of storeys: over 5
- 106) Configuration: vertical,
- 107) Spatial organization: compact,
- 108) Singularity stylistic: no (0)
- 109) Spatial continuity: yes (1)
- 110) Type of structure: skeleton,
- 111) Spacing of the structure: no data

### State of the object before the intervention criteria

- 112) Technical condition: good,
- 113) Integrity of the object: 4) remain the significant machinery
- 114) Contamination of the land: no (0)

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## VALUE

### Value criteria:

- 25) Declaration of protection: yes (1)/
- 26) Level of protection: National,
- 27) Singularity: representative
- 28) Type of value: historical, social, technique or and scientific, aesthetic,

It is declared as historic monument.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 121) General: Units (U) U35 Community services,
- 122) Specific: U35 University
- 123) Year: 2006
- 124) Continuity of use: no (0)
- 125) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 126) Type of actuation: inside to out, Installation.
- 127) Planning of the intervention: Yes (1)/
- 128) Significant change of the façade and morphology: Yes (1)

### **Ethic of value criteria:**

- 129) Remains of the former name: Yes (1)/
- 130) Reversibility: partial,
- 131) Demolition: no (0)
- 132) Storage of the element removed: no (0)
- 133) Existence of a centre of interpretation or museum: yes (1)/

### **Investment criteria:**

- 134) Type of financial support: State, Administration local, Administration Regional, Private, Sectorial,
- 135) Property: Mixed
- 136) Tenure of the land: Property
- 137) Location of the investment: National

### **Social criteria:**

- 138) Job post: no data
- 139) Public target: age group,
- 140) Answer to a need: local,

### **Observations:**

The ownership of the place is SEMAPA, an institution created in 1985 that joint to Administration of Paris with 57% of the capital, SNCF with 20%, the RIVP with 20%, the State with 5%, the region of Ile de France with 5% and private partners.

### **Bibliography**

Histoire, SEMAPA, Université Paris Diderot <http://www.univ-paris-diderot.fr/> (accessed July 5, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Nordwestdeutsche Museum für IndustrieKultur. Delmenhorst, Germany (code EGDE1)**

### General data

- 115) Current name: Nordwestdeutsche Museum für IndustrieKultur
- 116) Former name: Norddeutsche Wollkämmerei & Kammgarnspinnerei
- 117) Year of built: expressed in year 1884
- 118) Year of standstill: expressed in year 1984

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 119) General: Manufacturing (Division D)
- 120) Specific: Textile Mill Products (Major Group 22)
- 121) Part of an industrial complex: yes (1)
- 122) Transportation infrastructure associated: railway

### Morphological criteria

- 123) Coefficient of occupation of soil (COS) 2300
- 124) Number of storeys: 3-5
- 125) Configuration: horizontal
- 126) Spatial organization: compact
- 127) Singularity stylistic: no (0)
- 128) Spatial continuity: yes (1)
- 129) Type of structure: skeleton
- 130) Spacing of the structure: no data

### State of the object before the intervention criteria

- 131) Technical condition: good
- 132) Integrity of the object: 4) remain the significant machinery
- 133) Contamination of the land: no (0)

Observation: It is a textile manufactory of wool with structure of company town. It borders are dominated by the line of railway and a river. It has associated residential core and service core. A model with a social and functional stratification. It configuration is known as a city inside of other city. It had a capacity of 28 000 temporal workers of around the world. In the place are living an amount of 4000 inhabitants.

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## VALUE

### Value criteria:

- 29) Declaration of protection: yes (1)
- 30) Level of protection: National
- 31) Singularity: representative

32) Type of value: historical

Observations: The manufactory and the residential settlement are classified as historic monument known under the name of Denkmalshutz. It is Anchor point in the European Route of Industrial Heritage, ERIH. It is a site that was characterized for the immigration of worker force from East Europe. In this way the topic of the museum is worsted spinning and the condition of the young immigrant workers. The place is a representative example of the ideas of the industrial architecture in XIX Century.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 141) General: U36 Recreation, leisure, sport
- 142) Specific: U361 Museum
- 143) Year: 1996
- 144) Continuity of use: no (0)
- 145) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 146) Type of actuation: Installation.
- 147) Planning of the intervention: Yes (1)
- 148) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 149) Remains of the former name: Yes (1)
- 150) Reversibility: Possible,
- 151) Demolition: Yes (1)/
- 152) Storage of the element removed: no (0)
- 153) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 154) Type of financial support: Administration local
- 155) Property: Public
- 156) Tenure of the land: Property
- 157) Location of the investment: national

### **Social criteria:**

- 158) Job post: no data
- 159) Public target: wide
- 160) Answer to a need: local

Observations: The reuse is in a Museum of Industrial Culture. It was motivated by the located of some open air exhibitions during the World Expo 2000. As part of a complex, many infrastructure associated with the production are reuse, in factory museum, city museum, public university, job centre, Convention centre.

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Museum Küppersmühle. Duisburg, Germany. (code EGDU1)

#### General data

- 134) Current name: Museum Küppersmühle (MKM) Centre for Modern and Contemporary Art
- 135) Former name: Küppersmühle
- 136) Year of built: 1860
- 137) Year of standstill: 1973

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 2) Specific: Motor freight transportation and Warehousing (Major group 42)
- 3) Part of an industrial complex: yes (1)/
- 4) Transportation infrastructure associated: port,

#### Morphological criteria

- 5) Coefficient of occupation of soil (COS) 3600 m<sup>2</sup>
- 6) Number of storeys: 3-5,
- 7) Configuration: vertical,
- 8) Spatial organization: compact,
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)/
- 11) Type of structure: skeleton,
- 12) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 13) Technical condition: good,
- 14) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 15) Contamination of the land: no (0)

Observations: In 1969 the union between Werner and Nicola Germania Mühlenwerke and Küppers Mühlenwerken attributed this name. The installation is composed by a fabric building and metal silos which were adding in 1930.

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## VALUE

#### Value criteria:

- 33) Declaration of protection: yes (1)
- 34) Level of protection: National,
- 35) Singularity: representative
- 36) Type of value: historical,



It belongs to the Ruhr Heritage Trail. Its value is linked to the inner harbour. It is well known as the Breadbasket of the Ruhr area. The process conscience about its value emerged due to the attempt of demolition of the metal silos.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 161) General: Units (U): U36 Recreation, leisure, sport
- 162) Specific: U36 Museum of Art.
- 163) Year: 1999
- 164) Continuity of use: Yes (1)
- 165) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 166) Type of actuation: Installation.
- 167) Planning of the intervention: Yes (1)
- 168) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 169) Remains of the former name: yes (1)
- 170) Reversibility: Possible
- 171) Demolition: no (0)
- 172) Storage of the element removed: no (0)
- 173) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 174) Type of financial support: mixed
- 175) Property: Public
- 176) Tenure of the land: Property
- 177) Location of the investment: National

### **Social criteria:**

- 178) Job post: no data
- 179) Public target: wide,
- 180) Answer to a need: territorial,

Observations: the building was designed by the prestigious architect Herzog and the Meuron following the master plan of Norman Foster. There is the addition to the external image of the building of a body of stairs.

### **Bibliography**

Profile. Architecture. Organizer. The MKM – Centre for Modern and Contemporary Art <http://www.museum-kueppersmuehle.de/en/the-mkm/> (accessed July 13, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Zollverein UNESCO World Heritage Site. Essen, Germany (code EGE1)

(Kemnitz, Christina, Silke Ladnar and Corinne Valentin eds, 2012, 1-12)

#### General data

Code EGE1

- 138) Current name: Zollverein UNESCO World Heritage Site
- 139) Former name: Zollverein Coal Mine Industrial Complex
- 140) Year of built: 1926
- 141) Year of standstill: expressed in year 1986

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 142) General: mining (division B)
- 143) Specific: Coal mining (major group)
- 144) Part of an industrial complex: yes (1)
- 145) Transportation infrastructure associated: railway

#### Morphological criteria

- 146) Coefficient of occupation of soil (COS): 1000000 m<sup>2</sup>
- 147) Number of storeys: 5
- 148) Configuration: vertical
- 149) Spatial organization: articulated
- 150) Singularity stylistic: yes (1)
- 151) Spatial continuity: yes (1)
- 152) Type of structure: skeleton, load-bearing wall, mixed
- 153) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 154) Technical condition: good
- 155) Integrity of the object: 4) remain the significant machinery
- 156) Contamination of the land: yes (1) (NRTEE, 2003, A-27)

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## VALUE

### Value criteria:

- 37) Declaration of protection: yes (1)
- 38) Level of protection: World Heritage List
- 39) For the WHL year of declaration: 2001
- 40) Singularity: representative
- 41) Type of value: technique or and scientific, aesthetic,

Observations: It is the largest colliery in Europe. It is the only UNESCO World Heritage List in the region of the Ruhr. The complex included the central shaft Zollverein XII, Shafts 1/2/8, Coking Plant (Kokerie). The argumentation of the outstanding value was under the criterion (ii): "The Zollverein XII Coal Mine Industrial Complex is an exceptional industrial monument by virtue of the fact that its buildings are outstanding examples of the application

of the design concepts of the Modern Movement in architecture in a wholly industrial context", and the criterion (iii): "The technological and other structures of Zollverein XII are representative of a crucial period in the development of traditional heavy industries in Europe, which were reinforced through the parallel development and application of Modern Movement architectural designs of outstanding quality" (<http://whc.unesco.org/>)

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## **ADAPTIVE REUSE**

### **Functional criteria:**

- 1) Classification of the function: U341 Commerce, U342 finance, professional and information services, U350 Community services, U361 Recreation, leisure, U362 sport
- 2) Specific:  
U341 Commerce: restaurant, café, shop  
U342 Finance, professional and information services: research department, design workshop,  
U350 Community services: design faculty, regional dance school, kindergarten  
U361 Recreation, leisure: regional museum, art museum, art gallery, open air art gallery,  
U362 Sport: swimming pool, ice skating rink
- 3) Continuity of use: no (0)
- 4) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 5) Type of actuation: Installation
- 6) Planning of the intervention: Yes (1)
- 7) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 8) Remains of the former name: Yes (1)
- 9) Reversibility: possible
- 10) Demolition: Yes (1)/ no (0) (corresponding with no significant demolition)
- 11) Storage of the significant element removed: Yes (1)
- 12) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 13) Type of financial support: State, Administration Regional, Private, Sectorial.
- 14) Property: Mixed
- 15) Tenure of the land: Property
- 16) Location of the investment: national

### **Social criteria:**

- 17) Job post: no data
- 18) Public target: wide
- 19) Answer to a need: territorial

Observations: It is based on the term industrial culture. The main idea began from 1990 with the initiative of convert Zollverein Shaft XII in an international centre of culture. The program combines culture, dining, design, architecture, handcraft and other creative industry. The project objectives declared were the preservation of the cultural and natural heritage, stressing over the condition of authenticity and turning into a useful space for the public life. The ownership is the State Development Corporation of Northem Westphalia, Municipal Association of Ruhr, Veva Real State, Ruhrkohle AG a German Coal Mining Corporation. Its land is distributed in four administration but the greater part belong to Essen. The unemployment rate in Essen is the 11.9%, and the German average is the 6.2 %

for September, 2015. In ten years the unemployment rate was reduced from 16.9% in February, 2005 to 12.5% in February 2015 (<http://www.zeit.de/wirtschaft/2013-03/unemployment>)

## **REFERENCES**

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NRTEE. Cleaning the Past, Building a Future. A National Brownfield Re-development Strategy for Canada. (Ottawa: National Round Table on the Environment and the Economy 2003), A-27

Regional job markets. The Zeit online. <http://www.zeit.de/wirtschaft/2013-03/unemployment> (accessed June 14, 2016)

Zollverein Coal Mine Industrial Complex in Essen. World Heritage List. <http://whc.unesco.org/> (accessed June 13<sup>th</sup>, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

Speicherstadt, Hamburg, Germany (code EGH1)

### General data

- 157) Current name: Speicherstadt
- 158) Former name: Speicherstadt
- 159) Year of built: 1883 (Mende, 2002)
- 160) Year of standstill: expressed in year (1988)

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 161) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 162) Specific: Motor freight transportation and Warehousing (Major group 42)
- 163) Part of an industrial complex: yes (1)
- 164) Transportation infrastructure associated: railway, port,

### Morphological criteria

- 165) Coefficient of occupation of soil (COS) 630000 m<sup>2</sup>
- 166) Number of storeys: 3-5,
- 167) Configuration: vertical,
- 168) Spatial organization: compact
- 169) Singularity stylistic: yes (1)
- 170) Spatial continuity: yes (1)
- 171) Type of structure: skeleton
- 172) Spacing of the structure: Indicated in meter per meter

### State of the object before the intervention criteria

- 173) Technical condition: good,
- 174) Integrity of the object: 5) remain machinery
- 175) Contamination of the land: no (0)

Observations: It is located in the Hamburg port constituted the largest warehouses district in the world. It was created as custom free zone. It was dedicated to the stores of products but also to develop some manufacturing process. The building followed a neo-gothic design representative of the Hanoverian School. They are 11 buildings distributed in five and seven storeys.

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## VALUE

### Value criteria:

- 42) Declaration of protection: yes (1)
- 43) Level of protection: World Heritage List
- 44) Singularity: master piece
- 45) Type of value: historical, technique or and scientific, aesthetic,

Observations: In 1991 it was recognized and protected in the condition of Hamburg heritage site. In 2015 it was registered in the World Heritage List as part of the ensemble composed by Kontorhaus District with Chilehaus.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 181) General: U31 transport, communication networks, storage, protective works, U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.
- 182) Specific:
  - U31 transport, communication networks, storage, protective works: carpet warehouse
  - U341 Commerce: restaurant, café, food store, hotel
  - U342 finance, professional and information services: office
  - U35 Community services: foundation, information centre
  - U361 Recreation, leisure: museum, theatre
- 183) Year: 1999
- 184) Continuity of use: yes (1)
- 185) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 186) Type of actuation: Installation.
- 187) Planning of the intervention: Yes (1)
- 188) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 189) Remains of the former name: Yes (1)
- 190) Reversibility: Possible
- 191) Demolition: Yes (1)
- 192) Storage of the element removed: no (0)
- 193) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 194) Type of financial support: Local Administration, Regional Administration, Private
- 195) Property: Public
- 196) Tenure of the land: Property
- 197) Location of the investment: national

### **Social criteria:**

- 198) Job post: Amount of job posts generated with the new activities
- 199) Public target: wide
- 200) Answer to a need: territorial

Observations: As the process of recuperation, it was included in the area of the special zone that covered the project Hafencity quarter. The first actions was the construction of the Philharmonic Hall by the Pritzker prize architect Herzog and the Meuron. In 1988 the initial plan was open to privatization the 90 per cent of the land. The initiative of the civil representation, economic sector and workers in the senate stoped the development of this project. The major area is public property just a small part is

private that corresponds with Kehrwiederspitze, an area of 33000m<sup>2</sup>. To achieve the reuse of this area to purposes of offices, ludic and residential, it was necessary the revaluation of the land from port activities to business, entertainment and residential. In 2012, Hamburg Parliament, removed the law that limited the inclusion of activities not related with the port function. As an interest element, there is an intentional continuity of use in some of the building. The activity of store is maintained in this case oriented to the carpet store. Other relevant point is that the same public company that was before in charge of the management of the port has a dependency related with the real state and it is responsible of the management of the area. The land use is based on a horizontal and vertical diversity of activities.

The financial support comes majority from the private sector with an amount of 8 bn of Euros. The federal budget finances the construction of the subway with 100m of euros. The other part comes from Hamburg City in charge of the construction of communitarian functions like schools and Hafencity University, the Elbphilharmonie, and the Hanover Railroad Station and documentation centre. All of this outside of the budget. Other relevant strategic is the sale of terrain as well as the credits to financial the project of urban infrastructure. The land are related with brownfield not build for the construction with high density. (<https://hhla.de/en/history/speicherstadt/world-heritage.html>)

## REFERENCES

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Hamburg's Speicherstadt becomes UNESCO WORLD HERITAGE. HHAF. <https://hhla.de/en/history/speicherstadt/world-heritage.html> (accessed June 5, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Warehouse of LVR-Industriemuseum. Oberhausen, Germany (code EGO1)

#### General data

- 176) Current name: Peter Behrens Bau
- 177) Former name: warehouse of the Gutehoffnungshütte (GHH)
- 178) Year of built: 1920
- 179) Year of standstill: 1990

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 2) Specific: Motor freight transportation and Warehousing (Major group 42)
- 3) Part of an industrial complex: Yes (1)
- 4) Transportation infrastructure associated: railway,

#### Morphological criteria

- 5) Coefficient of occupation of soil (COS) around 36000m<sup>2</sup>
- 6) Number of storeys: over 5
- 7) Configuration: vertical,
- 8) Spatial organization: compact,
- 9) Singularity stylistic: yes (1)/
- 10) Spatial continuity: yes (1)/
- 11) Type of structure: skeleton
- 12) Spacing of the structure: 6x6

#### State of the object before the intervention criteria

- 13) Technical condition: good,
- 14) Integrity of the object 3) dismantling of the machinery and remain almost empty buildings
- 15) Contamination of the land: no (0)

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## VALUE

### Value criteria:

- 46) Declaration of protection: yes (1)
- 47) Level of protection: no data
- 48) Singularity: master piece
- 49) Type of value: historical, aesthetic,

#### Observations:

The complex was designed under rational thought of the conception of the building developed by Peter Behrens, pioneer in the rationalism movement. It was the main warehouse of Metallurgy Company of Gutehoffnungshütte.



## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 201) General: U31 transport, communication networks, storage, protective works,
- 202) Specific: U31 Warehouse of Museum
- 203) Year: 1998
- 204) Continuity of use: Yes (1)/
- 205) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 206) Type of actuation: Installation.
- 207) Planning of the intervention: Yes (1)/
- 208) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 209) Remains of the former name: no (0)
- 210) Reversibility: Possible,
- 211) Demolition: no (0)
- 212) Storage of the element removed: Yes (1)/
- 213) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 214) Type of financial support: Regional Administration
- 215) Property: Public,
- 216) Tenure of the land: Property,
- 217) Location of the investment: national

### **Social criteria:**

- 218) Job post: no data
- 219) Public target: sectorial,
- 220) Answer to a need: territorial,

### **Observations:**

The recuperation was made by regional administration and it is a central warehouse for the industrial museum of the region. It is associated to Industriemuseum LVR. It is a continuity of use.

### **Bibliography**

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Gasometer Oberhausen. Oberhausen, Germany (code EGO2)

#### General data

- 180) Current name: Gasometer Oberhausen
- 181) Former name: Gutehoffnungshütte Gasometer
- 182) Year of built: 1927
- 183) Year of standstill: 1988

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 184) General: Mining (Division B)
- 185) Specific: Oil and Gas Extraction (Major Group 13)
- 186) Part of an industrial complex: no (0)
- 187) Transportation infrastructure associated: any

#### Morphological criteria

- 188) Coefficient of occupation of soil (COS) 3587
- 189) Number of storeys: over 5
- 190) Configuration: vertical
- 191) Spatial organization: compact
- 192) Singularity stylistic: no (0)
- 193) Spatial continuity: yes (1)
- 194) Type of structure: skeleton
- 195) Spacing of the structure: 67 m diameter

#### State of the object before the intervention criteria

- 196) Technical condition: good
- 197) Integrity of the object: 4) remain the significant machinery
- 198) Contamination of the land: yes (1)

---

## VALUE

### Value criteria:

- 50) Declaration of protection: yes (1)/
- 51) Level of protection: national (Deutsche Stiftung Denkmalschutz. <https://en.wikipedia.org>)
- 52) Singularity: representative
- 53) Type of value: historic

Observations: It was the largest deposit of gas in Europe with an effective volume of 347,000 cubic metres. The store of gas was a measure to save the excess of gas produced and don't required in the moment. During the Second World War, the structure was hit by the bombs but it was in 1946 when a fire during reparation work destroyed the installation madding necessary the rebuilding. Some part of the pre-existent structure were reuse. This object is included in the Regional Route of the Ruhr as well

as it is considered as an anchor point in the European Route of Industrial Heritage ERIH. Its major value is the fact that is regular industrial structure without strong relevance that is became in element of reference in the milestone of the regional industrial heritage. (Erih, <http://www.erih.net/anchor-points.html>)

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 221) General: Units (U): U36 Recreation, leisure, sport
- 222) Specific: U361 Recreation, leisure: Exhibition Hall
- 223) Year: 1994
- 224) Continuity of use: no (0)
- 225) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 226) Type of actuation: Installation
- 227) Planning of the intervention: Yes (1)
- 228) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 229) Remains of the former name: Yes (1)
- 230) Reversibility: Possible
- 231) Demolition: no (0)
- 232) Storage of the element removed: no (0)
- 233) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 234) Type of financial support: State, local administration, European Union
- 235) Property: Public
- 236) Tenure of the land: Property
- 237) Location of the investment: national

### **Social criteria:**

- 238) Job post: no data
- 239) Public target: wide
- 240) Answer to a need: territorial

Observations: The infrastructure was object of potential demolition. The mobilization of the citizen of Oberhausen, the city council and the Regional Government of NRW and the Emscher Park International Building Exhibition achieved to include in the proposal of the plan of Emscher Park and reconverted. The property that belonged before to Ruhrkohle AG (RAG), payed an equivalent amount

of 1.8 million of Deutsche Mark (DM) equivalent to 920325 Euros to the Oberhausen City for avoid the demolition (Industriedenkmäler. Gasometer. <https://www.uni-due.de>). The property was transfer to the City of Oberhausen which is inside of the state of North Rhein Westfalen which lead in the project of European Route of the Industrial Heritage (ERIH, <http://www.erih.net/anchor-points.html>) (Industrial Culture. History. <http://www.gasometer.de/>)

- 1) Estimated cost: 16 million DM equivalent to 8129542 Euros (Industriedenkmäler. Gasometer. <https://www.uni-due.de>).

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery. Ferrara, Italy (code EIF1)**

### General data

- 199) Current name: Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery
- 200) Former name: Zuccherificio Eridania S. A.
- 201) Year of built: 1900
- 202) Year of standstill: 1967

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 203) General: Manufacturing (Division D)
- 204) Specific: Food and kindred Product (Major Group 22)
- 205) Part of an industrial complex: no (0)
- 206) Transportation infrastructure associated: railway, berth

### Morphological criteria

- 207) Coefficient of occupation of soil (COS) 6200 m2
- 208) Storeys: 3-5
- 209) Configuration: vertical
- 210) Spatial organization: articulated
- 211) Singularity stylistic: no (0)
- 212) Spatial continuity: yes (1)
- 213) Type of structure: skeleton,
- 214) Spacing of the structure: no data

### State of the object before the intervention criteria

- 215) Technical condition: good
- 216) Integrity of the object 3) dismantling of the machinery and remain almost empty buildings
- 217) Contamination of the land: no (0)

Observations:

I was the most important sugar mill of the company Eridania S. A.

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## VALUE

### Value criteria:

- 54) Declaration of protection: no data
- 55) Level of protection: -

- 56) Singularity: representative  
57) Type of value: historic,
- 

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 241) General: Units (U): U35 Community services  
242) Specific: U35 University  
243) Year: 1995  
244) Continuity of use: no (0)  
245) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 246) Type of actuation: Installation.  
247) Planning of the intervention: Yes (1)  
248) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 249) Remains of the former name: Yes (1)  
250) Reversibility: Possible  
251) Demolition: Yes (1)  
252) Storage of the element removed: no (0)  
253) Existence of a centre of interpretation or museum: yes (1)/

### **Investment criteria:**

- 254) Type of financial support: international regional union  
255) Property: Public  
256) Tenure of the land: Usufruct  
257) Location of the investment: foreign

### **Social criteria:**

- 258) Job post: Amount of job posts generated with the new activities  
259) Public target: age group  
260) Answer to a need: local

### **Observations:**

The recuperation of the infrastructure was planning from 1985 and 1988 by the Arch. Stefano Marini. The first ideas were oriented to the incorporation of exhibition areas. The property was giving usufruct to the University of Ferrara in a term of 99 years. It was demolished buildings related with the indirect infrastructure. The actions developed over the complex are rehabilitation and renovation. The support for the project came from the European Funds for the Regional development, FESR. The main transformation is in the space of classroom where from and unique space pass to a configuration in three levels.

### **Bibliography**

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Base coworking, MUDEC Museum, Scenery Workshop of the Scala Theatre. Milan, Italy  
(code EIM1)**

### General data

- 218) Current name: Base coworking, MUDEC Museum, Scenery Workshop of the Scala Theatre
- 219) Former name: Acciaierie Ansaldo
- 220) Year of built: 1904
- 221) Year of standstill: 1986

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 222) General: Manufacturing (division D)
- 223) Specific: Transmission And Distribution Equipment transformer (Major group 36)
- 224) Part of an industrial complex: yes (1)
- 225) Transportation infrastructure associated: railway

### Morphological criteria

- 226) Coefficient of occupation of soil (COS) 70 000 m2
- 227) Number of storeys: 3-5
- 228) Configuration: vertical
- 229) Spatial organization: compact
- 230) Singularity stylistic: no (0)
- 231) Spatial continuity: yes (1)
- 232) Type of structure: skeleton
- 233) Spacing of the structure: no data

### State of the object before the intervention criteria

- 234) Technical condition: good,
- 235) Integrity of the object. 3) dismantling of the machinery and remain almost empty buildings
- 236) Contamination of the land: no (0)

Observations: The Ansaldo Steelworks was the core for important industrial enterprise like Zust, AEG and Galileo Ferraris. After was a reconverted in warehouse for tramway and locomotive for the exportation.

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## VALUE

### Value criteria:

- 58) Declaration of protection: no data
- 59) Level of protection: no data



- 60) Singularity: representative
  - 61) Type of value: aesthetic, historic
- 

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 261) General: Units (U): U22 industry and manufacturing, U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport
- 262) Specific:
  - U22 Scenery workshop
  - U34 Coworking
  - U36 Exhibition areas, Museum
- 263) Year: 1990
- 264) Continuity of use: Yes (1)
- 265) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 266) Type of actuation: Add on, Installation.
- 267) Planning of the intervention: no (0)
- 268) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 269) Remains of the former name: no (0)
- 270) Reversibility: Possible
- 271) Demolition: no (0)
- 272) Storage of the element removed: no (0)
- 273) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 274) Type of financial support: Mixed, Administration local and Private
- 275) Property: Public
- 276) Tenure of the land: Property
- 277) Location of the investment: National

### **Social criteria:**

- 278) Job post: no data
- 279) Public target: wide
- 280) Answer to a need: local

Observations: In 1990 the property passed to the Municipality of Milan. The uses of the building is shared among diverse institution Scala Theatre and private sector. The main activities developed in the interior are the Scenery Workshop of the Scala Theatre, Base Coworking and Exhibition Areas and a MUDEC Museum. The Museum was designed by the recognized architect David Chipperfield. The process of recuperation was developed in progressive way. First with a continuity of use as warehouse, dedicated to the Scala Theatre and then the inclusion of other alternative uses. There was not the present of a master plan and the action took placed as independent unit.

From the total 5 500 m2 are dedicated to cultural organizations. It is a core for the discussion about urban regeneration and synergies. It is oriented to the developed of the youth population promoting

their initiatives. The Administration of Milan together with private sector are the main sponsor. The profile of Base, is oriented to the creation of a core for the enterprise, formation and experimentation in the field of the culture. It covers a surface of 6000 m2. The investment was developed by Ari Milano, Avanzi, Esterni, H+ e Make a Cube 3 together with the local administration. The program of Base also included accommodations. In term of intervention the activities of coworking and workshop follow the installation actuation and the museum the add on.

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Fondazione Arnaldo Pomodoro. Milan, Italy (code EIM2)

#### General data

- 237) Current name: Fondazione Arnaldo Pomodoro
- 238) Former name: Acciaierie Riva Calzoni
- 239) Year of built: 1897
- 240) Year of standstill: 1998

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 241) General: Manufacturing (Division D)
- 242) Specific: Primary Metal Industries (Major Group 33)
- 243) Part of an industrial complex: yes (1)
- 244) Transportation infrastructure associated: railway

#### Morphological criteria

- 245) Coefficient of occupation of soil (COS) 170000 m2
- 246) Number of storeys: 1-2
- 247) Configuration: horizontal,
- 248) Spatial organization: compact,
- 249) Singularity stylistic: no (0)
- 250) Spatial continuity: yes (1)
- 251) Type of structure: skeleton
- 252) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 253) Technical condition: good
- 254) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 255) Contamination of the land: no (0)

Observations: Its production was oriented to the elaboration of hydraulic engines and pumps. Two engines produced here were located in the Niagara Fall.

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## VALUE

#### Value criteria:

- 62) Declaration of protection: no data
- 63) Level of protection: no data
- 64) Singularity: representative
- 65) Type of value: historic

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## ADAPTIVE REUSE

### Functional criteria:

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 281) General: Units (U): U36 Recreation, leisure, sport
- 282) Specific: U36 Exhibition Area
- 283) Year: 2005
- 284) Continuity of use: no (0)
- 285) Correspondence with the land use for the area: Yes (1)

### Architectural Intervention criteria:

- 286) Type of actuation: Installation.
- 287) Planning of the intervention: Yes (1)
- 288) Significant change of the façade and morphology: no (0)

### Ethic of value criteria:

- 289) Remains of the former name: no (0)
- 290) Reversibility: Possible
- 291) Demolition: Yes (1)
- 292) Storage of the element removed: no (0)
- 293) Existence of a centre of interpretation or museum: no (0)

### Investment criteria:

- 294) Type of financial support: Private
- 295) Property: Private
- 296) Tenure of the land: Property
- 297) Location of the investment: National

### Social criteria:

- 298) Job post: no data
- 299) Public target: wide
- 300) Answer to a need: local

Observations: the reconversion of the places was in the beginning destined for the hold the Foundation of Arnaldo Pomodoro. Nowadays it doesn't have a permanent use and its function oscillate in the frame of cultural and administrative.

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Teatro e Silos Armani. Milan, Italy (code EIM3)

#### General data

- 256) Current name: Teatro e Silos Armani
- 257) Former name: Nestle Chocolate factory
- 258) Year of built: 1950
- 259) Year of standstill: before 2000 but there is not the precise data

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 260) General: Transportation, communications, electric, gas and sanitary services (Division E)
- 261) Specific: Motor freight transportation and Warehousing (Major group 42)
- 262) Part of an industrial complex: yes (1)
- 263) Transportation infrastructure associated: railway

#### Morphological criteria

- 264) Coefficient of occupation of soil (COS) 12000 m<sup>2</sup>
- 265) Number of storeys: 3-5
- 266) Configuration: vertical
- 267) Spatial organization: compact,
- 268) Singularity stylistic: yes (1)
- 269) Spatial continuity: no (0)
- 270) Type of structure: load-bearing wall
- 271) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 272) Technical condition: good
- 273) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 274) Contamination of the land: no (0)

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## VALUE

#### Value criteria:

- 66) Declaration of protection: no (0)
  - 67) Level of protection: non-recognized
  - 68) Singularity: representative
  - 69) Type of value: aesthetic
-

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 301) General: Units U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport
- 302) Specific:  
U34 Offices  
U36 Museum, theatre, archive
- 303) Year: 2000-2015
- 304) Continuity of use: no (0)
- 305) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 306) Type of actuation: Installation.
- 307) Planning of the intervention: Yes (1)
- 308) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 309) Remains of the former name: Yes (1)
- 310) Reversibility: Possible
- 311) Demolition: Yes (1)
- 312) Storage of the element removed: no (0)
- 313) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 314) Type of financial support: Private
- 315) Property: Private
- 316) Tenure of the land: Property
- 317) Location of the investment: National

### **Social criteria:**

- 318) Job post: no data
- 319) Public target: sectorial
- 320) Answer to a need: local

Observations: the project was made by the Arch. Tadao Ando under an action of revitalization. From the total 4500 m2 are dedicate to expositions and 2000 to theatre. Also the place count with a space for the memory of the former production. Other complementary uses are café shop and a space for work. The cost of the intervention was 50 million. The lines of the actuation is spatial continuity like a forum. The project cover the Nestle factory of chocolate and its warehouse. In the first is located the theatre that was the first intervention.

### **Bibliography.**

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# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

## Manifattura Tabacchi. Milan, Italy (code EIM4)

### General data

- 275) Current name: Manifattura Tabacchi
- 276) Former name: Manifattura Tabacchi
- 277) Year of built: 1929
- 278) Year of standstill: 2000

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Manufacturing ( Division D)
- 2) Specific: Tobacco Product (Major group 21)
- 3) Part of an industrial complex: yes (1)
- 4) Transportation infrastructure associated: highway

### Morphological criteria

- 5) Coefficient of occupation of soil (COS) 760 000 m2
- 6) Number of storeys: 3-5,
- 7) Configuration: vertical
- 8) Spatial organization: articulated
- 9) Singularity stylistic: yes (1)
- 10) Spatial continuity: yes (1)
- 11) Type of structure: skeleton
- 12) Spacing of the structure: no data

### State of the object before the intervention criteria

- 13) Technical condition: good
- 14) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 15) Contamination of the land: no (0)

Observations: the object present an architecture in eclectic style in the majority of the building. The entrance, it is designed following the Rationalism.

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## VALUE

### Value criteria:

- 70) Declaration of protection: yes (1)
- 71) Level of protection: National
- 72) Singularity: representative
- 73) Type of value: historical

It is an example of the eclecticism of the beginning of the XX Century.

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 321) General: Units (U): U35 Community services, U36 Recreation, leisure, sport and U37 residential.
- 322) Specific:
- 323) U361 Museum  
U350 Educational  
U370 residential
- 324) Year: 2000
- 325) Continuity of use: no (0)
- 326) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 327) Type of actuation: Installation.
- 328) Planning of the intervention: Yes (1)
- 329) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 330) Remains of the former name: Yes (1)
- 331) Reversibility: partial
- 332) Demolition: Yes (1)
- 333) Storage of the element removed: no (0)
- 334) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 335) Type of financial support: Administration local, Administration Regional, Private,
- 336) Property: Public and Private
- 337) Tenure of the land: Property
- 338) Location of the investment: national

### **Social criteria:**

- 339) Job post: no data
- 340) Public target: wide
- 341) Answer to a need: regional

Observations: The project is part of the general regional plan of the Lombardi. The transformation was possible due to the change of land use where the land was re-qualified from industrial use to Special Zone Z21 for use mixed. There is the cohabitation of the public and the private sector. The property is divided by object under diverse ownership. The private use are residential and commerce and the public one are Experimental Centre of Cinema, The civic school of cinema, the audio visual pole, the student resident, the temporary residence, the social residence and the centre for old people. The property belong to the former Company of Tobacco. It is a private and public property operated by public and private sector.

### **Bibliography**



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[http://www.comune.milano.it/wps/portal/ist/it/servizi/territorio/pianificazione\\_urbanistica\\_attuativa/progetti\\_attuazione/area\\_nord-est/pii\\_manifatturatabacchi](http://www.comune.milano.it/wps/portal/ist/it/servizi/territorio/pianificazione_urbanistica_attuativa/progetti_attuazione/area_nord-est/pii_manifatturatabacchi) (accessed July 4, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Centro Tecnofin Servizi. Rovereto, Italy (code EIR1)

#### General data

- 279) Current name: Centro Tecnofin Servizi (BIC)
- 280) Former name: Cotonificio di Rovereto. Pirelli
- 281) Year of built: no data
- 282) Year of standstill: 1982

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 283) General: Manufacturing (Division D)
- 284) Specific: Textile Mill Products ( Major Group 22)
- 285) Part of an industrial complex: Yes (1)
- 286) Transportation infrastructure associated: railway

#### Morphological criteria

- 287) Coefficient of occupation of soil (COS) 25 400 m2
- 288) Number of storeys: 1-2,
- 289) Configuration: horizontal
- 290) Spatial organization: compact,
- 291) Singularity stylistic: no (0)
- 292) Spatial continuity: yes (1)/
- 293) Type of structure: skeleton,
- 294) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 295) Technical condition: good
- 296) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 297) Contamination of the land: no (0)

Observations: the Cotton factory of Rovereto, Cotonificio Roveretano, after Pirelli, its production was dedicated to the cotton spinning that after it will use in the elaboration of tyre and electric wire. The raw material came from the Pinelli Plant in Lainate. It is located in the periphery of the city.

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## VALUE

#### Value criteria:

- 74) Declaration of protection: no (0)
  - 75) Level of protection: non-recognized
  - 76) Singularity: representative
  - 77) Type of value: historic, social,
-

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 342) General: U34 Commerce, finance, professional and information services
- 343) Specific: U341 Offices and scientific centre
- 344) Year: 1986
- 345) Continuity of use: Yes (1)
- 346) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 347) Type of actuation: Add on, Installation
- 348) Planning of the intervention: Yes (1)
- 349) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 350) Remains of the former name: Yes (1)
- 351) Reversibility: Possible
- 352) Demolition: Yes (1)
- 353) Storage of the element removed: no (0)
- 354) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 355) Type of financial support: Administration local
- 356) Property: Public
- 357) Tenure of the land: Property
- 358) Location of the investment: national

### **Social criteria:**

- 359) Job post: no data
- 360) Public target: sectorial
- 361) Answer to a need: territorial

Observations: The project of reconversion had the basis in the Master Plan developed in 1986 by Arch. Franco Mancuso, and architectural project of reconversion by the Ing. Rolando Segatta in 1986 and other of new building, for the civic centre in 1990 by the Arch. Franco Mancuso. The intervention was motivate by the Provincial Administration of Trento. It was demolished part of the factory of no relevance like deposit and offices as well as it was built new buildings. The new functions are addresses to business, laboratories and all the necessary infrastructure for a technological park. Also it was built a Civic centre.

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Progetto Manifattura. Rovereto, Italy (code EIR2)

#### General data

- 298) Current name: Progetto Manifattura
- 299) Former name: Manifattura Tabacchi di Sacco
- 300) Year of built: 1857
- 301) Year of standstill: 2008

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 302) General: Manufacturing ( Division D)
- 303) Specific: Tobacco Product (Major group 21)
- 304) Part of an industrial complex: yes (1)/
- 305) Transportation infrastructure associated: berth

#### Morphological criteria

- 306) Coefficient of occupation of soil (COS) 28 000 m2
- 307) Number of storeys: 3-5,
- 308) Configuration: horizontal
- 309) Spatial organization: articulated
- 310) Singularity stylistic: no (0)
- 311) Spatial continuity: yes (1)
- 312) Type of structure: skeleton
- 313) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 314) Technical condition: good
- 315) Integrity of the object: 4) remain the significant machinery
- 316) Contamination of the land: no (0)

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## VALUE

#### Value criteria:

- 78) Declaration of protection: yes (1)
  - 79) Level of protection: National,
  - 80) Singularity: representative
  - 81) Type of value: historical,
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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 362) General: Units (U): U22 industry and manufacturing U34 Commerce, finance, professional and information services, U35 Community services,
- 363) Specific:
  - U22 Manufactory
  - U34 Offices
  - U35 University
- 364) Year: 2014
- 365) Continuity of use: Yes (1)/
- 366) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 367) Type of actuation: Add on, Put on, Installation.
- 368) Planning of the intervention: Yes (1)
- 369) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 370) Remains of the former name: Yes (1)
- 371) Reversibility: Possible
- 372) Demolition: no (0)
- 373) Storage of the element removed: no (0)
- 374) Existence of a centre of interpretation or museum: yes (1) Archives

### **Investment criteria:**

- 375) Type of financial support: Administration Regional, private
- 376) Property: Public
- 377) Tenure of the land: Property
- 378) Location of the investment: national

### **Social criteria:**

- 379) Job post: no data
- 380) Public target: sectorial
- 381) Answer to a need: territorial

### **Observations.**

The space is already in use but the whole project should finished for 2018. It was created under the direction of a master plan and criteria of sustainability. The reuse followed the model of incubator of enterprise and it coordinated by the regional administration.

### **Bibliography**

Master plan of Progetto Manifattura

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

University of Verona. Department of Enterprise Administration and Social Science. (EIV1)

### General data

- 317) Current name: University of Verona. Department of Enterprise Administration and Social Science.
- 318) Former name: Panificio della Caserma Santa Marta
- 319) Year of built: 1863
- 320) Year of standstill: no data

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 321) General: Manufacturing (Division D)
- 322) Specific: Food and Kindred Products (Major Group 22)
- 323) Part of an industrial complex: no (0)
- 324) Transportation infrastructure associated: railway

### Morphological criteria

- 325) Coefficient of occupation of soil (COS) 25 000 m<sup>2</sup>
- 326) Number of storeys: 3-5,
- 327) Configuration: vertical,
- 328) Spatial organization: compact,
- 329) Singularity stylistic: no (0)
- 330) Spatial continuity: yes (1)/
- 331) Type of structure: skeleton,
- 332) Spacing of the structure: no data

### State of the object before the intervention criteria

- 333) Technical condition: good,
- 334) Integrity of the object: 3) dismantling of the machinery and remain almost empty building
- 335) Contamination of the land: no (0)

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## VALUE

### Value criteria:

- 82) Declaration of protection: no data
- 83) Level of protection: no data
- 84) Singularity: representative
- 85) Type of value: historical,

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 382) General: Units (U): U35 Community services,
- 383) Specific: U35 University
- 384) Year: 2015
- 385) Continuity of use: no (0)
- 386) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 387) Type of actuation: Installation.
- 388) Planning of the intervention: Yes (1)/
- 389) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 390) Remains of the former name: Yes (1)/
- 391) Reversibility: Possible,
- 392) Demolition: no (0)
- 393) Storage of the element removed: no (0)
- 394) Existence of a centre of interpretation or museum: yes (1)/

### **Investment criteria:**

- 395) Type of financial support: State, Administration local,
- 396) Property: Public,
- 397) Tenure of the land: Property,
- 398) Location of the investment: national

### **Social criteria:**

- 399) Job post: no data
- 400) Public target: sectorial,
- 401) Answer to a need: local,

### **Observations:**

The amount of the inversion was 35 143 823,20 euro. The financial support came from the budget, the local administration as buy credit by the European Bank of Inversion, Unicredit and BEI. The operations over the building were restauration and adaptation of the space to the educational requirements. Also it is classified as a project of recuperation.

### **Bibliography**

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Arsenale di Venezia. Venice , Italy (code EIVE1)

#### General data

- 336) Current name: Arsenale di Venezia
- 337) Former name: Arsenale di Venezia
- 338) Year of built: 1104
- 339) Year of standstill: 1957

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 340) General: Manufacturing (Division D)
- 341) Specific: Transportation Equipment (Major Group 37)
- 342) Part of an industrial complex: yes (1)
- 343) Transportation infrastructure associated: railway, port,

#### Morphological criteria

- 344) Coefficient of occupation of soil (COS) 151114 m2
- 345) Number of storeys: 1-2,
- 346) Configuration: horizontal,
- 347) Spatial organization: articulated
- 348) Singularity stylistic: yes (1)
- 349) Spatial continuity: yes (1)
- 350) Type of structure: skeleton
- 351) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 352) Technical condition: good
- 353) Integrity of the object: 4) remain the significant machinery
- 354) Contamination of the land: no (0)

Observation: It was a complex oriented to the construction of ships. It hosted the activities of shipyard and armoury. During the period of Early Middle Ages and the Modern Ages was property of the Republic of Venice. Its beginning are in XII and during its evolution was object of transformations, expansion and modernizations. Before the first Industrial Revolution, it was the largest complex in Europe. The innovation was in the mass construction of ships. In 1473 it was built the Arsenal Novissimo and it introduced a serial system of production. During the XVI, the arsenal was enlarge to allow the construction of galeazze ship. The construction of the Arsenal was progressive as was conditioned by the process of modernization or enlarge of its capacity. It is a perfect example of overlapping of historical periods. The growth of the Arsenal was in direction of conquer the water land. Its ship production contributed to the conquest of the Aegean See as well as the travels to North Europe. It is considered the first factory in the history.



The same condition that motivated its development placed it in a state of obsolescence. The maritime trade requirements of the current society, demands larger infrastructures for the construction of ship. The activity of shipyard was transferred to mainland standstill the Arsenal production. The arsenal was working until the First World War.

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## **VALUE**

### **Value criteria:**

- 86) Declaration of protection: yes (1)
- 87) Level of protection: National
- 88) Singularity: master piece/
- 89) Type of value: historical, social, technique or and scientific, aesthetic,

Observations: From the dimension of complex has cultural, landscape and historic value. Other individual object present architectural value like the nave of Galeazze, of Nappe, of Cristoforo, of Novissime. According the value attributed to the whole or individual objects is the scope of the possible actions. In 2001 the complex was declared under protection as cultural and landscape interest property. The city of Venice is registered in the World Heritage List.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 402) General: Units (U): U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport
- 403) Specific:
  - U34 Commerce, finance, professional and information services: Centre for the conservation of antique ship
  - U35 Community services: University, Research Centre
  - U36 Recreation, leisure, sport: Museum, Exhibition Areas
- 404) Year: 1980
- 405) Continuity of use: no (0)
- 406) Correspondence with the land use for the area: no (0)

### **Architectural Intervention criteria:**

- 407) Type of actuation: Installation.
- 408) Planning of the intervention: no (0)
- 409) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 410) Remains of the former name: Yes (1)/
- 411) Reversibility: Possible
- 412) Demolition: no (0)
- 413) Storage of the element removed: no (0)
- 414) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 415) Type of financial support: Administration local
- 416) Property: Public

- 417) Tenure of the land: Property
- 418) Location of the investment: national

**Social criteria:**

- 419) Job post: no data
- 420) Public target: wide,
- 421) Answer to a need: territorial,

Observation: The arsenal of Venice is property of the Venice Administration in 2013. It was created an Association for its enhancing, under the name of Arsenale di Venezia S.p.A. It form is a public real state. A group of actions took places after 1980 in post the recuperation of the infrastructures. The Biennale of Venice was visionary to appreciate the competences of its components for other uses. A great variety of agents have interacted with the structures. Function like educational, research, residential, cultural were performance in this facilities. This situation brought to consider an integral planning for the complex. It was created a space under the name of Parteciparsenale for the development of possible scenarios for the planning of the Arsenal. This frame allows the integration of the plan of the Arsenal with the territorial planning of the metropolitan area of Venice and the region. In 2015 was made a new director plan for the whole complex.

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## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Museum of the Electricity. Lisbon, Portugal (code EPLI1)

#### General data

- 355) Current name: Museum of the Electricity
- 356) former name: Central Tejo
- 357) Year of built: 1909
- 358) Year of standstill: 1972

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Transportation, Communications, Electric, Gas, And Sanitary Services (Division E)
- 2) Specific: Electric, Gas, And Sanitary Services (Major group 49)
- 3) Part of an industrial complex: yes (1)/
- 4) Transportation infrastructure associated: railway, port,

#### Morphological criteria

- 5) Coefficient of occupation of soil (COS) 38 000 m<sup>2</sup>
- 6) Number of storeys: over 5
- 7) Configuration: vertical,
- 8) Spatial organization: articulated
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)/
- 11) Type of structure: skeleton,
- 12) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 13) Technical condition: good,
- 14) Integrity of the object: 5) remain machinery
- 15) Contamination of the land: no (0)

Observations:

It was a thermoelectric station that belong to Companhias Reunidas de Gás e Electricidade. It was the supply of power for the city of Lisbon.

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## VALUE

#### Value criteria:

- 90) Declaration of protection: yes (1)/
- 91) Level of protection: National,
- 92) Singularity: representative
- 93) Type of value: historical, social, technique or and scientific, aesthetic,

It was the bigger power station of Portugal until the middle of XX. It was relevant in the process of modernization of the city of Lisbon and the inclusion of the tramway. The complex is classified as property of public interest (Imóvel de Interesse Público) from 1986.

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## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 422) General: U36 Recreation, leisure, sport and
- 423) Specific: U36 Museum
- 424) Year: 1990
- 425) Continuity of use: no (0)
- 426) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 427) Type of actuation: Installation.
- 428) Planning of the intervention: Yes (1)/
- 429) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 430) Remains of the former name: Yes (1)/
- 431) Reversibility: Possible,
- 432) Demolition: no (0)
- 433) Storage of the element removed: Yes (1)/
- 434) Existence of a centre of interpretation or museum: yes (1)/

### **Investment criteria:**

- 435) Type of financial support: Private,
- 436) Property: Private
- 437) Tenure of the land: Property,
- 438) Location of the investment: national

### **Social criteria:**

- 439) Job post: no data
- 440) Public target: wide,
- 441) Answer to a need: territorial,

## **Bibliography**

Central Tejo Fundacao edp <http://fundacaoedp.pt/> (accessed July 5, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

## LX Factory. Lisbon, Portugal (code EPLI2)

### General data

- 359) Current name: LX Factory
- 360) Former name: Companhia de Fiação e Tecidos Lisbonense,
- 361) Year of built: expressed in year 1846
- 362) Year of standstill: no data

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 363) General: Manufacturing (Division D)
- 364) Specific: Printing, publishing and Allied Industries (major group 27)
- 365) Part of an industrial complex: yes (1)/ no (0)
- 366) Transportation infrastructure associated: railway, port, highway,

### Morphological criteria

- 367) Coefficient of occupation of soil (COS) 23.000 m2
- 368) Number of storeys: 1-2,
- 369) Configuration: v, horizontal,
- 370) Spatial organization: articulated
- 371) Singularity stylistic: no (0)
- 372) Spatial continuity: yes (1)/
- 373) Type of structure: skeleton,
- 374) Spacing of the structure: no data

### State of the object before the intervention criteria

- 375) Technical condition: good,
- 376) Integrity of the object: 4) remain the significant machinery
- 377) Contamination of the land: no (0)

Observations:

In the beginning it belong to the Companhia de Fiação e Tecidos Lisbonense, and after it was reconverted in a printing factory. It was considered one of the bigger manufactories of the city during XIX.

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## VALUE

### Value criteria:

- 94) Declaration of protection: yes (1)
- 95) Level of protection National,
- 96) Singularity: representative
- 97) Type of value: historical,

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 442) General: U34 Commerce, finance, professional and information services,
- 443) Specific: U34 Commerce, Offices, Coworking, restaurant, café, bar,
- 444) Year: 2000
- 445) Continuity of use: Yes (1)/
- 446) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 447) Type of actuation: Installation.
- 448) Planning of the intervention: Yes (1)/
- 449) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 450) Remains of the former name: no (0)
- 451) Reversibility: Possible,
- 452) Demolition: Yes (1)
- 453) Storage of the element removed: Yes (1)
- 454) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 455) Type of financial support: Private,
- 456) Property: Private
- 457) Tenure of the land: Property,
- 458) Location of the investment: National

### **Social criteria:**

- 459) Job post: no data
- 460) Public target: wide,
- 461) Answer to a need: local

## **Bibliography**

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[http://www.monumentos.pt/Site/APP\\_PagesUser/SIPA.aspx?id=26069](http://www.monumentos.pt/Site/APP_PagesUser/SIPA.aspx?id=26069) (accessed July 23, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Manufaktura. Lodz, Poland (code EPLO1)

#### General data

- 378) Current name: Manufaktura
- 379) Former name: Textile Manufacture of Izrael Poznański
- 380) Year of built: 1877
- 381) Year of standstill: 1992

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 382) General: Manufacturing (Division D)
- 383) Specific: Textile Mill Products ( Major Group 22)
- 384) Part of an industrial complex: yes (1)/
- 385) Transportation infrastructure associated: railway,

#### Morphological criteria

- 386) Coefficient of occupation of soil (COS) 30 000 m<sup>2</sup>
- 387) Number of storeys: 3-5,
- 388) Configuration: horizontal,
- 389) Spatial organization: articulated
- 390) Singularity stylistic: no (0)
- 391) Spatial continuity: yes (1)/
- 392) Type of structure: skeleton,
- 393) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 394) Technical condition: good
- 395) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 396) Contamination of the land: no (0)

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## VALUE

#### Value criteria:

- 98) Declaration of protection: yes (1)
- 99) Level of protection: National
- 100) Singularity: representative
- 101) Type of value: historical,

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## ADAPTIVE REUSE

#### Functional criteria:

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 462) General: Units (U): U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport
- 463) Specific:
  - U341 Hotel
  - U340 Commerce centre
  - U340 Restaurant
  - U361 Cultural centre
  - U360 Museum city, Museum of the Activity
  - U362 Sport centre
- 464) Year: 2006
- 465) Continuity of use: no (0)
- 466) Correspondence with the land use for the area: Yes (1)/

**Architectural Intervention criteria:**

- 467) Type of actuation: Add on
- 468) Planning of the intervention: Yes (1)/
- 469) Significant change of the façade and morphology: no (0)

**Ethic of value criteria:**

- 470) Remains of the former name: Yes (1)
- 471) Reversibility: partial
- 472) Demolition: Yes (1)/
- 473) Storage of the element removed: Yes (1)/
- 474) Existence of a centre of interpretation or museum: yes (1)

**Investment criteria:**

- 475) Type of financial support: Private,
- 476) Property: Private
- 477) Tenure of the land: Property
- 478) Location of the investment: foreign

**Social criteria:**

- 479) Job post: no data
- 480) Public target: wide,
- 481) Answer to a need: territorial,

**Observations:**

The reuse is enclosed in operation like revival, renovation, conservation of the urban image. The place was the set for the movie the Promised Land about the Industrialization of the city. The operation had the goal of preserve the pre-existent image.

**Bibliography**

Manufaktura Historia. Manufaktura <http://www.manufaktura.com/21/historia> (accessed July4, 2016)



## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### OFF Piotrkowska, Lodz, Poland (EPLO2)

#### General data

- 397) Current name: OFF Piotrkowska
- 398) Former name: Francis Ramisch Factory
- 399) Year of built: around 1850
- 400) Year of standstill: 1990

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Manufacturing (Division D)
- 2) Specific: Textile Mill Products ( Major Group 22)
- 3) Part of an industrial complex: yes (1)/
- 4) Transportation infrastructure associated: railway,

#### Morphological criteria

- 5) Coefficient of occupation of soil (COS) 5 500 m<sup>2</sup>
- 6) Number of storeys: 3-5,
- 7) Configuration: vertical,
- 8) Spatial organization:, articulated
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)/
- 11) Type of structure: skeleton,
- 12) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 13) Technical condition: good,
- 14) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 15) Contamination of the land: no (0)

---

## VALUE

#### Value criteria:

- 102) Declaration of protection: no data
  - 103) Level of protection: no data
  - 104) Singularity: representative
  - 105) Type of value: historical, social,
-

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 482) General: U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport
- 483) Specific:
  - U34 shop, restaurant, bar.
  - U34 offices
  - U36 concert hall
- 484) Year: 1999
- 485) Continuity of use: no (0)
- 486) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 487) Type of actuation: Installation.
- 488) Planning of the intervention: Yes (1)
- 489) Significant change of the façade and morphology: Yes (1)/

### **Ethic of value criteria:**

- 490) Remains of the former name: no (0)
- 491) Reversibility: Possible,
- 492) Demolition: no (0)
- 493) Storage of the element removed: Yes (1)/
- 494) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 495) Type of financial support: Administration local, Private, Communitarian,
- 496) Property: Public,
- 497) Tenure of the land: Property
- 498) Location of the investment: National

### **Social criteria:**

- 499) Job post: no data
- 500) Public target: wide,
- 501) Answer to a need: local,

It is public property but the project is operated by OPG Orange Property Group, a Real Estate company. The key point of this intervention is the progressive intervention based on small unit that allow a diversity of potential markets. Also it is a viable solution for context where the financial supply is limited.

## **Bibliography**

Historia. Off Piotrkowska. <http://offpiotrkowska.com/> (accessed July 6, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Matadero Madrid. Madrid, Spain (code ESM1)

#### General data

- 401) Current name: Matadero Madrid
- 402) Former name: Matadero de Arganzuela
- 403) Year of built: 1910
- 404) Year of standstill: 1970

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 405) General: Manufacturing (Division D)
- 406) Specific: Food and kindred Products (major group 20)
- 407) Part of an industrial complex: no (0)
- 408) Transportation infrastructure associated: highway, berth

#### Morphological criteria

- 409) Coefficient of occupation of soil (COS) 165 415m2
- 410) Number of storeys: 1-2,
- 411) Configuration: horizontal,
- 412) Spatial organization: compact,
- 413) Singularity stylistic: yes (1)
- 414) Spatial continuity: yes (1)
- 415) Type of structure: skeleton,
- 416) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 417) Technical condition: good
- 418) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 419) Contamination of the land: no (0)

---

## VALUE

#### Value criteria:

- 106) Declaration of protection: yes (1)
  - 107) Level of protection: National
  - 108) Singularity: representative
  - 109) Type of value: historical
-

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 502) General: Units (U): U34 Commerce, finance, professional and information services  
U35 Community services U36 Recreation, leisure, sport and U37 residential.
- 503) Specific:  
U34 Coworking  
U361 Cultural centre  
U37 Residential for artist.
- 504) Year: 2009
- 505) Continuity of use: no (0)
- 506) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 507) Type of actuation: Installation.
- 508) Planning of the intervention: Yes (1)/
- 509) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 510) Remains of the former name: Yes (1)/
- 511) Reversibility: Possible
- 512) Demolition: no (0)
- 513) Storage of the element removed: no (0)
- 514) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 515) Type of financial support: State, Administration local, Private,
- 516) Property: Public,
- 517) Tenure of the land: Property
- 518) Location of the investment: national

### **Social criteria:**

- 519) Job post: no data
- 520) Public target: wide
- 521) Answer to a need: territorial

### **Observations:**

In 1987 the building in charge of the sale of meat was converted in cultural activities. Also it was the core of the Municipal offices. In 1990 the area dedicated to the animal rise was converted in the core of National Ballet of Spain. In 1996, the industrial installation closed. It is acquired in form buy by the Municipality. After the acquisition of the municipality the first project was to usufruct the space for private uses. But in 2003 the new administration included the Abattoir as part of the project of regeneration of this sector of the Municipality. IN 2005 began the operation. The main activity is a space of cultural production. The reconversion of the installation brought the centrality to this area. It has a diversity of use, exhibition hall, formative, coworking and residential. The investment of the recuperation cost an amount of 110 865 467 euros where the 75% was public investment and the other institutions like INAEM, Comunidad de Madrid, IFEMA, Fondation Germàn Sánchez Ruipèrez.

### **Bibliography**

Historia. Matadero Madrid [www.mataderomadrid.com](http://www.mataderomadrid.com) (accessed July 5, 2016)

Reactivación de espacios urbanos. Matadero Madrid en la Real Fábrica de Artillería sevillana y otras propuestas para la ciudad. By Reyes Gallegos. La ciudad viva  
<http://www.laciudadviva.org/blogs/?p=29198> (accessed July 5, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

## Tate Modern. London, United Kingdom (code EUKL1)

### General data

- 420) Current name: Tate Modern. British Museum of Modern Art
- 421) Former name: Power Station od Bankside
- 422) Year of built: 1947
- 423) Year of standstill: 1981

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 424) General: Transportation, Communications, Electric, Gas, And Sanitary Services (Division E)
- 425) Specific: Electric, Gas, And Sanitary Services (Major group 49)
- 426) Part of an industrial complex: yes (1)/
- 427) Transportation infrastructure associated: highway

### Morphological criteria

- 428) Coefficient of occupation of soil (COS) around 9000 m2
- 429) Number of storeys: 3-5,
- 430) Configuration: horizontal
- 431) Spatial organization: articulated
- 432) Singularity stylistic: yes (1)
- 433) Spatial continuity: yes (1)
- 434) Type of structure: skeleton,
- 435) Spacing of the structure: no data

### State of the object before the intervention criteria

- 436) Technical condition: good
- 437) Integrity of the object: 4) remain the significant machinery
- 438) Contamination of the land: no (0)

---

## VALUE

### Value criteria:

- 110) Declaration of protection: no data
- 111) Level of protection: no data
- 112) Singularity: no data
- 113) Type of value: historical, technique or and scientific

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## ADAPTIVE REUSE

**Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 522) General: Units (U): U36 Recreation, leisure, sport and
- 523) Specific: U361 Museum
- 524) Year: 2000
- 525) Continuity of use: no (0)
- 526) Correspondence with the land use for the area: Yes (1)/

**Architectural Intervention criteria:**

- 527) Type of actuation: Add on
- 528) Planning of the intervention: Yes (1)/
- 529) Significant change of the façade and morphology: Yes (1)/

**Ethic of value criteria:**

- 530) Remains of the former name: no (0)
- 531) Reversibility: Possible,
- 532) Demolition: no (0)
- 533) Storage of the element removed: no (0)
- 534) Existence of a centre of interpretation or museum: no (0)

**Investment criteria:**

- 535) Type of financial support Private, State
- 536) Property: private
- 537) Tenure of the land: Property
- 538) Location of the investment: national

**Social criteria:**

- 539) Job post: no data
- 540) Public target: wide,
- 541) Answer to a need: territorial,

Observations:

The project was design by the architect Herzog and the Meuron well recognized in the world of the architecture. It is the second major attraction in London and it is the Museum of Modern Art more visit in the world and third in themes of Museum.

**Bibliography**

History. Tate Modern. <http://www.tate.org.uk/> (accessed July 3, 2016)

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

## The Old Vinyl Factory. London, United Kingdom. (code EUKL2)

### General data

- 439) Current name: The Old Vinyl Factory
- 440) Former name: EMI buildings. London Gate Business Park. Vinyl Factory
- 441) Year of built: 1907
- 442) Year of standstill: 1970

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 443) General: Manufacturing (Division D)
- 444) Specific: Electronic and other electrical equipment and components (Major group 36)
- 445) Part of an industrial complex: no (0)
- 446) Transportation infrastructure associated: any

### Morphological criteria

- 447) Coefficient of occupation of soil (COS) 69 000
- 448) Number of storeys: over 5
- 449) Configuration: vertical,
- 450) Spatial organization: articulated
- 451) Singularity stylistic: no (0)
- 452) Spatial continuity: yes (1)/
- 453) Type of structure: skeleton,
- 454) Spacing of the structure: no data

### State of the object before the intervention criteria

- 455) Technical condition: good,
- 456) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 457) Contamination of the land: no (0)

The production was dedicated to vinyl records, radio and other broadcasting equipment. The complex included administrative buildings, laboratories and production.

---

## VALUE

### Value criteria:

- 114) Declaration of protection: yes (1)
- 115) Level of protection: National
- 116) Singularity: representative
- 117) Type of value: historical, social,

It is listed in grade of protection II.



## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 542) General: Units (U): U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.
- 543) Specific:
  - U34 Offices, Commerce, Restaurant
  - U35 University
  - U36 Museum and open spaces
  - U37 residential
- 544) Year: 2012
- 545) Continuity of use: Yes (1)
- 546) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 547) Type of actuation: Put on, Inside out
- 548) Planning of the intervention: Yes (1)/
- 549) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 550) Remains of the former name: Yes (1)
- 551) Reversibility: Possible,
- 552) Demolition: no (0)
- 553) Storage of the element removed: no (0)
- 554) Existence of a centre of interpretation or museum: yes (1)

### **Investment criteria:**

- 555) Type of financial support: State, Administration local, Private,
- 556) Property: Public and Private
- 557) Tenure of the land: Property
- 558) Location of the investment: mixed

### **Social criteria:**

- 559) Job post: 22 000 post
- 560) Public target: sectorial,
- 561) Answer to a need: territorial,

### **Observations**

The current ownership is U+I Group. Cathedral Group together with Development Securities Plc. The main new activities are educational, commercial and residential. The renovation cost 250 million £. The building was renamed under The Old Vinyl Factory. In 2015, began the construction of the media college. The partnership of the project are University of Art of London, Sonos, Host Europe Group and Champ Cargosystem. The full program proposes 500 flats, museum, restaurant, open area and playgrounds. The ownership identified the place as a magnetic atmosphere and in this way brought activities that motivates a continuity of use. This is the case of the introduction of the media college in the sense of thematic continuity.

### **Bibliography**

History. Residential. Offices. Retail. The old vinyl factory. <http://www.theoldvinylfactory.com> (accessed July 3, 2016)

The vinyl Factory. The skyscraper city <http://www.skyscrapercity.com/> (accessed July 3, 2016)

The Old Vinyl Factory, West London. A bureau Veritas Group Company. <http://www.hcdgroup.co.uk/> (accessed July 3, 2016)

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

### Britannia Mills, Manchester, United Kingdom (code EUKM1)

#### General data

- 458) Current name: Britannia Mills
- 459) Former name: Britannia Mills
- 460) Year of built: around 1897
- 461) Year of standstill: 1991

#### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 462) General: Manufacturing (Division D)
- 463) Specific: Stone, Clay and Glass and Concrete Product (Major Group 32)
- 464) Part of an industrial complex: yes (1)/
- 465) Transportation infrastructure associated: railway,

#### Morphological criteria

- 466) Coefficient of occupation of soil (COS) 610000m2
- 467) Number of storeys: 3-5,
- 468) Configuration: vertical
- 469) Spatial organization: compact
- 470) Singularity stylistic: no (0)
- 471) Spatial continuity: yes (1)/
- 472) Type of structure: skeleton,
- 473) Spacing of the structure: no data

#### State of the object before the intervention criteria

- 474) Technical condition: good,
- 475) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 476) Contamination of the land: no (0)

Observations:

The Britannia Mills are a complex of six buildings.

---

## VALUE

#### Value criteria:

- 118) Declaration of protection: no data
- 119) Level of protection: no data.
- 120) Singularity: representative
- 121) Type of value: historical

---

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 562) General: Units (U): U37 residencial.
- 563) Specific: U37 residencial.
- 564) Year: 2000
- 565) Continuity of use: no (0)
- 566) Correspondence with the land use for the area: Yes (1)

### **Architectural Intervention criteria:**

- 567) Type of actuation: Installation.
- 568) Planning of the intervention: Yes (1)
- 569) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 570) Remains of the former name: Yes (1)
- 571) Reversibility: partial
- 572) Demolition: Yes (1)
- 573) Storage of the element removed: no (0)
- 574) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 575) Type of financial support: Private,
- 576) Property: Private
- 577) Tenure of the land: Property
- 578) Location of the investment: national

### **Social criteria:**

- 579) Job post: no data
- 580) Public target: sectorial
- 581) Answer to a need: individual

### **Observations:**

The building contains four floors of residential use. It was adapted 125 apartments. The operation were restauration and renovation. The recuperation of this buildings are motivated the recuperation of other similar structures along the canal. The recuperation of the space as residential purpose closed the public access to the interior of the yard. The insertion of residential use over an industrial land brought the adaptation of the space to the human comfort reducing the acoustic contamination from the railway area. The project also count with a communal gym.

### **Bibliography**

MENGÜŞOĞLU, Nuran. Reuse of industrial built heritage for residential purposes in Manchester. Journal of the Faculty of Architecture. Middle East Technical University. METUJFA 20013/1. 117-138

# FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Albert Mill, Manchester, United Kingdom (code EUKM2)**

## General data

- 1) Current name: Albert Mill
- 2) Former name: Albert Mill
- 3) Year of built: 1869
- 4) Year of standstill: 1998

## Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 1) General: Manufacture (Division D)
- 2) Specific: Textile Mill Products ( Major Group 22)
- 3) Part of an industrial complex: yes (1)
- 4) Transportation infrastructure associated: railway

## Morphological criteria

- 5) Coefficient of occupation of soil (COS) around 8000 m2
- 6) Number of storeys: 3-5,
- 7) Configuration: vertical,
- 8) Spatial organization: compact,
- 9) Singularity stylistic: no (0)
- 10) Spatial continuity: yes (1)
- 11) Type of structure: skeleton,
- 12) Spacing of the structure: no data

## State of the object before the intervention criteria

- 13) Technical condition: good,
- 14) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings  
Contamination of the land: yes (1)

Observations:

It is a cotton spinning and weaving mill. It covered diverse stage of the production process.

---

## VALUE

### Value criteria:

- 1) Declaration of protection: yes (1)
- 2) Level of protection: National
- 3) Singularity: representative
- 4) Type of value: historical,

Observations: the grade of protection level 2.

---

## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 1) General: Units (U): U37 Residential.
- 2) Specific: U37 Residential
- 3) Year: 2008
- 4) Continuity of use: Yes (1)/
- 5) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 6) Type of actuation: Installation.
- 7) Planning of the intervention: Yes (1)/
- 8) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 9) Remains of the former name: Yes (1)/
- 10) Reversibility: partial,
- 11) Demolition: Yes (1)
- 12) Storage of the element removed: no (0)
- 13) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 14) Type of financial support: Private,
- 15) Property: Private
- 16) Tenure of the land: Property
- 17) Location of the investment: national

### **Social criteria:**

- 18) Job post: no data
- 19) Public target: sectorial
- 20) Answer to a need: individual

Observations.

In 1998 the spinning block was demolished however there good condition.

## **Bibliography**

Albert Mill. Urban Splash.

[http://www.urbansplash.co.uk/documents/brochure/us\\_resi\\_guide\\_100001.pdf](http://www.urbansplash.co.uk/documents/brochure/us_resi_guide_100001.pdf)

(accessed July 5, 2016)

Albert Mill, Manchester 2008 to 2012 <http://www.mauriceshapero.com/albert-mill-manchester-2008-to-2012.html> (accessed July 5, 2016)

Albert Mill Donald Architects <http://www.donaldarchitecture.com/albert-mill/> (accessed July 5, 2016)

Former Albert Mill on West Corner of Junction with Ellesmere Street, Manchester. British Listed Buildings <http://www.britishlistedbuildings.co.uk/> (accessed July 5, 2016)

Taylor, Simon. Pendle Textile Mills. English Heritage Royal Commission of Historical Monument of England. York: RCHME, 1999

## FORM FOR THE CHARACTERIZATION OF VACANT INDUSTRIAL HERITAGE BUILDING

**Murray's Mills, Manchester, United Kingdom (code EUKM3)**

### General data

- 1) Current name: Murray's Mills
- 2) Former name: Murray's Mills
- 3) Year of built: 1797
- 4) Year of standstill: 1950

### Functional criteria

Classification of the function: According the Standard of Industrial Classification (United State Government, <http://www.sec.gov/info/edgar/siccodes.htm>)

- 5) General: Manufacturing (Division D)
- 6) Specific: Textile Mill Products ( Major Group 22)
- 7) Part of an industrial complex: yes (1)/
- 8) Transportation infrastructure associated: port,

### Morphological criteria

- 9) Coefficient of occupation of soil (COS) 64 000
- 10) Number of storeys: 3-5
- 11) Configuration: vertical,
- 12) Spatial organization: articulated
- 13) Singularity stylistic: no (0)
- 14) Spatial continuity: yes (1)/
- 15) Type of structure: skeleton,
- 16) Spacing of the structure: no data

### State of the object before the intervention criteria

- 17) Technical condition: regular
- 18) Integrity of the object: 3) dismantling of the machinery and remain almost empty buildings
- 19) Contamination of the land: no (0)

---

## VALUE

### Value criteria:

- 1) Declaration of protection: yes (1)/
- 2) Level of protection: National,
- 3) Singularity: representative
- 4) Type of value: historical,

It was a cotton Mill. It is the oldest in the world that used steam power to the cotton spinning. It is under grade of protection II.

---



## **ADAPTIVE REUSE**

### **Functional criteria:**

Classification of the function: Corresponds with the second and third level of Eurostat System of Classification (<http://ec.europa.eu/eurostat/documents/205002/6786255/LUCAS2015-C3-Classification-20150227.pdf/969ca853-e325-48b3-9d59-7e86023b2b27>)

- 1) General: Units (U): U34 Commerce, finance, professional and information services, U37 residential.
- 2) Specific:  
U34 Hotel  
U34 Offices  
U370 Residential
- 3) Year: 2004
- 4) Continuity of use: no (0)
- 5) Correspondence with the land use for the area: Yes (1)/

### **Architectural Intervention criteria:**

- 6) Type of actuation: Installation.
- 7) Planning of the intervention: Yes (1)
- 8) Significant change of the façade and morphology: no (0)

### **Ethic of value criteria:**

- 9) Remains of the former name: Yes (1)
- 10) Reversibility: partial
- 11) Demolition: Yes (1)/
- 12) Storage of the element removed: no (0)
- 13) Existence of a centre of interpretation or museum: no (0)

### **Investment criteria:**

- 14) Type of financial support: State, Private
- 15) Property: Mixed
- 16) Tenure of the land: Property,
- 17) Location of the investment: National

### **Social criteria:**

- 18) Job post: no data
- 19) Public target: sectorial
- 20) Answer to a need: local,

### **Observations**

In 1940 the building was reconverted in a bedding manufacture. In 1954 it was used like warehouse. During the sixties the building was reconverted by the light productions. It was demolished the bock in the Bengal Street. The financial support came from a grant of the Heritage Lottery Fund to cover the restauration. Also the North West Development Agency took the control of the space in 2003 and gave financial support for the adaptation of new use. The new use are residential, hotel and offices. The partnership are Ancoats Urban Village Company, Manchester City Council, English Heritage, the Northwest Regional Development Agency and Heritage Lottery Fund.

### **Bibliography**

Murray´s Mills. E architect. <http://www.e-architect.co.uk/> (accessed July7, 2016)

The Murray's Mills. Ancoats- permanent repair project. <http://www.heritageworks.co.uk/>(accessed July7, 2016)

Murray's Mills. Manchester History. <http://manchesterhistory.net/> (accessed July7, 2016)

## Appendix 6.

### Data Base of Reuse

(Complementary information of 2.1.1. The Form, tool for the characterization)

The Database of Reuse is exposed in representation of the others database that form the size it is no possible to index as appendix.

Source: Author

Part 1: General Data

Part2: Functional Criteria

Part3: Architectural and Value Criteria

Part 4: Investment and Social Criteria

DATABASE REUSE									
Reference database					General Data				
Code					Year				
UA	IB	Continent	Country	city	current name	former name	built	standstill	
USNY	EAUSA1	America	United States	New York	Industry city	Bush Terminal	1890	no data	
EFH	EFH1	Europe	Finland	Helsinki	Helsinki Courthouse District	Salmisaari plant, Alki headquarters	1937	1998	
EFIL	EFILF1	Europe	France	Ile de France	Dumas	Usine du papiers peints Dumas	1913	no data	
EFLI	EFL1	Europe	France	Lille	Euratechnologies	Le Blan-Lafont Cotton Mill	1900	1989	
EFP	EFP1	Europe	France	Paris	Grands Moulins Université Paris 7 Denis Diderot	Grands Moulins	1921	1996	
EGDE	EGDE1	Europe	Germany	Delmenhorst	Nordwestdeutsche Museum für IndustrieKultur	Norddeutsche Wolkämmerei & Kammgarnspinnerei	1884	1984	
EGDU	EGDU1	Europe	Germany	Duisburg	Museum Küppersmühle Zollverein UNESCO World Heritage Site	Küppersmühle	1860	1973	
EGE	EGE1	Europe	Germany	Essen	Speicherstadt	Zollverein Coal Mine Industrial Complex	1926	1986	
EGH	EGH1	Europe	Germany	Hamburg	Warehouse of LVR-Industriemuseum Gasometer Oberhausen	Speicherstadt	1884	1988	
EGO	EGO1	Europe	Germany	Oberhausen	Warehouse of LVR-Industriemuseum Gasometer Oberhausen	Warehouse of Gutehoffnungshütte (GHH)	1920	1990	
EGO	EGO2	Europe	Germany	Oberhausen	Gasometer Oberhausen	Gutehoffnungshütte Gasometer	1927	1988	
EIF	EIF1	Europe	Italy	Ferrara	Ex Eridania Scientific-Technological Pole of the University of Ferrara, Faculty of Enginery	Zuccherificio Eridania S. A.	1900	1967	
EIM	EIM1	Europe	Italy	Milan	Base coworking, MUDEC Museum, Scenery Workshop of the Scala Theatre	Acciaierie Ansaldo	1904	1986	
EIM	EIM2	Europe	Italy	Milan	Fondazione Arnaldo Pomodoro	Acciaierie Riva Calzoni	1897	1998	
EIM	EIM3	Europe	Italy	Milan	Teatro e Silos Armani	Nestle Chocolate factory	1950	2000	
EIM	EIM4	Europe	Italy	Milan	Manifattura Tabacchi S. A.	Manifattura Tabacchi S. A.	1929	2000	
EIR	EIR1	Europe	Italy	Rovereto	Centro Tecnofin Servizi	Cotonificio di Rovereto, Pirelli	no data	1982	
EIR	EIR2	Europe	Italy	Rovereto	Progetto Manifattura	Manifattura Tabacchi di Sacco	1857	2008	
EIV	EIV1	Europe	Italy	Verona	University of Verona. Department of Enterprise Administration and Social Science.	Panificio della Caserma Santa Marta	1863	1960	
EIVE	EIVE1	Europe	Italy	Venice	Arsenale di Venezia	Arsenale di Venezia	1104	1957	
EPLO	EPLO1	Europe	Poland	Lodz	Manufaktura	Textile Manufacture of Izrael Poznański	1877	1992	
EPLO	EPLO1	Europe	Poland	Lodz	OFF Piotrkowska	Francis Ramisch Factory	1850	1990	
EPLI	EPLI1	Europe	Portugal	Lisbon	Museum of the Electricity	Central Tejo	1909	1972	
EPLI	EPLI2	Europe	Portugal	Lisbon	LX Factory	Companhia de Fiação e Tecidos Lisbonense	1846	no data	
ESM	ESM	Europe	Spain	Madrid	Matadero Madrid	Matadero de Arganzuela	1910	1970	
ESS	ESS	Europe	Spain	Seville	Rectorate of the University of Sevilla	Royal Tobacco Factory	1763	1950	
EUKL	EUKL1	Europe	United Kingdom	London	Tate Modern.	Power Station od Bankside	1947	1981	
EUKL	EUKL2	Europe	United Kingdom	London	The Old Vinyl Factory	EMI buildings	1907	1970	
EUKM	EUKM1	Europe	United Kingdom	Manchester	Britannia Mills	Britannia Mills	1897	1991	
EUKM	EUKM2	Europe	United Kingdom	Manchester	Albert Mill	Albert Mill	1869	1998	
EUKM	EUKM3	Europe	United Kingdom	Manchester	Murray's Mills	Murray's Mills	1797	1950	

DATABASE REUSE

Reference database					Functional				
Code					1	2	3	4	5
UA	IB	Continent	Country	city	General	Specific	year	continuity	correspondence
USNY	EAUSA1	America	United States	New York	U22 industry and manufacturing, U34 Commerce, finance, professional and information services	U22 Domestic Industrial Product U34 Offices in concept of coworking U34 Centre of Research in Surgery	2009	1	1
EFH	EFH1	Europe	Finland	Helsinki	U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport	U34 Offices U34 Restaurant, cafeterias U35 Courthouse U36 Gallery	2004	0	1
EFIL	EFILF1	Europe	France	Ile de France	U34 Commerce, finance, professional and information services,	U34 Offices	1985	1	1
EFLI	EFL1	Europe	France	Lille	U34 Commerce, finance, professional and information services, U35 Communitarian services	U 34 Technological Park U 35 Educational, University	2009	1	1
EFP	EFP1	Europe	France	Paris	U35 Community services,	U35 University	2006	0	1
EGDE	EGDE1	Europe	Germany	Delmenhorst	U36 Recreation, leisure, sport	U361 Museum	1996	0	1
EGDU	EGDU1	Europe	Germany	Duisburg	U36 Recreation, leisure, sport	U36 Museum of Art.	1999	1	1
EGE	EGE1	Europe	Germany	Essen	mixed	mixed	1996	0	1
EGH	EGH1	Europe	Germany	Hamburg	U36 Recreation, leisure, sport	U361 Recreation, leisure: museum, theatre	1999	1	1
EGO	EGO1	Europe	Germany	Oberhausen	U31 transport, communication networks, storage, protective works,	U31 Warehouse of Museum	1998	1	1
EGO	EGO2	Europe	Germany	Oberhausen	U36 Recreation, leisure, sport	U361 Exhibition Hall	1994	0	1
EIF	EIF1	Europe	Italy	Ferrara	U35 Community services	U35 University	1995	0	1
EIM	EIM1	Europe	Italy	Milan	U22 industry and manufacturing, U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport	U22 Scenery workshop U34 Coworking U36 Exhibition areas, Museum	1990	1	1
EIM	EIM2	Europe	Italy	Milan	U36 Recreation, leisure, sport	U36 Exhibition Area	2005	0	1
EIM	EIM3	Europe	Italy	Milan	U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport	U34 Offices U36 Museum, theatre, archive	2000	0	1
EIM	EIM4	Europe	Italy	Milan	1) U35 Community services, U36 Recreation, leisure, sport and U37 residential.	U361 Museum U350 Educational U370 residential	2000	0	1
EIR	EIR1	Europe	Italy	Rovereto	U34 Commerce, finance, professional and information services	U341 Offices and scientific centre	1986	1	1
EIR	EIR2	Europe	Italy	Rovereto	U22 industry and manufacturing U34 Commerce, finance, professional and information services, U35 Community services,	U22 Manufactory U34 Offices U35 University	2014	1	1
EIV	EIV1	Europe	Italy	Verona	U35 Community services,	U35 University	2015	0	1
EIVE	EIVE1	Europe	Italy	Venice	U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport	U34 Commerce, finance, professional and information services: Centre for the conservation of antique ship U35 Community services: University, Research Centre U36 Recreation, leisure, sport: Museum, Exhibition Areas	1980	0	0
EPLO	EPLO1	Europe	Poland	Lodz	U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport	U341 Hotel U340 Commerce centre U340 Restaurant U361 Cultural centre U360 Museum city, Museum of the Activity U362 Sport centre	2006	0	1
EPLO	EPLO1	Europe	Poland	Lodz	U34 Commerce, finance, professional and information services, U36 Recreation, leisure, sport	U34 shop, restaurant, bar. U34 offices U36 concert hall	1999	0	1
EPLI	EPLI1	Europe	Portugal	Lisbon	U36 Recreation, leisure, sport and	U36 Museum	1990	0	1
EPLI	EPLI2	Europe	Portugal	Lisbon	U34 Commerce, finance, professional and information services,	U34 Commerce, Offices, Coworking, restaurant, café, bar,	2000	1	1
ESM	ESM	Europe	Spain	Madrid	U34 Commerce, finance, professional and information services U35 Community services U36 Recreation, leisure, sport and U37 residential.	U34 Coworking U361 Cultural centre U37 Residential for artist.	2009	0	1
ESS	ESS	Europe	Spain	Seville	U35 Community services	U351 University	1950	0	1
EUKL	EUKL1	Europe	United Kingdom	London	U36 Recreation, leisure, sport	U361 Museum	2000	0	1
EUKL	EUKL2	Europe	United Kingdom	London	U34 Commerce, finance, professional and information services, U35 Community services, U36 Recreation, leisure, sport and U37 residential.	U34 Offices, Commerce, Restaurant U35 University U36 Museum and open spaces U37 residential	2012	1	1
EUKM	EUKM1	Europe	United Kingdom	Manchester	U37 residential.	U37 residential.	2000	0	1
EUKM	EUKM2	Europe	United Kingdom	Manchester	U37 residential.	U37 residential.	2008	1	1
EUKM	EUKM3	Europe	United Kingdom	Manchester	U34 Commerce, finance, professional and information services, U37 residential.	U34 Hotel U34 Offices U370 Residential	2004	0	1

DATABASE REUSE

Reference database					Architectural			value				
					6	7	8	9	10	11	12	13
Code					Actuation	planning	façade	former name	reversibilit	demolition	storage element	interpretation
UA	IB	Continent	Country	city								
USNY	EAUSA 1	America	United States	New York	installation	1	0		1 possible	0	0	0
EFH	EFH1	Europe	Finland	Helsinki	installation	1	0		0 possible	1	0	0
EFIL	EFILF1	Europe	France	Ile de France	installation	1	0		1 possible	0	0	0
EFLI	EFL1	Europe	France	Lille	installation	1	0		0 partial	1	0	0
EFP	EFP1	Europe	France	Paris	installation	1	1		1 partial	0	0	1
EGDE	EGDE1	Europe	Germany	Delmenhorst	installation	1	0		1 possible	1	0	1
EGDU	EGDU1	Europe	Germany	Duisburg	installation	1	0		1 possible	0	0	0
EGE	EGE1	Europe	Germany	Essen	installation	1	0		1 possible	0	1	1
EGH	EGH1	Europe	Germany	Hamburg	installation	1	0		1 possible	1	0	1
EGO	EGO1	Europe	Germany	Oberhausen	installation	1	0		0 possible	0	1	0
EGO	EGO2	Europe	Germany	Oberhausen	installation	1	0		1 possible	0	0	1
EIF	EIF1	Europe	Italy	Ferrara	installation	1	0		1 possible	1	0	1
EIM	EIM1	Europe	Italy	Milan	add on, ins	0	0		0 possible	0	0	0
EIM	EIM2	Europe	Italy	Milan	installation	1	0		0 possible	1	0	0
EIM	EIM3	Europe	Italy	Milan	installation	1	0		1 possible	1	0	1
EIM	EIM4	Europe	Italy	Milan	installation	1	0		1 partial	1	0	0
EIR	EIR1	Europe	Italy	Rovereto	Add on, Ins	1	0		1 possible	1	0	1
EIR	EIR2	Europe	Italy	Rovereto	add on, pu	1	0		1 possible	0	0	1
EIV	EIV1	Europe	Italy	Verona	installation	1	0		1 possible	0	0	1
EIVE	EIVE1	Europe	Italy	Venice	installation	0	0		1 possible	0	0	1
EPLO	EPLO1	Europe	Poland	Lodz	add on, ins	1	0		1 partial	1	1	1
EPLO	EPLO1	Europe	Poland	Lodz	installation	1	1		0 possible	0	1	0
EPLI	EPLI1	Europe	Portugal	Lisbon	installation	1	0		1 possible	0	1	1
EPLI	EPLI2	Europe	Portugal	Lisbon	installation	1	0		0 possible	1	1	1
ESM	ESM	Europe	Spain	Madrid	installation	1	0		1 possible	0	0	1
ESS	ESS	Europe	Spain	Seville	installation	0	0		1 possible	1	0	0
EUKL	EUKL1	Europe	United Kingdom	London	add on	1	1		0 possible	0	0	0
EUKL	EUKL2	Europe	United Kingdom	London	Put on, Ins	1	0		1 possible	0	0	1
EUKM	EUKM1	Europe	United Kingdom	Manchester	installation	1	0		1 partial	1	0	0
EUKM	EUKM2	Europe	United Kingdom	Manchester	installation	1	0		1 partial	1	0	0
EUKM	EUKM3	Europe	United Kingdom	Manchester	installation	1	0		1 partial	1	0	0

DATABASE REUSE

Reference database					Investment				social		
Code					14	15	16	17	18	19	20
UA	IB	Continent	Country	city	financial	property	tenure	location	job post	public	need
USNY	EAUSA1	America	United States	New York	State, Private	mixed	property	national	no data	wide	local
EFH	EFH1	Europe	Finland	Helsinki	Administrative	public	property	national	60000	sectorial	territorial
EFIL	EFILF1	Europe	France	Ile de France	State, Administrative	public	property	national	no data	age group	territorial
EFLI	EFL1	Europe	France	Lille	Public and Administrative	public	property	national	1100	sectorial	territorial
EFP	EFP1	Europe	France	Paris	State, Administrative	mixed	property	national	no data	age group	local
EGDE	EGDE1	Europe	Germany	Delmenhorst	Administrative	public	property	national	no data	wide	local
EGDU	EGDU1	Europe	Germany	Duisburg	mixed	public	property	national	no data	wide	territorial
EGE	EGE1	Europe	Germany	Essen	State, Regional	mixed	property	national	no data	wide	territorial
EGH	EGH1	Europe	Germany	Hamburg	Local Administrative	public	property	national	no data	sectorial	territorial
EGO	EGO1	Europe	Germany	Oberhausen	Regional Administrative	Public	property	national	no data	sectorial	territorial
EGO	EGO2	Europe	Germany	Oberhausen	State, Regional	public	property	national	no data	wide	territorial
EIF	EIF1	Europe	Italy	Ferrara	international	public	usufruct	foreign	no data	age group	local
EIM	EIM1	Europe	Italy	Milan	Administrative	public	property	national	no data	wide	local
EIM	EIM2	Europe	Italy	Milan	Private	private	property	national	no data	wide	local
EIM	EIM3	Europe	Italy	Milan	Private	private	property	national	no data	sectorial	local
EIM	EIM4	Europe	Italy	Milan	Administrative	public, private	property	national	no data	wide	regional
EIR	EIR1	Europe	Italy	Rovereto	Administrative	public	property	national	no data	sectorial	territorial
EIR	EIR2	Europe	Italy	Rovereto	Administrative	public	property	territorial	no data	sectorial	territorial
EIV	EIV1	Europe	Italy	Verona	State, Administrative	public	property	national	no data	sectorial	local
EIVE	EIVE1	Europe	Italy	Venice	Administrative	public	property	national	no data	wide	territorial
EPLO	EPLO1	Europe	Poland	Lodz	private	private	property	foreign	no data	wide	territorial
EPLO	EPLO1	Europe	Poland	Lodz	Administrative	public	property	national	no data	wide	local
EPLI	EPLI1	Europe	Portugal	Lisbon	private	private	property	national	no data	wide	territorial
EPLI	EPLI2	Europe	Portugal	Lisbon	private	private	property	national	no data	wide	local
ESM	ESM	Europe	Spain	Madrid	State, Administrative	public	property	national	no data	wide	territorial
ESS	ESS	Europe	Spain	Seville	State, Administration	local	property	national	no data	sectorial	territorial
EUKL	EUKL1	Europe	United Kingdom	London	Private, State	private	property	national	no data	wide	territorial
EUKL	EUKL2	Europe	United Kingdom	London	State, Administrative	public, private	property	mixed	22000	sectorial	territorial
EUKM	EUKM1	Europe	United Kingdom	Manchester	private	private	property	national	no data	sectorial	individual
EUKM	EUKM2	Europe	United Kingdom	Manchester	private	private	property	national	no data	sectorial	individual
EUKM	EUKM3	Europe	United Kingdom	Manchester	State, Private	mixed	property	national	no data	sectorial	local

## Appendix 7

Appendix 1 List of objects, foundation, existence, current use and integrity state

(Complementary information of 3.1.2. Area of study: The vacant industrial heritage buildings along the Almedares River. Administrative and functional borders)

Source: Author

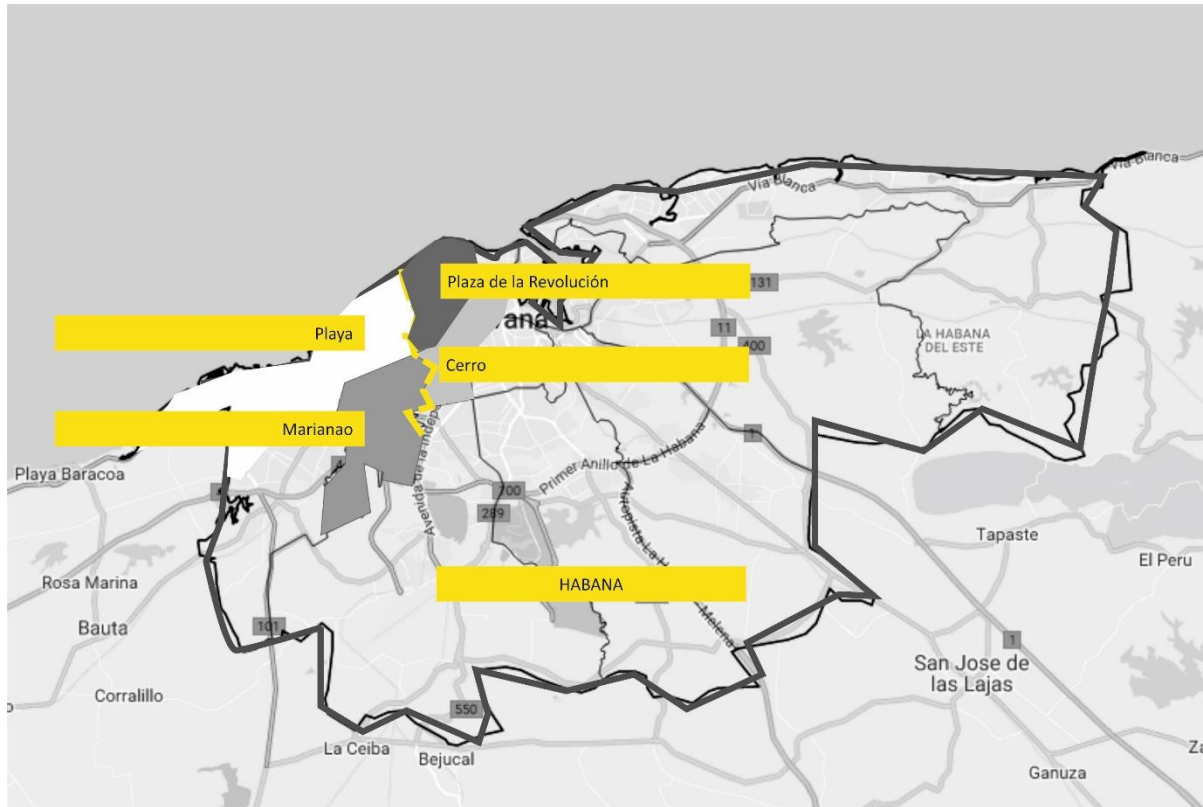
Name	Former use	Current use	Founded	Existence	Integrity state				
					1	2	3	4	5
1 Sawmill	Sawmill		XVI	0					
2 Lime furnace	furnace		XVI	0					
3 Tiled furnace	furnace		XVI	0					
4 Husillo dam	dam	no use	XVI	1		■			
5 San Andres sugar mill	sugar mill	no use	XVII	1		■			
6 Catchment pond, Aqueduct of Albear	Catchment pond	catchment pond	XIX	1					■
7 La Moderna S.A. paper mill	paper mill	warehouse	XIX	1			■		■
8 Gin distillery	distillery		XIX	0					
9 New Factory of Ice S.A.	ice production	warehouse	XIX	1			■		■
10 La Tropical brewery	brewery	warehouse	XIX	1			■		■
11 Factory of animal charcoal	animal charcoal		XIX	0					
12 Brick furnace	Brick furnace		XIX	0					
13 Oil refinery	Oil refinery		XIX	0					
14 La Internacional brewery S. A.	brewery	warehouse	XX	1			■		■
15 Almedares Factory of Cement	Factory of Cement	residential	XX	1		■			
16 Mosaic factory	Mosaic factory		XX	0					
17 Electric Station for tramway	Electric Station	cultural centre	XX	1			■		
18 Deposit of tramway	deposit	factory of bike	XX	1			■		
19 Bandel and Fantoche Factory of Juices	Berverage factory	berverage factory	XX	1					■
20 Goodrich S. A. pneumatics factory	pneumatics factory	offices	XX	1			■		
21 Factory of CO2 and others	Gas factory	gas factory	XX	1					■

## Appendix 8

Limits of Habana, plaza de la Revolución, Playa, Marianao y Cerro

(Complementary information of 3.2.2. Micro analysis. Level of the municipalities and surrounding the objects within 1 km)

Source: Author





## Appendix 9

Borders of the area of 1km around the objects.

(Complementary information of 3.2.2. Micro analysis. Level of the municipalities and surrounding the objects within 1 km)

Source: Author



## **Appendix 10**

Morphology of the urban area of the context of the Almandares River.

(Complementary information of 3.2.2. Micro analysis. Level of the municipalities and surrounding the objects within 1 km. Morphological criteria)

Source: Author

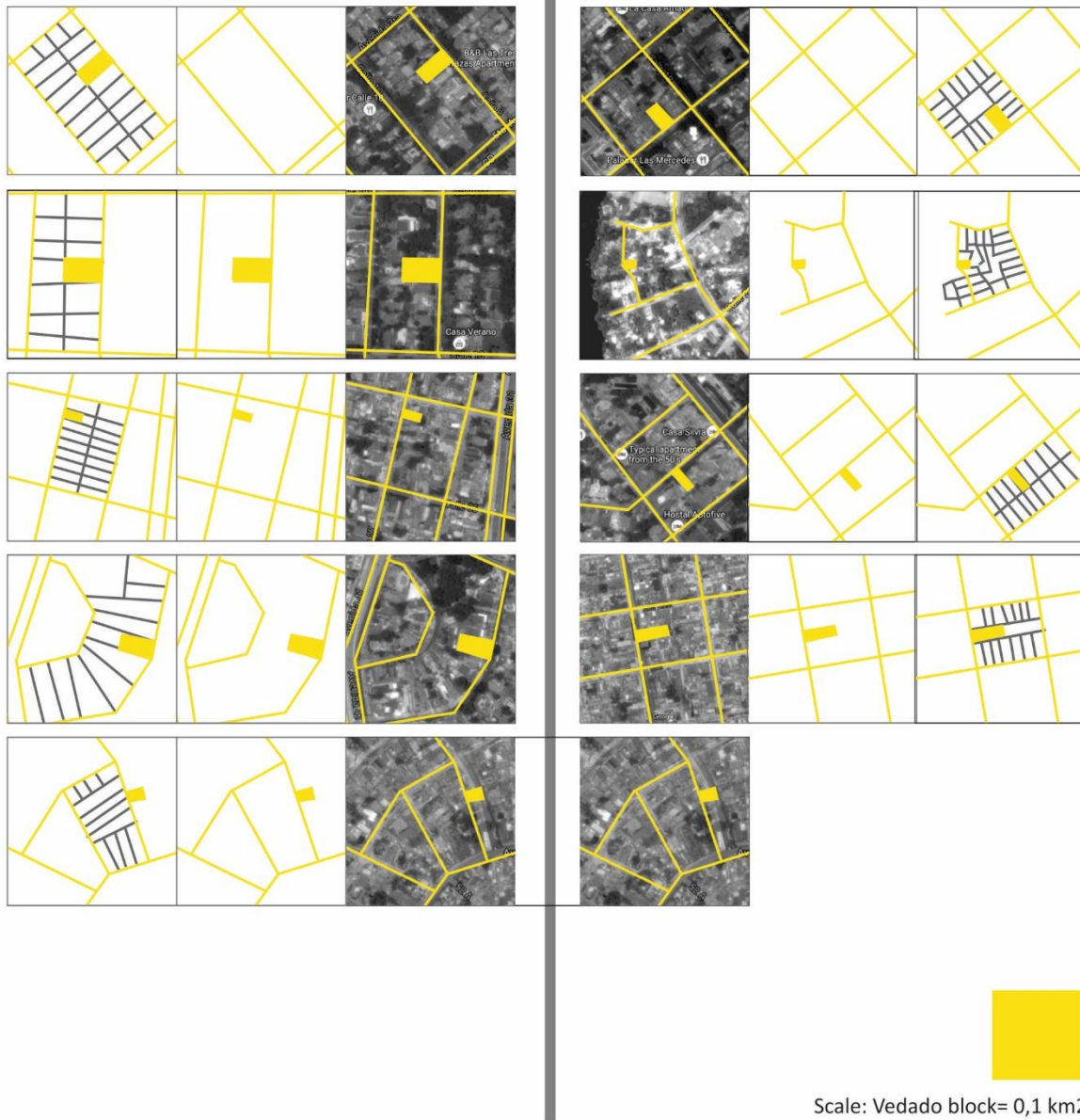


Fig. 10 Comparative scheme of the urban pattern along the Almendares River, in term of block and lot.  
Source: Author

# Appendix 11

## Morphological box for the Type B

(Complementary information of 3.5. Potential use for vacant industrial heritage buildings)

Source: Author

General		Morphological box for Type B										Cases			
Specific	correspondence	actuation	planning	façade	former name	reversibility	demolition	storage element	interpretation	financial	property	tenure	location	public	need
Museum	Yes	Installation	Yes	Yes	No	Yes	Possible	No	Yes	Local	Administration	Public	property	national	wide
Coworking		Add on					Partial			Regional	Administration	Private	Usufruct	foreign	age target
Housing										International		Mixed			sectorial
Manufacture										Regional	Private				
Cultural centre										Private					
Commercial centre										Mixed					
University															
Sport centre															
Gallery															
Communitarian centre															
Total															

## Appendix 12

Structure functional by Municipalities

(Complementary information of 3.6.1. Diagnostic of objectives. Functional structure)

Source: Author

	Distribution of the functional structure							
	Tourism	Education		Health			Green area	
	per capita	per year	U	U	U	U	U	Mm2
	Tourism	Technician	Centre	doctor/p	Primary unit	Services	Park	Green Area
Playa	6.9	1123	2231	53	545	227	20	29609
Marianao	0	481	81	69	150	162	56	9234
Plaza	2.6	845	104	16	352	213	100	34899
Cerro	0	736	73	100	142	121	47	339160

	Distribution of the functional structure											
	Culture							Sport		Other		
	U	U	U	U	U	U	U	U	U	U	U	
	Cinema	Theater	Culture House	Museum	Library	Bookshop	Piscina	Sport centre	Open air	Grandparent		
Playa	2	3	5	3	3	7	1	1	36	4		
Marianao	1	1	1	1	1	2	1	10	30	1		
Plaza	14	6	34	10	25	49	4	29	5	1		
Cerro	3	0	1	1	1	1	0	0	0	1		

## Appendix 13

Profile of worker in employment

(Complementary information of 3.6.1. Diagnostic of objectives. Social)

Source: Author

Profile of worker in employment			
	2010	2014	2014/2010 %
Total	899496	478490	53
Professional	265873	123491	46
Technician	314559	216238	68
Administrative	21106	10265	48
Service worker	202043	99443	49
Direction worker	95915	29053	30

## Appendix 14

Distribution of the enterprise

(Complementary information of 3.6.1. Diagnostic of objectives. Economic and active worker population)

Source: Author

Representation of the Enterprise					
	Habana	1565			
		total	Public	Budget	Cooperative
M1	Playa	353	352	74	1
M2	Marianao	50	43	21	7
M3	Plaza	282	282	153	0
M4	Cerro	119	85	31	3
	total	804	762	279	11



## Appendix 15

Pertinence of the potential use to answer to the territorial needs. La Tropical Brewery.  
 (Complementary information of 3.6.3 Evaluation of the potential uses according the objectives.  
 Answering to territorial needs) The table is divided in two parts due to its dimensions.  
 Source: Author

Potential use	Urban					social		
	1	2	3	4	5	1	2	3
	efficient land use	housing, cultural public spaces	third age	accessibility	reducing distant services	plurality	target job posts	life facilities
1 Museum	0	2	1	0	0	1	1	0
2 Coworking	2	1	1	2	2	2	2	1
3 Housing	0	2	1	1	0	0	0	2
4 Manufacture	1	0	1	2	1	2	2	0
5 Cultural centre	1	2	2	2	2	2	0	2
6 Commercial centre	0	0	0	2	2	1	2	1
7 University	2	2	2	2	2	1	0	2
8 Sport centre	0	2	2	2	2	2	0	2
9 Gallery	0	2	1	1	0	1	0	0
10 Communitarian centre	1	2	2	2	2	2	0	2

Potential use	Economic							Enviromental		V/T %	
	1	2	3	4	5	6	7	1	2		
	foreign investment	domestic economic growth	self sufficient	high quality of job post and large amount	mutual work	manufacture production	balance public sector	formalizing intervention	reducing contamination		
1 Museum	0	1	0	0	0	0	1	0	2	4	26
2 Coworking	1	2	2	2	2	1	0	1	2	13	76
3 Housing	1	0	2	0	0	0	0	2	2	7	38
4 Manufacture	2	2	2	2	1	2	2	1	1	15	70
5 Cultural centre	1	2	2	2	2	0	2	1	2	14	79
6 Commercial centre	1	1	2	1	0	0	1	1	2	9	50
7 University	0	1	0	2	0	0	2	1	1	7	58
8 Sport centre	1	0	1	1	0	0	2	1	1	7	55
9 Gallery	1	1	2	0	0	0	1	1	1	7	35
10 Communitarian centre	0	0	1	1	2	0	2	1	1	8	61

### Territorial needs

- 0 No or almost no correspondance
- 1 Possible to answers but depends of the solution
- 2 Direct answers

	First group
	Second group
	Third group

## Appendix 16

Pertinence of the potential use with the capabilities of the context and the object (Complementary information of 3.6.3 Evaluation of the potential uses according the objectives. Tolerance and exploitation of the capabilities) The table is divided in two parts due to its dimensions.

Source: Author

Potential use	Urban				Social			Economic		
	1 Large amount of population	2 Compatibility with cultural, sportive use	3 Controlling access	4 High mobility	5 Cohabitation of interest	1 High quality of human resource	2 Belonging	3 Human resource	1 Skills	2 Financial capacity for manufacture
1 Museum	0	2	0	1	0	2	2	1	0	0
2 Coworking	2	0	0	2	2	2	2	2	2	2
3 Housing	1	2	0	0	0	0	1	0	0	0
4 Manufacture	2	0	2	2	0	2	2	2	2	2
5 Cultural centre	2	2	0	2	2	1	2	1	0	0
6 Commercial centre	2	0	0	2	0	1	0	2	1	0
7 University	2	1	0	2	2	2	2	2	1	0
8 Sport centre	2	2	0	2	2	0	2	1	0	0
9 Gallery	1	2	0	1	0	1	1	1	0	0
10 Communitarian centre	2	2	0	1	2	1	2	1	1	0
	2	2	2	2	2	2	2	2	2	2

Potential use	Environment	Legal		Architectural		Heritage protection					total of all objective	VT %	
	1 Clean use	1 Form of property	2 Form of association	1 Intervention	2 Flexible	1 Reversibility	2 No demolition	3 Storage	4 Interpretation	5 Wide public			
1 Museum	2	2	2	2	2	2	2	1	1	1	2	17	62
2 Coworking	2	2	2	2	2	2	2	2	2	1	2	19	87
3 Housing	2	1	2	0	0	1	0	0	1	1	1	8	31
4 Manufacture	1	2	2	1	1	1	0	1	1	1	1	11	67
5 Cultural centre	2	2	2	2	2	2	2	2	1	2	2	19	77
6 Commercial centre	1	2	2	2	2	2	1	0	1	2	2	15	57
7 University	2	2	2	2	2	2	2	2	1	2	2	19	82
8 Sport centre	2	2	2	1	2	1	1	1	1	2	2	15	65
9 Gallery	2	2	2	2	2	2	2	2	1	1	1	17	60
10 Communitarian centre	2	2	2	2	2	2	2	1	2	2	2	19	77

### Capabilities

0 Not compatible with the tolerance of the site

It is acceptable the use but it doesn't use in efficient way the resource of the territory

1 the territory  
It is compatible in term of tolerance of use and efficient exploitation of the resources of the territory

	First group
	Second group
	Third group

## Appendix 17

Correspondence with the priority objectives

(Complementary information of 3.6.3 Evaluation of the potential uses according the objectives. Analysis of the group according the correspondence with the priority objectives

Source: Author

Potential use	Needs						Capabilities				Total	V/T %
	1	1	2	3	4	2	5	3	4			
	efficient land use	plurality	domestic economic growth	self sufficient	high quality of job post and large amount	reducing contamination	Cohabitation of interest	Human resource	Interpretation			
2 Coworking	2	2	2	2	2	2	2	2	2	1	17	94
4 Manufacture	1	2	2	2	2	1	0	2	1	13	72	
5 Cultural centre	1	2	2	2	2	2	2	1	2	16	88	
6 Commercial centre	0	1	1	2	1	2	0	2	1	10	55	
7 University	2	1	1	0	2	1	2	2	2	13	72	
8 Sport centre	0	2	0	1	1	1	2	1	1	9	50	
10 Communitarian centre	1	2	0	1	1	1	2	1	2	11	61	
Total	2	2	2	2	2	2	2	2	2	18	100	



## **COLLECTIVE PROJECT**

Tramway in the World:  
Evolution of the design of the tramway



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## **Abstract**

The collective project has the name of World Tramway, it is a project organized by four line of research that covers the technic, impact, cultural aspect of the object. The frame of the individual part inside of the collective project was oriented to two direction: one about the studies of the evolution of the design of the tramway and the other to the creation of a project of communication of the tramway by an online platform.

In the case of the aspect of the design, it is analysis the antecedent of the tramway that created the first knowledge about the use of rail over ordinary routes. Beside it is analysis the variables of the design which were predominant for each period of evolution of the tramway.

A second moment is related with the creation of a project of communication of the tramway as a technic object. It design the concept of the space, the organization and it is normalized the intervention in the design.

## Résumé

Le projet collectif a le nom de World Tramway, il est un projet organisé par quatre lignes de recherche qui couvre la technique, l'impact, l'aspect culturel de l'objet. Le cadre de la partie individuelle à l'intérieur du projet collectif a été orienté vers deux directions: l'une sur les études de l'évolution de la conception du tramway et l'autre à la création d'un projet de communication du tramway par une plate-forme en ligne.

Dans le cas de l'aspect de la conception, il est l'analyse l'antécédent du tramway qui a créé la première connaissance de l'utilisation du rail sur les routes ordinaires. A côté se trouve l'analyse des variables de la conception qui était prédominant pour chaque période d'évolution du tramway.

Un second moment est lié à la création d'un projet de communication du tramway comme un objet technique. Il concevoir le concept de l'espace, l'organisation et il est normalisé l'intervention dans la conception.

## **INTRODUCTION**





## **Definition and justification of the subject**

The tramway is a means of transportation created in the beginning of the XIX Century. Its general definition is a vehicle guide by rail that go over the ordinary streets. The evolution of the object brought the apparition of diverse terminologies to refer to the object. Its determination was connected with the innovative characteristic of the design of the tramway. From the first terms like streetcar or tramway or strassebahn, that made reference to the use of the ordinary routes or the ones related with the source of energy like horsecar or stream tramway or electric tramway. Also the one connected with the form of organization like interurban, or its quality like light rail or monorail.

This object was the core a large variety of experimentations. One that appeared to answered to the new demand in the design. In the frame of this research is study the identification of phases of performance of the design of the tramway. The attention over the variables change according the priorities by period.

This topic is connected to the collective research by the characterization of the object according its aspect of design by the difference phases. The variables to observe are the rail design, the power source and the form of the object.

## **Definition of the scope chronology and geography**

The research has a global scope, it study cases around the world but it make attention the cases in Europe and United States. The chronological frame begins in the early XIX until now a days.

## **General problematic of the project collective**

The collective project approach to the problematic of the evolution of the tramway in the world and the process of enhancing of the object. In this way it is study the characteristic of the object to create a project of enhancing of the tramway by an online platform. The main lines of problematic are the studies of the design characteristic of the object, the impact of the object over the territory, the process of representation of the object as well as the mechanism for its enhancing.

## **General Objective of the project**

Enhancing of the tramway by online platform

### **Specific Objective of the individual part**

Analysing the evolution of the characteristic of the design of the object

Determining the main variables of the design per each phase of evolution

Designing a project of enhancing of the tramway by an online platform.

### **Justification of the research**

The relevance of the study of the characteristic of the design of the tramway permitted identified potential field for the enhancing of the object. Understanding the characteristic that were priority in each period allowed to determine in the collective project areas of attention to underline in the process of communication of the object. It constitutes to organize the form of the information of the object by phases as well as comprehends the dynamic nature of the object.

## **CHAPTER 1**

The collective project of World Tramway



## 1.1.Overview of the subject

The tramway is a means of transportation composed by a system of components. The rail, the car, the station, the power source as well as the deposit are some of the elements that provided the workability of the tramway. But its definition as object is not clear. Which is the border between tramway and railway or between tramway and metro? An overview about the terminology of the object it is possible to appreciate a large diversity of term, like roadway, streetcar, voie ferrée a traction du chevaux, tramcar, Straßenbahn, car American, cablecar, electric street railway, light rail or trolley. These differences enlarge that problematic of definition of its borders. Prosper in 1878, in his book "Tramway et Chemins de fer sur les routes", defined the tramway as an iron rail located over the public street, which is the support for the displacement of diverse vehicles. The list of possible vehicles included wagons, car or any other type. In this case the identification of the tramway it related to the existence of the rail over a public street without make discrimination about the type. Taking again the terminology used to identify the pioneer tramways, there is coincidence in the attention over the condition of a rail over the street. This is the case of streetcar, tram road or roadway commonly referred in the bibliography of the time in United States.

From a point of view of the etymology the word tramway is composed by the part tram and the part way. The part tram is origins is related with the irons lines used in the coal mines in Scottish in XVI Century. Serafón (1898) identified tram as the plateau and way as a road. The own construction of the word constitute an evidence of the innovation that, for this time, meant for the Society the introduction of the rail over the ordinary street. In this way it is possible to identify that the singularity of the tramway in relation with metro and railway it the displacement over ordinary streets in the way that the train did not need a street and the metro and underground system based on the dimension of 1m between rails.

The terminology decided for the determination of the object shows the path of period of development of the object. The richness of conditions, factors of influence that model the object are contained also in the same way that object was called. Looking for the terminology of the objects it is possible to observe the evident multi-culture influence. This influence will defined for the genesis of the object and the continuo interchange during the period of evolution. For example, in the case of France, the denomination will have diverse sources of origin according the actor that will make use of it. In the introduction it will be call voie ferrée a traction de chevaux in the legal documents related to the demand of concession for the use of

the street (Challot, 1878). It has placed because for this moment there wasn't any legal instruments adapted to this object and it has to use the train legal instruments. The interesting fact is that however it was call iron rail it won't use iron instead of it will use steel. The society will do an associative form between the train and tramway for the legal frame.

The other way to call it was car américain. It will establish for the popular and press space. This shows the origin of the technique transference. This car was brought from New York design. Then it was call le métropolitain, name that time after will be taken by the metro or sub-way. This denomination comes from the urban condition of the tramway. After, it will have the identification of tramway that will arise from technique interchange with England. In the case of this object, its definition change together with the process of transformation of the object. It is the direct evidence of the technological improvement as well as the present of process of transfer of technology.

## **1.2.General presentation of the collective project**

World Tramway is a collective project developed by student of Master TPTI with multidisciplinary basement. The main objective is explore the object of the tramway to achieve a project of enhancing of the object by the way of a communication project where to present to object to a wide public.

The organization of the project is divided in four lines of research. One is oriented to the technical and design characteristic of the tramway, the second is connected to the impact of the tramway in the urban space, the third with the process of representation of the tramway by the art manifestation and the fourth with the current dynamics of enhancing of the tramway.

These fourth lines of study is progressive connected by a system. The design of the object with the urban impact, how one and the other interacted in a mutual process of redefinition. In the case of the art representation is linked with the tramway as a thematic in the representation, the impact in the daily life of the machine, the new practices and the problematics. The fourth topic enters to cross horizontal way all the themes. The enhancing due to the value of the technical or design of the tramway as an object, or due to its responsibility in the configuration or development of the territory as well as the topic for the art representation.

A second relevant was this dedicated to the creation of a project of enhancing of the object. In this way, the attention was addressed in the creation of space where communicates the object

by diverse interest of the potential user: the object from the research aspect, the object in particular cases by the exhibition and the tramway in the process of appropriation by the citizen.

It is studied the diverse form of communication of a technique object. It is built an online project. It is designed the goal of the project, the ways of enhancing of the tramway, the space of interaction with the object, the target public, the form of communication.

### **1.3.Description of the methodology for the research of the individual part**

The subject of research corresponds with the individual part is oriented to two main direction. One related with the study of the evolution of the variables of design of the tramway and the second to the creation of a communicational project for the enhancing of the tramway.

For the first part, it is used the consultation of the literature about the subject. It is defined area thematic for the study under a chronological approach to the evolution of the design of the tramway. It is study the power sources, the form of the object as well as the requirement that in the diverse moment was demand in the design.

A second method was the comparative analysis of studies cases as a support to define the moment of evolution of the tramway. It is developed a global revision of the evolution of the tramway in the world that is considered as the support for the exemplification of the phases.

For the second part of the research, it is consulted study cases of enhancing technical object by the use of online platform. It is identified the main structure of the site, the area thematic, the multimedia support, the accessibility that help to build the system of normative of the project. For the cases of the collection, it is analysed the system of interpretation of the Dublin code for the indexation of item in the collection. It is study the case of the national library of France and the case of the Database of Canada.

### **1.4.Sources and bibliography**

For the study of the evolution in the design of the tramway was used a variety of sources. A first group correspond with technical publication of the time, like Tramways : construction et exploitation by Daniel Kinnear Clark in 1878 and 1890, or Prosper Challot with Tramways et Chemins de fer sur les routes of 1878 as well as M. E. Serafón with the book *Étude sur les chemins de fer, les tramways et les moyens de transport en commun à Paris et à Londres* in

1872 and the book of *Les Tramways, les chemins de fer sur routes, les automobiles et les chemins de fer de montagne à crémaillère* in 1898.

Other relevant repository was the google patent database, where was possible to accessed to the patent corresponding with the North American invention. For the case of the European case the patent repository used was the *Grace Guide to British Industrial History*. In both cases it was relevant to consult primary sources of the invention a studied the way that the object was design. There is large database of invention that covered all the component of the object. The limitation is the bibliography of the time did not displayed a critical analysis of all the component of the object. There a stressed over this that were important for each period. In this way it is difficult to identify if the invention were generalized or was just a trial application.

Also the database of the National Library of France, Gallica where it was founded visual material of the representation of the tramways. Other online database regular to consult was the CNUM that belong to Conservatoire National des Arts et Metiers. Here was possible to access to technical bibliography.

Other relevant bibliography, it the current publication developed by the operators and producers of Tramway. Here is exposed the intention of the producer related with the design of the object.

For the study of the form of communication of the object, the bibliography consult was the webliography nature of others website dedicated to the communication of technical object. It was study the structure of the site, the areas and the subdivision in thematic areas. Also it was study the normative followed by diverse institution present the diverse multimedia items.

For the identification of the tramway in the world is following the comparison of the bibliography support by online list of cases offered by Wikipedia. For the creation of the interactive projects, it is used the data supply by the social networks Facebook with the goal of building the system of representation of the object by the population.



## **CHAPTER II**

### Evolution of the design of the tramway in the world



The tramway, appeared in an urban context, to answer to the demand of transportation of large amount of population in specific moment of the day. The pre-existent mobility system dominated by the omnibus with horse drawn did not achieve the capability to displace a great number of passenger per time. Main limitation were in the power source that restrictive the weight. For this time, the other power source where considered no stables to be used in the interior of the city. In this ways, the variables potential to redesign was the element that related the car with the surface of the soil.

The wheel of the omnibus offered a high friction with the soft soil that characterized the street of the cities as well as for the cases of street in rocks, it was common its damages due to the irregularities in the surface. In this context is where the tramway appeared.

It took the role of connect the population from centre of the city to the periphery like in the cases of Paris where also was used to connect among them the peripheral settlements. In other case the object brought the passengers from the train terminus to the urban core or in other cases like San Francisco and New York to cross the city. In Belgium the introduction of the tramway was used to connect the high part of the city with the places of entertainment.

In the following parts it will study the evolution of the tramway and the diverse key point of its design in the time.

## **2.1. Origin of the tramway**

The origins of the tramway are related with the system of wagon employed in the iron mines in Scotland. But for XVI Century, it was rolling by the German mines the first models of wagons to move the ore to the surface for the smelting process. This was a relevant innovation because of the use of two wooden rails as guide for the wagons. This representation was made by Georgius Agricola in the publication *De Re Metallica* in 1556 (See Fig.1)

The introduction of the tramway is related to the use of the waggon-way in the transportation of ore from the mine to the port. In the early XVII Century, the owners of collieries had to reduce the cost of transportation of the mineral to the River. In Newcastle, it is reported the first use of the wagonway over wooden plat rails. Sérafon (1898) in "Les Tramways, les chemins de fer sur routes, les automobiles et les chemins de fer de montagne à crémaillère" described the object showing how the wagon rolled over these two plane wooden rails. The rail had a dimension of 1520 to 1580 mm, it was placed over pine sleepers with a space of 600 mm

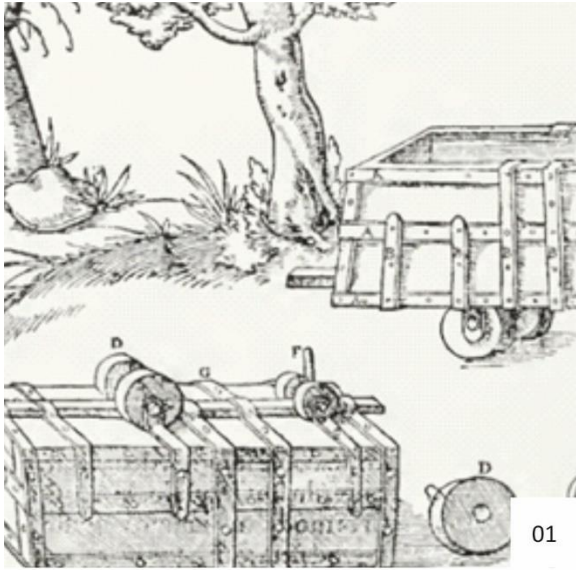
between them. The introduction of the wooden rail increased the efficiency in the mineral transportation from 2 to 3 times more than the ordinary manner (North, 1890) (See Fig.2).

But the use of the wooden for the rail had a problematic. The wooden rail used in the mines and collieries for the transportation of ore and mineral had problems in limiting the friction. This issue was common in curves and inclined planes in conditions of high humidity and porosity of the wood. To face this problem, an iron sheet was incorporated in the wooden rail. This experiment was the first the demonstration of the feasibility of the iron over the wood (See Fig. 03 and 04). For the author Kinneak Clark (1880), the section of the piece was not enough strong to support the weight of the wagon and in some cases, the double wooden rail was considered providing better performances.

The main causal was the friction of the wagon-way over the wooden and the steps of the horses that provoked the erosion of the material. The double wooden rail allowed the easy replacement of the worn out of the rail. Other improvement was the application of layer of mud to protect the rail from the horses' steps. The double rail also reduced the friction in comparison to the simple rail (Kinneak, 1880) (See fig.5).

All the effort were concentrate in the design and improvement of the rail. It continued in this way until in 1767 when the price of the iron decrease. In Colebrook Dale iron work, for this time it was in used a system of trams over wooden rail, but with the reduction of the price of the iron the need of keeping the furnace ongoing, Mr. Reynolds proposed the alternative of produce iron rail. In this way the design will avoid the material wear by the friction. It was created the "scantlings of iron" -scantling mean timber-, five feet long, four inches broad and one inch and a quarter thick.

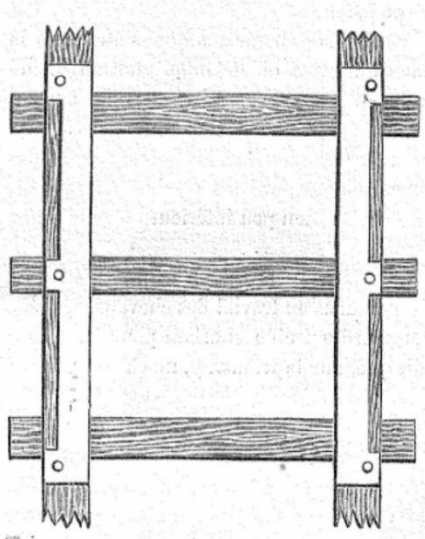
The experimentations in the Colebrook Dale with the first iron rail opened to new initiatives. It was the case of the Duke of Norfolk that around 1776 created the first cast iron rail with an L form. The rail was fixed over wooden sleeper. This form was quite useful for maintaining the wheel in the way. He used the experience of the wooden rail to use the sleeper as a support for the cast iron rail. In 1793, was introduced stone sleeper that gave more resistance and stability to the rail (Penny Ciclopeadia, 1841) (See Fig. 07 and 08).



01



02



03

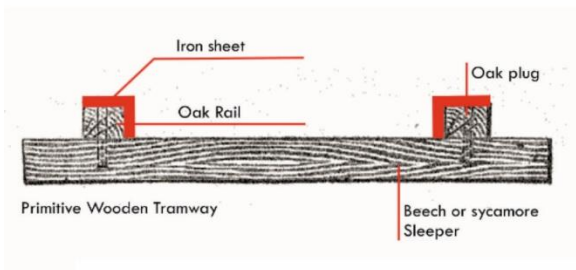
Fig. 1 Leitnagel Hund, the first wagon  
 Source: Agricola, Georgius (1494-1555) Doctor, Scholar of the Metallurgy., "Leitnagel Hund," Master TPTI groupe 2 : le tramway, (accessed September 6, 2016)

Fig.02 Archeological remains of a wooden rail from the mining in Newcastle  
 Source: Manchester Evening news Syndication ©

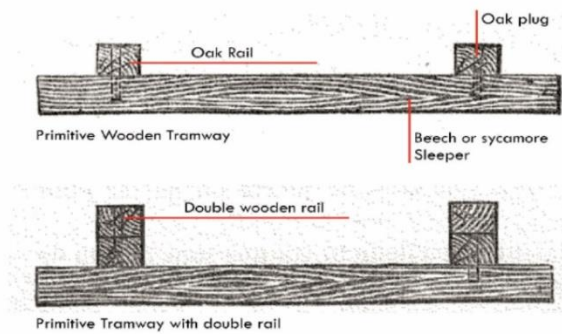
Fig.03 The improvement of the iron sheet.  
 Source: Kinnear Clark, Daniel. Tramways : construction et exploitation. (Paris, Dunod: 1880)  
 CNAM-BIB 8 Le 208

Fig.04 Side view of the adaptation of the iron sheet over the rail  
 Source: Author

Fig.05 Double wooden rail  
 Source: Zoe Misseri www.instagram.com  
 Source: Kinnear Clark, Daniel. Tramways : construction et exploitation. (Paris, Dunod: 1880)  
 CNAM-BIB 8 Le 208



04

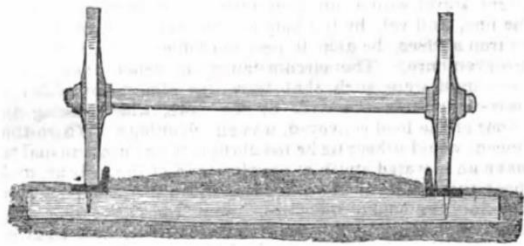


05

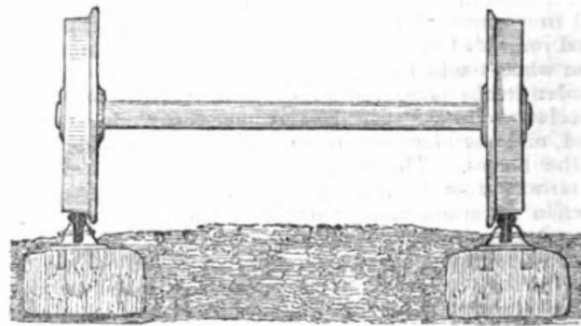
After the experimentation of new materials in the reduction of friction, engineers began to study the form of the rail to avoid the accumulation of dust and stones that commonly affected the movement of the wagon over the rail or threw it out of the rail. In the Surrey tram-road, a rib was placed under the rail. In 1801, an edge-railway with an elliptic form was used in the quarries of Lord Penrhyn. It was invented by Mr. Wyatt who quickly optimized the design to create a flat wheel to reduce the friction. This design has been the base for the railway, but not for the tramway, because it could not work efficiently in the ordinary routes (Penny Cyclopeadia, 1841).

The first rail for the tramway was made of cast iron and it was registered by Mr. Jonathan Woodhouse of Ashby-de-la-Zouch. In 1803, this was patented under the name of "A new method of forming a cast-iron rail or plate, which may be used in making iron railroads, or drags for the working and running of waggons, drays, and other carriages, on public and other roads; and also a new method of fixing, fastening, and securing such cast-iron rail or plate on such roads: dated February 28, 1803." (The Repertory of Arts, Manufactures, and Agriculture: Consisting of Original Communications, Specifications of Patent Inventions, Practical and Interesting, 1803). It integrated the experience gained in a system that incorporated the rail at the level of the street to protect them from the horse step and use a design that allowed the stability of the car over the rail. Several designs were proposed but it was the Mr. Woodhouse patent in 1803, which presented a full iron rail with an empty beam web, located inside the road. The concave form allowed maintaining the wagon in the right direction as well as its easy turning (Penny Cyclopeadia, 1841) (See Fig.06).

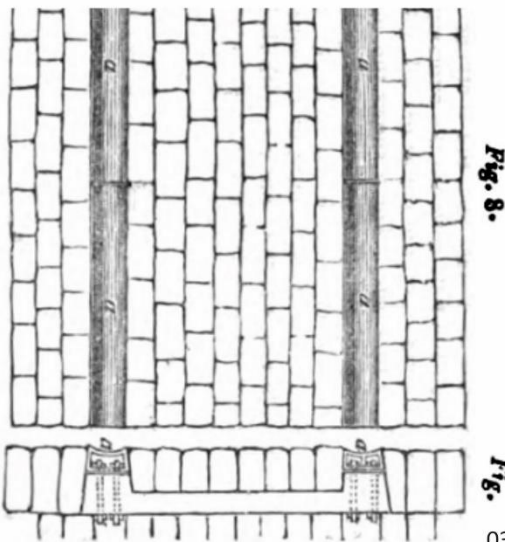
In the side of the cars, the structure of omnibus represented the ideal for its adaptation to the tramway. This car, which imperial or not style, it means to have two or one level, going on the street driving by horses. It was a mono car made in the beginning by wooden where the drive was regularly place in the roof. It was vehicles with a certain lightness and a capacity around 20 passengers. In function of the power source, the accessible one for the generalization was the horse traction power. It is well expanding the collective system of transportation. The areas of development that the context permitted was reduce the friction, reduce the material wear, and lighten the cars.



06



07



03

Fig.06. The modification of the rail in form of L for estabily of the wagon.

Source: The Penny Ciclopeadia of The Society for the Diffusion of Useful Knowledge. Primaticcio- Richardson VXIX. London: Charles Knight and Co. 22, Ludgate Street. 1841

Fig.07 The edge-rail, base for the design of the rail way.  
Source: The Penny Ciclopeadia of The Society for the Diffusion of Useful Knowledge. Primaticcio- Richardson VXIX. London: Charles Knight and Co. 22, Ludgate Street. 1841

Fig.08 The first cast iron rail designed for the tramway.  
Source: The Repertory of Arts, Manufactures, and Agriculture: Consisting of Original Communications, Specifications of Patent Inventions, Practical and Interesting Papers, Selected from the Philosophical Transactions and Scientific Journals of All Nations, Vol III Nichols, 1803

Fig 09 The first tramway in the world appear in New York.  
Source: Kennedy, William Sloane. Wonders and Curiosities of the Railway. Chicago, S.C. Griggs and Co. 1884



05

## **2.2. The introduction of the tramway in the cities. The first lines in the world.**

The growing of the urban centres, the insufficient capacity of the public omnibus system and the bad state of the streets configuration have been the conditions for the introduction of the tramway in the cities. The first experience of introduction of the tramway is related to United State, in New York City. However currents bibliographies present the thesis of the first introduction in Wales United Kingdom with the Swansea and Mumbles Railway in 1807. Nevertheless the publication of the time made reference to the case of New York City as the first. This initiative was promoted by Mr. John Mason. He inaugurated the first tramway in November, 1832. The New York and Haarlem Railway Co., who's Mason was the president, had the concession for using the streetcar in 4th Avenue. John Stephenson, coach-builder of the company was charged of the production of passengers' wagons. He was in charge of the design of the car. The line connected New York and Haarlem, a highly congested route. The public expressed curiosity for the new invention. But the success was limited. Indeed there were difficulties to the horses which made hard avoid accidents. It was closed after a while (Kennedy, 1884).

In 1852, a French engineer, M. Loubat, planned a tramway line in New York in the 6th avenue. He created a tramway line with a rolled iron rail located above the wooden rail. The fast growth of North-American cities allowed the diffusion of the tramway in United States. The success of this experience stimulated other countries to implement the use of tramway transportations.

Like in the period before, the experimentation related the improvement of the rail continued. Other were the conditions that motivated the innovation. As a constant the reduction friction to rise the speed and capacity of charge by horse, also the level between the rail and the street. It is interest to observe how in some context the design will be addressed to deal with some variables that in other context will be no considered.

One example of the improvement in the design was the order of how reduce the friction without loss the stability of the car over the rail. In the case of the rail used in New York City, it presented a hollow in the middle in order to maintain the car in the way. The English engineer Charles L. Light described this form as a gutter. He designed a new rail reducing the depth of the rut; this was later studied and used in the Boston City, USA. It propose a differential deepness with increase until 19 mm and an inclined plane on one side. It constituted an



advancement in supporting the coexistence of the tramway and the ordinary cars in the street. The richness of experimentation is quite elevated. The moment of introduction of the tramway in the cities as well as its expansion open the field to the trial project.

Philadelphia was another city where the tramway was quickly spread. As an answer to the problem of the rut in the rail, typical of New York tramway, here a new form of rail was produced. The step was 127 mm long and 22mm wide. It weighted 23kg per meter. It was used in the 5th and 6th avenue, in Philadelphia. This rail became a benchmark for other cities where it saved the name of “Philadelphia rail”. It became quite popular because it could coexist with other types of transportation (Kinnear, 1880).

The success and expansion of the tramway or streetcar in United States, created the interest to introducing the design in European cities. The Philadelphia's rail design thanks to its notoriety and its success was transferred to Europe. In 1860, it was introduced in England. After a three years long request of concession to the English Parliament, Mr. M. G. F. Train in association with the civil engineer M. James Samuel received the authorization to locate a tramway in his city, Birkenhead. He designed a model based on the Philadelphia design which was patented in 1860 under his name. It was adapted to the tarmac street. The rail was made of rolled iron with a weight of 25kg per meter. This design was extended to other cities like London and Staffordshire Potteries. The use of the Philadelphia rail was interrupted in England due to the problems caused to ordinary cars which were getting blocked between the rails.

In the same period other variables of the design began to be attend to. The access to the tramway as well as the increase of the capacity made Joseph Harris. Jr. of Roxbury developed a patent proposing a new design of car. This form allowed the passenger to enter or go out without disturbing the passengers inside the car gaining valuable space for passenger transportation. Another interesting element is related to the access on both sides of the car and in diagonal position. In this way it was always possible to enter tramway close to the walking way and not from the street (Harris, 1860).

The design of the tramway demanded a certain requirement that variety its components. In United State the efforts was addressed to adapt the tramway to a diversity of type of streets as well as the reuse of the former rails of the former train (Serafón, 1898). Also it was demanded a reduction of the own weight of the machine that limited the speediness of the object (Serafón,

1898). In other hand it was some experiences in France and United State that combined the capability of the tramway to work for passengers as well as for merchandises. Besides, other studies put the attention over the possibility that the tramway could suppose for substituting the traditional omnibus. In other line was studied the possibility of reduce the cost of construction and maintenance of the system.

Other interest in the design were the different between the level of the street and the rail. In the cities of United State this was not a problematic however in the city of Liverpool, the continue conflict between other vehicles and the rail of the tramway generated a rejection to this means. It was created a new design to guaranty the same height. This was used by M. J. Noble in 1865 in Liverpool. But the small size of the ruts in both side of the rail reduced the speed because of the accumulation of dust. It ensured the same level between the rail and the street but the experience was abandoned in the following years (Kinnear, 1880). This design made a combination of rail with cast iron and wooden.

This period parallel with the horse traction power is characterized for the reduction of the variables physicals that can reduce the efficiency in the mobility with the tramway. In other hands, there is an adaptation of the system of tramway for the coexistence with other means of transportation. This first moment finished with wide experimentation and introduction in many cities.

### **2.3. Generalization of the tramways in the cities.**

The beginning of the tramway has its core in the North American cities. The fast expansion of the cities as well as the opportunity of investment opened the frame for the experimentation. The first tramway in the world appeared in the city of New York. Here was created the first line of urban tramway. Its objective was the connection of the terminus with the centre of the city. William Sloane Kennedy (1884) in his book *Wonders and Curiosities of the Railway*, described the scenario of 1832 when the first tramway was rolling. The expectation together with the preoccupation of control the machine overfilled the observers. The event demonstrated the capability as well as the limitation that the system had it. Quickly the tramway was spread to other North American cities. The settlements located in the South part of the country like New Orleans were pioneer in the introduction.

In New Orleans the streetcar, as was identified the tramway, was built in 1835. Also Philadelphia were the city where the tramway was more developed. In 1858 is introduced the first horse streetcar. The expansion of the system for 1860 covered the demand of service that before was supply by the omnibus. It is common to think that the tramway was a means of socialization inter class, in the case of Philadelphia, the tramway was other instrument more which one segregated the population. Here the Africa-American were not admitted to use the transportation. After the protest, some lines permitted his entrance. A more efficient system of transportation motivated the middle class to move to the periphery where established their dormitory village.

In this way the tramway that was a successful experience in United States is transferred to Europe by the hand of entrepreneur that found in the land an opportunity of economic growth. In France the tramway came in the half of XIX by the French engineer Alphonse Loubat. It worked in the design of a line of tramway for the city of New York. It experience in the application of this system drove him to design a system that profit of the American streetcar and added a new type of rail. The tramway was located in the platform of DeBilley. The idea was not well perceive by the population that found in the design no imperial as well as the rail over the street a great problematic. Paris and the Americans cities were the first in applied the tramway to the urban structures.

In the case of Birkenhead, London, the tramway was introduced in 1860 by the North American entrepreneur George Francis Train. But a limitation in the legal frame restricted the possibility of developed. In the same year, it was opened a line in Alexandria, Egypt. This system used the imperial style and traction by horses. In 1863 it was opened in Vienna, Austria.

Other of the pioneer cities was the city of Berlin that in 1865 opened a line of tram using horse drawn. This line was converted to electric in 1881 turning into the second line in the world to achieve it. In 1865, the American street were modifying the landscape of the European cities. First in France with the incursion Loubat and after in Antwerp, Belgium where American streetcar where transfer. The operation began the in 1873.

Other cities tried also the possibilities of this object. In 1869 it was incorporated to the city of Brussels, Belgium. In 1869 it was built a line of tram in Brno, Czech Republic by horse drawn. It was the first to introduce the system in the Austro Hungarian Empire.

During the decade of 1870's it is moment of more proliferation of tramway in the cities. In the main cities of Germany was introduced the tramway or Straßenbahn by horse drawn. Some of them are Dresden (1872-1903), Dusseldorf (1876-1900) and Frankfurt and Main (1872-1904). Around the world other cities made incursion on this form of transportation. In 1872 it was introduced the horse power tramway in Turin, Italy. For 1873 also was introduced in Kolkata, India, by the British Colony, but a not well of management planning made it not successful and a little time after closed. In 1880 it opened again using the horse drawn. In 1875 was opened the line by horse drawn in Prague, Czech Republic. This line was built after the line in Brno. The entrepreneur was Belgium. In 1875 was built the first horse line in Naples. In 1876 it is established the first line of horse tram in Milan in the former installation of the bus. In 1877 it was introduced a horse tram in Rome. In 1878 it was horse tram in Strasbourg, France as well as it was introduced in the city of Graz a line of tramway by horse drawn power. This was the first line in Austria. In 1880 it was established in the city of Linz by using horse drawn power.

In 1878 in Milan, Italy it is incorporated a steam line. All operated to connect the city of Milan with the proximities. The first urban tramway appeared in 1881 by horse traction during the international exhibition. In 1879 it was created the first line of horse tram in Florence, Italy.

#### **2.4. Diversity of mechanic power sources in the second half of the XIX Century.**

The tramway by horse drawn represented a limitation in its development. The dependency to the animal traction power, restricted the possibility of improved the speed as well as the capacity. All the variables related with the reduction of the friction were already exploited. The only solution was to address the research to alternative form of energy.

In the way the end of the XIX Century was the frame for a large amount of project and execution of alternative form of power. The city became a great laboratory to test the new patents. The ideas were oriented over the mechanic traction. (Steam)

In 1859, Mr. M. A. B. Latta introduced the steam power in the tramway. This was the Tramway Cincinnati, which had a capacity of 80 persons per car. Mr. Latta was an inventor with experience in the design of boiler machine. During the Fifties, he developed some patents improving the locomotive design and a more efficient boiler machine (Kinear,1880).

Other example was the John Grantham, who presented the steam as alternative to the use of horses. He chose to locate the steam machine in the middle of the car. He used two boilers, one for each pair of wheels. An air box isolates the heating of the boiler from the passenger place. Grantham imagined the driver as an engineer who was placed on the back side of the car where he had full control of the machine. But the power capacity of the boiler and the limitation for the heating isolation made the Gratham car no apt to circulate in the ordinary street, since when Mr. Edward Woods redesigned it (The engineer, 1871).

The Rowan steam tramway was used in Paris to connect the Louvre Museum and the park of Boulogne as well as in the Tours-Vouvray line. It was singular because it did not produced visible steam in the air. Each car could carry 50 passengers and also could run faster than an imperial car with 70 passengers (Serafon, 1898).

Philadelphia, thanks to its rich innovation in the tramway development, was the city where the steam power was first incorporated in the tramway. Mr. Grice and Long designed and developed a long car with a pair of four wheel track located on each border of the car. The Patent developed by Long in 1862 will bring an improvement in reduce the size of the steam machine inside of the borders of the streetcar, also to locate in the same place the boiler and the engine with the last connected directly to the wheels.

The features of the city required the steam power tramway to differently perform. Some of the new issues were the reduction of the noise, the steam smoke and the quick reaction to start and stop. Mr. Leonard Jennett Todd found the solution in the water as way for accumulating the high temperature and maintaining the force in the system. Also he achieved to increase the capacity of the machine equal to 10 horse of force in a car of 44 passengers with shorter equipment. In 1917 Todd designed a locomotive for the Santander Street that could carry two cars of passenger with a total amount of 76 passenger.

Other was the Baldwin Locomotive Tramway. This model achieved a speed of 18 miles per hour. It was rolled in Brooklyn, and later it was moved to Market Street in Philadelphia. It had steam cylinders under it, which were connected with the cranked axe. The machine was located over an iron bed plate bolted to the wooden framing of the car. It passed for improvement of the design under the hands of the same company.

To make the new sources of power more efficient, Dr. Emile Lamm presented an ammonia-gas car. This tramway was rolling in New Orleans City. The system worked with a recipient of hot water and ammonia liquid gas. This gas was obtained by heating ammonia. The gas passed through cylinders placed vertically. They were connected to a crank-shaft using a chain pulley that provoked rotation in the axes of the car. The problematic with this system was to avoid the escape of gas as well as the interaction of the gas with the iron. The project was soon stopped (Kinnear, 1880).

Other form appeared as an answered to reduce the contamination due to the steam machine. The collection presents the introduction of the technique, the main promoters, the inventors and the companies that contributed to the production and the diffusion of this type of energy source for the tramway. The period goes from the late XIX until the early XX Century. The Air Compress Drawn Power is created in 1840 by the engineer Andraud, but it is not until 1875 with the Mekarski system that it became effective. This model of power had the same limitation in capacity of storing raw material as the previous machines had.

The invention of the air compress as a power source for the tramway was developed for first time by M. Mékarsky. It was used in the Courbevoie line for the Tramway of Nord, Paris. The technique used cylinders to compress the air located under the floor. Two lines of air compress were employed; the second one was place in the fore end of the car. It was filled 3/4 with hot water at 350 F. The compressed air pass through the deposit of water and it was saturated of steam. This step was crucial to help in the heating of the air. The design of the car is different to the conventional. It had the capacity for 20 passengers inside and 40 outside. It had two pair of wheels. He used the same steam air in the system for this reason the consumption of fuel was reduced. This design achieved to fill the requirements to the transit in the city (Mekarski, 1875)

Also the Compressed air car of Beaumont. This design was engaged by Greenwood and Batley. This model presented an increase of the pressure respect to the model before due to the assumption: "high pressure more efficiency". But this principle was achieved for only this car. This design had to pass for several adjustments to become more efficient.

In other hand other system were also developed like the system by underground cables. During this period there is a great exploration of alternative for of power generation. The urban space

was expression of a diversity of form and practices. The entrepreneurship gave the frame for the developed of diverse alternatives.

#### **2.4.1. Coexistence of power sources horse drawn, mechanic power and electricity.**

In Germany, there were many lines by horse drawn opened after 1870. From 1872 to 1891 it was opened cities like Bonn (1891-1905), Dresden (1872-1903), Duisburg (1881-1898), Dusseldorf (1876-1900), Frankfurt and Main (1872-1904). In the case of the steam lines, they appears at the same time that horse lines are still operated. It means that there in many cases a coexistence of steam power together with horse drawn. It is not the same cases for the electricity power. If it is true that the diverse power was working at the same time it is also true that the destiny of many horse lines were to get converted in electric ones. (Some steam power lines in Germany are in Bonn (1892-1911), Bremen (1876-1913), Duisburg (1882-1899) and Frankfurt and Main (1888-1929). As well as from 1879 it were created electric trams in Bochum, Braunschweig (1879), Bonn (1905), Bremen (1892), Dresden (1893), Duisburg (1897), Dusseldorf (1891), Frankfurt and Main (1884).

At the end of XX Century, it continued the incorporation of the tramway by horse power in some cities however other source of energy more effectives was already in use. the is the case of the city of Osijek in Croatia, that was built a line using horse power at 1884 as well as in 1885, it was built the Sarajevo Tram that was the test before the introduction the Vienna Tramway. Or in 1888 that it was inaugurated the first horse tramway in Tallinn, Estonia. The cars came from Belgium. In some case the justification to install horse system came from financial support for the investment. One example is in 1890 in Helsinki, Finland it was created a horse drawn line. In the beginning the idea was the introduction of an electric system but the condition of public property and the lack of financial supply turned in the alternative of the horse drawn. For 1891 in the city of Zagreb, Croatia incorporated a horse tramway as an answer of the demand of mobility in the city as well as in 1892 in the city of Minsk, Belarus.

At the same time that the horse drawn lines where working, it was open in the cities others using mechanic power. In 1878 in Milan, Italy it is incorporated a steam line out of the urban zone. All operated to connect the city of Milan with the proximities. In 1884, entered in operation in Brno, Czech Republic, the firth steam tram related to the Steam tramway Company.

For the end of XX Century the electricity appears as other form more of power. The past to electricity coexistent with the steam power. In 1891 appeared electric lines in Prague, Czech Republic to connect the terminus with a place of entertainment. With the arrival of the XX Century, the electrification of the tram was in the hands of the Electric Company of the city. From the 1960 the tramway was competing with the capacity of the metro. In 1894 appeared the Gmunden Tramway, operated by a national company Stern & Hafferl Verkehr and it was constituted by a line, a depot and a power plant and administrative buildings. It connected the terminal with the centre of the city as well as the case of Linz city in 1898 under a system of electricity.

Many of the horse line that was not adapted to the steam power, with the revolution of the electricity was converted. In 1898 the horse tram were electrified. In 1898 the German city of Augsburg, converted its system of horse power to electricity passing also from the standard gauge to the meter gauge.

The steam power trams was all converted to electricity one. Nevertheless, in some case, maintained the steam system was cost less than to electrify all the network. An example is in 1900 the electric tram of Brno, Czech Republic opened. It was under the property of Company Brno. The transit from one form to the other took time due to the steam power system continued to be more feasible than to convert all the network to electricity.

In 1894 it was introduced the electric tramway in Brussels, Belgium. In 1895 the tram of Sarajevo, Bosnia and Herzegovina passed to electricity. In 1902 it was electric the tramway in Antwerp, Belgium. In 1905 it was created the electric tramway of Innsbruck, In Belarus. In 1910 was opened the first electric tram in Zagreb. It was not the first tramway in the city.

The operation of introduction the tramway was in cases developed by foreign investment. Like in 1898, in Sofia, Bulgaria was given the concessions for building lines of tram to Belgium and French operators or in 1915 the Russian Baltic Shipyard built a steam tramway in the city of Tallinn, Estonia. In 1925 was opened the electric lines.

In the beginning of the XX Century it was the wider concentration of diversity of power sources. As regards the case of Alsace in France, from the period of 1900 to 1930 it were working steam or mechanic system (Strasbourg, Ribeauville) and electric (Colmar, Mulhouse,



Strasbourg, Teckeheim) or in Aquitaine, France in the same period, there were working horse drawn (Hendaye) steam or mechanic (2 Bayonne.Anglet Biarritz) and electric (Arcachon, 3 Bayonne.Anglet Biarritz, Bordeaux, Hendaye, Pau). In the same way, it is the performance in the other provinces. There is a confluence of form of power, with a decline of the horse drawn. However it is possible to find settlement that the horse drawn was incorporated in in the decade of the XX Century. An observation to the introduction of lines by power sources there is an increase with the introduction of electricity that go over the double of the amount of lines pre-existent. In the case of France, there was before around a two percent of horse drawn line more than the lines using the steam machine due to this source should compete with other alternative mechanic power like air compress and gas. In the case of the electric lines, the total is 5 times the amount of horse drawn lines. This happened due to the electricity, the modification in the design of the tramway will be oriented to the efficiency of the system in terms of capacities per travel, force and in the current times comfort and accessibility.

During the early XX Century, the lines of tramway that in many contexts belong to private companies passed the municipality property. Some examples are in 1917 the tramway of Milan passed to public property as well as in 1929 the tramway of Rome and in 1937 the tramway of Naples.

If the introduction of the power source of horse drawn and the mechanic one, were developed in many cases by a variety of entrepreneurs, the introduction of the electricity brought the present of monopolies controlled by the Electric Companies.

The introduction of the tramway in its diverse power sources, arrived to the little cities by the importation from other countries. For the beginning of XX Century, some of these countries dependent of the importation, opened their own productions. In 1931 in Sofia, Bulgaria, that before imported the tramway, it began to produce its own cars. During the second half of XX Century, Bulgaria was in charge of the production of engine and tramcars.

Other form of incorporation of the tramway was by the form of donation. In the end of the XX Century, there are evidence of the donation of old tramway from one city to another. This is the case of tramway common from the city of Amsterdam to Sarajevo.

During the first part of the XX Century, was developed other models of tram that use double wagon or an articulated system. The main attention was in the variable of capacity of the tram per travel.

For the end of the first half of the XX Century, in many cities there pre-existent system of tramway was already working with electric power. From the beginning of XX Century, the metro, an underground system of massive transportation were in operation. For 1950, other form of transportation like the trolley bus appeared and it began the decline of the tramway in many cities. Under concepts of renovation of the urban area as well as due to the incompatibility with the rise of the individual form of transportation, many lines of tram were close.

## **2.5. The creation of combined form**

The tram train is an adaptation of the traditional tramway to a diversity infrastructure. From the beginning of the exploitation of the tramway under the used of the horse power, there was the requirement of the adaptation of the tramway to the pre-existent lines of railway.

Other form was the interurban tramway well developed in the countries of North America oriented to communicate among cities in the periphery. It was created for the beginning of 1900. There are examples in the city of Chicago and Quebec. It is a system of electric of self-generation of energy. It achieved the major expansion during first 20 years of the XX Century. Cities like California, Illinois and Utah were examples of its expansion. This system finally failed after the First War World due to financial problem of the producers and operators (Bradley, 1991(,)).

Inside of the city the tramway made use of their network and in the periphery the tramway took the network of the train. One example is the case of the Karlsruhe Model well spreading in Germany. It was created in 1979 in Karlsruhe by AVG but was not inaugurated until 1991. Other experience took place in France, like the Mulhouse Vallee de la Thur tram train as well as in the line 4 in Ile de France, France. This system is used as a tool for the development of town (AVG, 2015, 3-6)

After, it was designed other form of tramway that combined the experience with the trolley bus and the tramway and the monorail. This the case of the tramway with one rail. This system is guided by a rail and the cars are support by tyres. It uses a system of aerial electric power. The first experience was developed in Russia in 1820 by Ivan Elmanov. During the early XX Century there was an exploration of several form of monorail like the French Lartigue system.

With the electrification of the tramway line one the social regression to the system was the external network of wires. This problematic continued until the end of the XX Century where an underground system was created for the transmission of the energy. However from 1896, some experiments were done in the possibility to charge energy by a land system.

The path of innovation of other form of tramway, demonstrated the recycle of the innovation through the history. It is not more than the cycle approach of the accumulative knowledge.

## **2.6. The tramway inside of the environmental policies and comfort.**

During the second half of the XX Century new design of tramway where address to achieve diverse goals. In Eastern Europe the interest was to improve the capacity of the tramway experimenting with double wagon and articulated form. This allowed to maintain the system until now a days. In Western Europe a part of the pre-existent lines got close in the measure that other were expanded and renovated.

In many cases the traditional lines where complete close and at the end of the XX Century the system was reintroduced with an increase in the capacity of passenger by travel and under the concept of cost loss. This event was motivated after the oil crisis for the end of 1970'S that brought the need of find alternative for of transportation for the city with a less consummation of oil.

In term of comfort, from 1999 it is introduce the system of low floor. The requirement in the design during the XIX Century was related with the accessibility of the tramway to the handicapped. In this way, it was introduced models of low floor trams produced by Skoda transportation and designed by Porsche in Prague. This is a requirement that appeared from the beginning of the introduction of the tramway. During the beginning of the XX century was

developed some project of step less to equal the level of the cars with the walk way. One example was the Hedley-Doyle Stepless trams.

In the case of France the tramway is currently used inside of global mobility strategies. It count with a high capacity of transportation per travel. Its renovation go together with plans of restructuration of the mobility in the cities more over the centre of the cities. In the case of Nantes, France the tramway achieved to motivate the use of the public transportation over the individual one also the possibility to use intermodal form of transportation providing in the design of the tramway the accessibility of bike, a complement in a large network of transportation. Other example is the city of Strasbourg with its plan for accessibility to the centre and the inclusion of an efficient line of tramway. In Paris, the rediscovered of the tramway is concentrated to complete the system of mobility in the border of the city.

Also the tramway is used as a tool for requalify the urban context. The inclusion of the lines is joint with process of urban renovation. One example is the city of Grenoble and Nantes that from the 1985 carried large activities of urban renovation. The used of a system like the tramway over the ground allowed the development of the economic with the accessibility to many businesses. It promoted the creation of integral system of mobility from the pedestrian infrastructure until the individual means of transportation.

In Italy the new lines of tramway are located to cover the great displacement in the city. Like the case of Padua after the close in 1950 it is incorporated again in 2007 with the introduction of a guided system of Translohr.

The significance of the tramway is associated to environmental conscience. In many cities of the world the introduction of the new form of tramway is argument by conscience in the use of power. Also it is a symbol of modernization of the cities. The company producer of tramway work around the world. France companies work for the introduction of expansion as tramway in cities like Sao Paulo, Brazil (Ministry for ecology, sustainable, development and energy of France, 2012) It is considered that the energy that the electric system required is low, also from the point of the view that recently design there did not have almost acoustic contamination.

## **2.7. Determining of the phases of evolution of the design of the object**

The analysis of the evolution of the design of the tramway permitted to identify the present of phase of the evolution of the object. The definition of the phase did not has a precise temporal border. Instead of it, it is determined by the congruence of conditions.

The first phase corresponds with the period of the introduction of the tramway and the use of the horse drawn power. It began in the 1832 and continued middle of the second half of XIX with the introduction of alternative form of energy. The period is related with the modification in rail with the goal of reduce the friction, over material wear and maintains the car in the place.

The second phase was related with the exploration of alternative for power source. It began middle of the second half of XIX. The variable of design was the power system and the term of the tramway will change according the type of source. It the moment of coincidence of a large variety of mechanic system together with the pre-existent horse drawn.

The third moment is connected with the electrification of the system. The variables in the design will be related to ways of transition the energy. It is a moment of standarization in the design and adaptation of the pre-existent form of tramway to the electric system.

The fourth moment is related with the apparition of a variety of form of combined form that integrated models of tramway before with other form of transportation. The variables of design was oriented to the process of adaptation to the infrastructure of the city. Also it is a moment for the increase of the capacity of transportation of the object.

The firth correspond with the reduction of the environmental impact as well as the answering to variables of workability, comfort and accessibility. It is represented in the current period.



## **CHAPTER III**

Project of enhancing of the tramway in an online platform





### **3.1. Identification of a platform**

There is great diversity of platform where is possible communicate an object technique. Some of them as a temporary character or permanent. From a publication of a written material, the creation of an exhibition, the collection as well as the forum of discussion are some of the frame with the Tramway object could explained. With the aim of developed a permanent project that could be addressed to a wide public, it was decided to follow a digital support with the possibility to be accessible for a large group. It identified the competence that the website had in relation with these requirements. At this effect, it was selected the platform Omeka to support the communication project of the tramway.

Omeka is platform wide utilized around the world for organized database as well as to developed cultural projects. It has a free access and it is compatible with structure of collection for archives or academic bibliography as well as to developed exhibition in form of museum. Some examples are the L Arxiu de la Paraula, that is a repository of sounds, the Gothic Past related with the communication of medieval buildings in Ireland as well as Identities: Understanding Islam in a Cross cultural context. The possibilities that Omeka allowed is corresponding with the area of interest of the communication project.

It count with variety of plugin that permits diverse operation like index items, organizing them and presented by exhibition. Also it presents a singular tool addressed to the development of interactive project. The first ideas of the project.

### **3.2. Design of the project of communication**

According the capabilities of the Omeka platform, the competence of the team as well as the time, it was explored diverse ideas of organization of the project from a database to an interactive project. The first conceptual organization was the interest of creation of a database of case of tramway in the world. Using the plugin of items and collection could be possible to building a repository of cases. But the simple indexation of cases limited the possibilities of interaction with the user, the motivation of the appropriation over the project and the object as well as to cover a variety of interests.

Second idea was the elaboration of an interactive project based on the transfer of the technology of the tramway around the world. There was the empiric idea that the tramway technology transfer was a topic developed among cities and by countries. And it was based on the

introduction of the tramway as well as its consolidation as a system was in the hand of private entrepreneur that interchange their experiences. However in other context the monopoly of the state over the iron way, limited the exploration and diversity of practices. This thesis, was the motivation to create a visual space where by items it could be indexed the point of origin and destiny as well as the promoter and the technique applied. The limitation of the project was the lack of information about this variables as well as the physical restriction that Omeka had it to relate more than one topic by market in the neatline.

Finally, it was decided to work in the direction of offer a diversity of spaces where diverse public and interests could find an answers. In this way, the project has as main objective the enhancing of the value of the Tramway system. With the goal to achieve it, they are determined four supporting objectives:

- A. Demonstrating the cultural values
- B. Enhancing the economic value
- C. Stimulating the space of cooperation
- D. Motivating the appropriation

These objectives are developed by operational tasks that structure the informational architecture of the website. (Fig. 1 Diagram of correspondence between objective project and operational task and informational architecture) The website provides the functionalities associated with three activity sections: digital museum, archive and contact directory.

In the case of the Demonstrating the cultural value of the object, the project is oriented to create exhibits that developed thematic that underlines the contribution of the tramway to development and growth of the cities. Also from the position of the divulgation of the good practices in term of enhancing of the tramway like form of association, institutions, project, databases etc.

For the enhancing of the economic value of the tramway, the energy is addressed in the construction of collection of sources. From diverse database of the world is complicated the evidence contained in the manuscripts and bibliography which is organized and classified according topics. This structure allowed a flexible consultation of the materials well as the sequence of a temporary path. This ensemble represented a resource in term of economic due to store the knowledge gained in the design of the tramway in the time. The free access and the

intentional organization of the collective turned them into a potential source of creation and answers to possible situation related with object.

In the case of stimulating the space of cooperation, the goal is achieved by the elaboration of an inventory of institutions, civil organization, producers and operators of the tramway and its components. This repository is an active platform for the identification of potential interchange of ideas, projects and contacts.

Finally, the communication project, has the goal of motivating the appropriation of the tramway by the wide public. Three space of actions are created for get this aims. The capabilities that the user of the website make their contribution to the collection. Personal material of the family, photos of the people using the tramway, stories and archive material could be index and interchange in public way. In this form the space turn from be a fixed frame to a dynamic system where the public could feel them represented. The second decision is uses an accessible vocabulary for explaining the object. In this way it is elaborated diverse scenario where the information is oriented to diverse interest. In the collection there a language more technique related with interest of research, in the exhibition the language is non technique is addressed to a wide public and in the Neatline projects, the object is communicated using the daily boards of socialization of the users by Internet, like facebook, Instagram etc.

### **3.3. The spaces of communication of the research**

With goal of achieved a target communication of the object according public and interest of the public, the project is divided in diverse scenario of interaction with the topic. Archives, Museum and Directory are the three global frame where the speech of the project is presented. To support the communication strategic is necessary to determine the language written as well as visual. In this part is presented the goal for each section and underline the main guideline in the language of the site.

#### **3.3.1. Section of the project**

The content created in the site comes from two types of origin: from specialized published sources and from the common people. The format and the type of the content related with the site correspond with the requirement to achieve the objectives declared. The content is organized follow three section of activities: Digital Museum, Archives and Contact Directory.

The structure of the website is supported by the used and index of item. The Omeka platform provides of Dublin Core for the index of items.

### **Archives Activities**

The archive is made by the index of items provide by specialized sources. These registers are associated by collections for a better narrative of the depot. The utilization of technical and historical sources is compatible with the level of requirement of the system for the indexation of the item. The same resource Dublin Core can be used in the control of the quality of the information provide by contributors -users-. The administrator can ask for additional elements and help in the process of index by the Contributor Contact plug-in. The format covers diverse modalities: text, graphic, photography, video and audio and interactive elements. The type of elements is patents, urbanizations plans, cut press, letters, technical articles, illustrations, news documents audio recording and video.

The format covers diverse modalities: text, graphic, photography, video and audio and interactive elements. An analytical description helps in the comprehension of the source. The use of Tags and search tool by key works contribute to the accessible of the contents. The compendium of elements constituted the largest one.

### **Museum**

The museum section is support by the exhibits and interactive projects. The exhibits are narrated through the Global Impact and the Cities study cases. A main text structured the different items presented in the exhibit. The items have the type and format that the items index in the archives. They are present in simplified way following the communication rules for museum in digital frame. The description text will have a body of 500 characters for maintain the attention and motivation of the user. The use of relation item could provide the user to go deeper in the topic according there interest. As standard the number of items in the exhibitions will be 40 according with the informational organization of the website and the capacity of the screen without need to used scroll.

The interactive projects will be created with the newline plug-in. Content in format of image and type like maps, letters, illustration could be the support. Items will be related to get and actives positions of the user in the site. The quantity of item related will be reduce to not more than 15 items with the goal to concentrate the attention and the comprehension of the piece.

## **Contact Directory**

The way for index the directory of Museums, Institutions, Companies, Worker organizations and experts will be developed by the items creation and the collection. It will follow the same logic that in the cases before.

### **3.3.2. Language**

The language selected is the English to increase the accessible to a wide public. However literature sources will appear with in the original language. By the utilization of the Contribution plug-in, it is possible to acquire the translation of sources donned by users.

The volume proportion between visual elements and text change according the activity section and the majority target group for section. In the cases of the archives the majority of the target group is a public with a high level of specialized and capacity of comprehension. The use of a specialized vocabulary could not support a restriction for the user. However the utilization of tags, key works and relation items can facilitate the search of more complex items.

In the section of Museum, a colloquial grammatical structure and common vocabulary assists in the communication of the information. Short text and visual items will dominate the screen space. The size of the font could help to make stress over the most important elements. The color selected as a background are clear in the way that eraser any other distraction that composition resource could stole from the object. The red and black is employed to make relevance over interest point like access to other page.

A simple composition, related with the user experience in other support of communication like review will be used as an opportunity for the page composition. The information bring for the contributor will be control by the role of the administrator as well as the scheme that Dublin Core establishes. The site work like a complex which the user can visit looking for different interest in several times.

### 3.4. The organization of the website and the diverse spaces of interaction.

The structure is divided in three sections: Museum, Archive and Contact Directory. The Archive is the repository of all the items. It is organized in thematic collections and it contains the items that will be used in the Museum and Contact Directory (See Fig. 10 Scheme of level classifications of content)

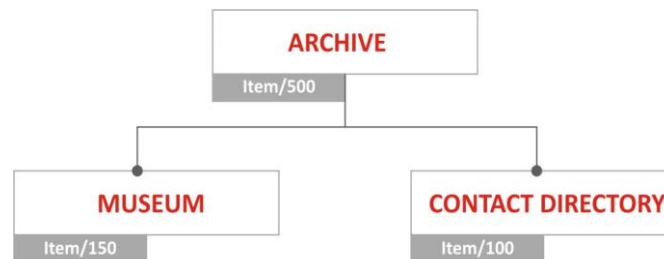


Fig. 10 Scheme of functional level of content dependence

Source: Author

The functional classifications will not correspond with the order of apparition of the section in the pages. According with the potential target groups and the objective of the project, the space of *Museum* will be the first one, follow for Archive and Contact Directory in this order. (Fig.11 Relevance and volume of structure per sections)

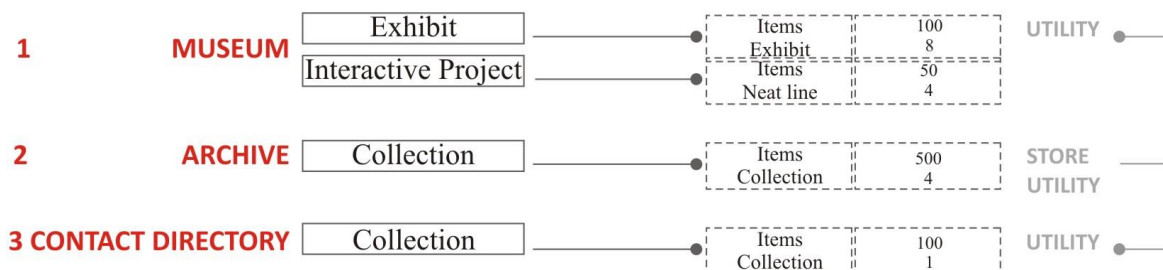


Fig. 11 Relevance and volume of structure per sections

Source: Author

The use of the Omeka platform provides a fix structure of Metadata. The Dublin Core structure the item construction. It is possible to add a new configuration according other item types that they were not previewed in the default configuration.

The Home page will provide the description of the Project as well as some features of the material that is presented in Museum. From Home page, it is possible to access to the difference sections: Museum, Archives, Contact Directory (See Fig. 12 Site map of content sections)

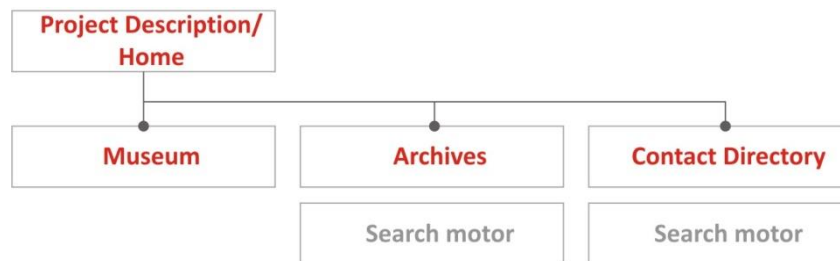


Fig.12 Site map of content sections

Source: Author

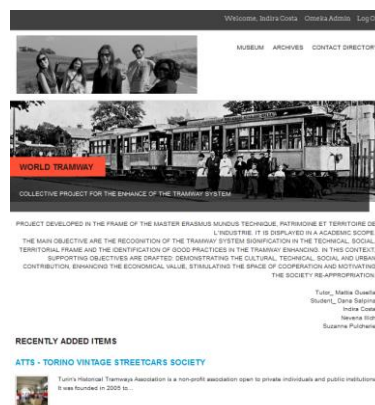


Fig. 13 Home page

Source: [http://pireh-dev.univ-paris1.fr/TPTI/groupe2\\_tpti/](http://pireh-dev.univ-paris1.fr/TPTI/groupe2_tpti/)

The homepage follow a simple design for the better orientation of the user in the page. The main sections structure the page follows the potential order according target groups and the objective of the project. From home it is possible to receive a short description of the website, the project and the actors related. The featuring of collections and recently items contribute to attract the same user more than one time. The images in the home pages are presented in black and white for address attention over the sections and information as well as maintain equilibrium among the elements (See Fig. 13)

### 3.4.1. Including the public in the continuing construction of the platform.

The nature of the project supported in the collective work but limited to the time of the master addresses the necessity of design a strategic that enables the site to continue its feeding.

According to this interest it is recommended to identify sensitive groups that could feel the motivation to contribute with new information to the website.

The Contribution plug-in permits the opportunity to involve passion people in the development of the website. The main objectives are to maintain the website and renew it as well as facilitate the appropriation and recognizing of people, institutions and companies participants of the history of the tramway and its future. It is possible to create a collective archive. The administrator of the website could control the quality of the information. The possibility of contact with the contributor will be managed with the Contributor Contact plug-in.

The project of enhancing of the tramway by an online platform is an opportunity to approach the public to the comprehension of the object. It permits to increase the sensibility of the user as well as motivate the process of appropriation of the object by the Society.



## **Conclusion**

It was analysed the evolution of the characteristic of the design of the object. It was studied the variety of the sources of energy as well as aspect of the form. The analysis of this characteristics allowed to determining the main variables of the design and the phases of evolution.

It was identified five phases where the main variables of the design change following diverse goal that the phase before. Form of the rail, power source, adaptation of the pre-existent structure and standardization, adaptability to a multiple infrastructure and capacity of passengers and the last, with the workability of the object, accessibility and comfort.

Finally it was designed a project of enhancing of the tramway over a platform on line. It was determine the organization structure, the system of communication and interaction with the users. It was created a design that answering to wide public and diverse interest.



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