

UNLOVED INDUSTRIAL HERITAGE AS A MOTOR FOR URBAN REGENERATION.

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INTRODUCTION

While moving towards a sustainable society, conservation and reuse of valuable industrial heritage is becoming more and more important from a social, cultural and historical point of view. The reinforced concrete industrial buildings that were built in the early 20th century, expressed the symbiosis between structure and architecture. Many of these buildings were abandoned when the industrial activities ended, even when they were protected. As a result, many of these sites became cancerous spots and sources of criminality in the city. Some of these early industrial buildings in reinforced concrete have disappeared by now; others survived and are now listed as historical monuments. Yet, the conservation of these early concrete industrial buildings is a greater challenge than one might expect. Due to their industrial importance, most of these buildings had an important impact on their environment. On the one hand, they caused intensive traffic, noise or pollution; on the other hand, they guaranteed employment and the development of the neighbourhood. These building sites are part and parcel of the history and the daily life of the city and its citizens. Therefore, their rehabilitation is more complicated than just finding a technical solution for their survival.

The conservation of these buildings and the requalification of their surroundings can only be guaranteed by an appropriate reuse. We should conceive these industrial areas as an integral part of the city, 'seeing the ground as a written place' (Gierstberg, Vroege 1996: 2). These areas function as a palimpsest, carrying the inscriptions of both the past and the present, thereby supporting the identity of the city.

Breweries and their fame, tangible and intangible, are inextricably connected with the cultural heritage of our country. On the European continent, brewing beer goes back to the Celtic and Germanic period. In Flanders, almost seven hundred breweries are listed in the inventory of the architectural heritage. Due to the increase of scale, many of these industrial areas were abandoned and became a wasteland. The size and location of these industrial areas offer new perspectives for the improvement of the city. This industrial heritage can be a strong catalyst for the development of their surroundings.

Although the cases that can be described are innumerable, we picked out two 'modernistic' breweries which are exceptional witnesses and representatives of concrete industrial buildings in Belgium. These sites are the old brewery of Wiels in Brussels and the Lamot brewery in Mechelen. These remarkable and impressive examples of an industrial past have recently been reclaimed, restored and transformed. They can be seen as one of the most impressive realisations in Belgium.

The reuse of these industrial buildings was successful and determining for the revitalization of the built environment. Due to our recent awareness of the importance of renewable energy it is no longer acceptable to lose energy and capital by demolishing these sites. The re-use of these old and flexible industrial buildings has a high economic value because of their changeability and multi-functionality.

Their economic, functional and physical lifespan makes it possible to assign a diversity of values to these building, which led to a socially accepted reuse. Yet, the refurbishment of these industrial sites was not at all evident because the circulation inside the building was only suited for their industrial function.

The brewery Wiels, Brussels, which is reused as a centre of art, will be analysed by going into the architectural and technical details of the renovation. The process of the determination of the new use, the assessment of the reinforced concrete structure, the strengthening inventions, the design options in relation to thermal insulation and fire safety, will be discussed. The assessment of the building deals with the evaluation of historical, structural and architectural aspects.

The brewery Lamot, Mechelen, which is reused as a conference and heritage centre where culture and commercial activities are integrated, will be discussed by means of models, which describe the process of reuse and give insights on factors which determine the success or failure of the renewal and improve sustainable performance.

BREWERY WIELS, BRUSSELS (1930).

The industrial area of the brewery Wielemans – Ceuppens is located to the south of Brussels, in the periphery of the city centre of the capital of Belgium and Europe.

The Wiels building, which is an exceptional witness of Belgian modernistic industrial architecture in Belgium, was designed by architect Adriaan Blomme in 1930 and acts as an urban landmark. For the technical aspects of the construction, the company Wielemans – Ceuppens was appealing to the Brussels engineer Sarrasin.

The architecture of this Blomme building features a modernistic lay-out, a construction of reinforced concrete, compact building volumes in white rendering, outspoken horizontalism through strip windows together with art-deco elements. The brewing room designed by Blomme is an example of the attitude of a time during which the distance between production and consumer was getting smaller and which is expressed by a transparent and visible architecture. The room is unique both from a historical point of view and from its architectural concept. In this monumental room, enlightened with twelve-meters-high windows, still three original brew-kettles are present.

The architectural concept shows the rationalism of production techniques by creating 'a company as a display window' and provides an extraordinary clean and functional work surroundings. The safeguarding of this brewery is the last track or witness of the famous brewing industry of Brussels.



Source: architects Art & Build Source photo: M. Plissart



Source: architects Art & Build

Evolution.

The first buildings of the brewery Wielemans – Ceuppens were erected in 1880 because of the inexpensive terrain and the presence of the Zenne river. Due to its continuous expansion, in 1903 an extension with a building consisting of a machinery and brewery room, in industrial art nouveau style, was added. The famous brewery building of architect Blomme was built in 1930.

By the end of the 20th century the Wiels brewery lost its productive function due to the increase of scale, thus falling into total disuse. In 1980, the brewery was sold to Inbev. After more than one hundred years of brewing activity, at the end of September 1988, the last Wiels beer was brewed.

At first the importance of this heritage and the historical values of the machine park were denied. Four of the eight brewing kettles were dismantled. After that, the place turned into a contemporary ruin. In 2005, a selected design competition was launched, which meant the start for a revival of the building and its district.

Reuse concept.

Wiels is neither a museum nor a gallery, but an innovative institution, integrating functions which are traditionally separated such as presentation, workshop and art-education, in one organisation structure. The re-use strategy contributes to the extension and realignment of the urban area and the surroundings. The ground floor functions as a meeting place as well as a workshop area. By the development of social – cultural programmes and by providing employment for the host community, this art centre creates a social link.

Functional reuse strategy.

The Blomme - building exists of three components. The first part, where in former days the brewing process took place, and the brewing room, are converted into exhibition rooms, reception and a bar and restaurant. The back wing of the building, the place for the silo or grain warehouse, is transformed into studios for artists, an administration area, a documentation centre, technical workshops and a multifunctional room. Opening up these building to the public included tightened regulations concerning accessibility and fire safety. The structure of the reinforced concrete building would have changed drastically if one would have tried to insert accurate circulation into this volume. The decision to add a new construction to provide the circulation as a link between the brewing area and the silos, made it possible to preserve the listed building and conserve the characteristic volume.

The adjustment of the building is limited to modifications for increasing the bearing capacity, security and sanitary supplies. These adjustments have been introduced in a very subtle way so that hardly anyone will see that they are new. Only in the silo extra floors were added and new openings in the walls were made to get more daylight.

Construction of the brewery and structural repair and strengthening.

The old brewery displays a spectacular construction. The brewing room with the connecting silos (grain warehouse) was erected entirely in reinforced concrete. Through the use of concrete the structure carries heavy loads so the walls are punctured with broad horizontal windows. Breweries have a purely functional construction. For functional reasons all beams and columns have different dimensions in relation to the weight of the brewery equipment such as brewery kettles. The equipment was mainly carried by beams. Structurally some interventions were carried out to ensure the strength and stability of the building.

The brewery component of the building is built up with four concrete porches. To ensure the stability in two directions on the first floor, two Vierendeel trusses¹, a frame with fixed joints that is capable of transferring and resisting bending moments, are assembled. The porches are connected with beams. The bending is limited by this entirely hyper static structure. These trusses, together with the columns in the walls, provide the load bearing capacity of this part of the building, so that the floors can remain very thin.

Detailed information about the reinforcement was available. This information was in accordance with the built construction. Flaking occurs where water infiltration lead to corrosion of the steel reinforcement bars. Material tests on the concrete slabs showed that the carbonated depth passed beyond the reinforcement. Due to the insufficient concrete cover of the steel reinforcement bars, the steel was corroded and carbonated. To repair the reinforced concrete, an epoxy layer was applied first and then reparation and equalisation mortar was added. New plaster ensures the building its original aesthetic.

The compression tests revealed that the quality of the concrete was good. The load bearing strength of the floors met the requested capacity. The only exception is the floor of the brewing room which is very thin, due to the fact that formerly this floor functioned only as passage between the kettles. For this reason this area is being re- used as a circulation area.

The silos functioned as a warehouse for grains. The structure of the silos comprises of a coherent system of monolithic concrete walls. The separating wall between the silos fulfils an additional strengthening role. Due to the poor quality of the steel, the reinforcement bars of the silos were almost entirely corroded. During the restoration process they were replaced by new ones and a fifteen

¹[1] Arthur Vierendeel (1852 - 1940) a Belgian civil engineer developed this regular truss, which comprise members that are commonly assumed to properly pinned joints with the implication that no moment exists at the jointed ends.

centimetres thick low alkaline gunned concrete was applied to a new steel reinforcement net to provide the necessary structural strengthening. By introducing extra floors in the silo, the stability was improved and the required openings could be created.

Sustainability.

In the domain of sustainability, no special measures were taken because to preserve as much as possible in the original state. No heat insulation, no double glass and no isolating window frames were used. The new steel window frames were manufactured according to the old production process. The original steel and model was used. Almost everything was restored in the identical state. Only a few isolating interventions were applied such as placing ten cm thick roof heat insulation. This intervention has a large influence on Energetic level of the building. The Belgian minimum standard requires a K-level² of 45. Yet, calculations prove that the current K-level is much higher than allowed by the standard. If the walls and the floors were isolated additionally with 4 cm polyurethane isolation and the windows were provided with a better isolating glazing, a K- level of 33 could be obtained. This would significantly increase the comfort of the building.

The energetic aspect often is a delicate issue when dealing with monuments. Thermal isolating leads almost always, directly or indirectly, to damage and loss of historically valuable material. Natural ventilation and a large buffer capacity, characterising for the historical architectural style of these industrial buildings ensured a favourable inner climate.

Water originating from the swampy underground is pumped up but is not reused. This water could create multiple durable solutions if it was used to withdraw warmth or cold by means of a heat pump. It is also possible to use this water for the toilets and the maintenance of the building. The ventilation is delivered by a mechanical system, for both the evacuation and the supply. The ventilation air is preheated with a heat winning apparatus.

Fire safety.

Fire safety in historical buildings is more focused on the stability of the building than on the curtailment of the fire. The structural elements of the floors above the lowest level have to guarantee a fire resistance of more than 1 hour. The most essential concept is the evacuation of people and the intervention of the fire brigade. For this reason the building is classified into compartments of which the surface is limited to 2500m² and no point of the compartment should be more than 30 meters away from an evacuation way.

BREWERY LAMOT, MECHELEN (1922).

The re-use of the Lamot brewery in Mechelen is a part of an interesting city renewal project. The brewery Lamot, located near the river Dijle, was one of the largest industrial sites in the old city centre of Mechelen, and played a prominent role in the economic and social life. The extension of the brewery was an ongoing process, which led to a conglomeration of several buildings. The most important cause of disuse is of a demographic nature. In 1995, the brewery stopped its activities because it was impossible to expand further.

The brewery is an identification point for people and has an important identity value. Many local people worked there. The architecture of the brewery tells the story of the history of brewing in Mechelen over the last 367 years. Because the building was not protected as a monument, the construction parts which were no longer sufficient because of structural and aesthetic reasons were demolished and replaced by new buildings. With the refurbishment of the building, only a small part was preserved. The oldest part with the brewing kettles, approximately one eighth of the former complex, was in a relatively good condition and was kept intact. The reinforced concrete structure of

² K-level is a number which indicate the degree of thermal losses of the skin of the building. The term not only takes into account the heat insulation degree but also the degree of compactness

the building which is hidden by brick façades was in a good condition. On the ground floor level the concrete structure was kept but the brick skin was removed and replaced by glass.



Source: <http://mapt.stadmechelen.be> Source: 'A&U, 2005

Rehabilitation.

The aim of the project is to mix culture with commercial activities by creating an intentional conflict, as a result of which commerce is fed by culture and culture can react by commerce. Because of this, a continuous movement of projects and activities will take place, with the heritage of Mechelen and the region as central topic. The new mix of commerce and culture refers to the status of the former brewery as an industrial complex and an element of the local culture. The design activates the competition between old and new and adds a new layer to the history by using the programme as a tool for the transformation.

Re- use concept.

With the metaphorically architectural concept of a doll's house the designers succeeded to summarise their ideas in a clear image. A doll's house is a building without a façade, where at the same time you can look into a lot of different spaces all at once. It gives you an idea of a section, but it adds simultaneously an extra dimension to the interior. The doll's house suggests the potential qualities of the building by piling one room up another, and preserves the special character and atmosphere of each room. The design team incorporated also the treatment of the public space.

Methods.

As methods for the implementation of the strategic reuse in the architectural concept, the approaches of Crimson architectural Historians and Cedric Price were evaluated.



Source: 'A&U, 2005

The inventory of Crimson Architectural Historians, incorporated in the book Re-Arch (Crimson 1995: 38-49) distinguishes eight so-called rhetorical characters which can be a model for the point of view of the designer in confrontation with the historical monument: underground, $1+1=1$, $1+1=2$, continuity, palimpsest, hermit - crab, recapitulation and face-lift.

In the design concept for the reuse of the Lamot building, we clearly identify the concept of contrast, with an emphasis on the contemporary elements, which reinforces the significance of the new and old parts of the building. For the modernisation of this brewery, the design team used a total concept, with a contrast between old and new, respecting each other and giving the entire complex an additional attraction. The largest part of the brewery is conserved and interwoven with a new structure. This new modern addition in steel and glass is situated at the position of the old malt and coal silo. The concrete silos were cut and enlarged with a new part. It is a rough, concrete self-supporting structure which is surrounded by glass. New and old are joined together in a beautiful way.

The English architect Cedric Price (2003), a prominent architecture critic, pleaded during the Eighties for more tolerance with respect to urban regeneration. He describes six design methods that comprise the major approaches towards transformation of existing buildings: reduction, addition, insertion, connection, demolition and expansion.

Reduction and addition were the main interventions for the design concept used by the design team. Reduction was used as a tool to add more daylight and a panoramic view. The building was torn open like an internal explosion, dismantling the finishing of the walls and replacing them with structurally fireproof glass. The new glass addition allows each visitor to read how the former brewery was broken up and how it is transformed into a new public building. To the façade at the riverside a glass volume was added which functions as the main entrance hall and a large auditorium. This action refers to the past where every new extension was stuck to the existing building.

By applying several strategies, unexpectedly frictions and paradoxes appear as a result, with a new definition of harmony to arise. The final aim is to create something new which transcends the old.

Strategies for success.

The qualification successful chances of re-use can be stipulated by evaluating the project based on a number of re-use models. The multiple stream model of Kingdon, the F6 model and a Swot analysis provide an insight to the success and failure opportunities of a re-use project.

In his study 'Agendas, Alternatives and Public Policies' (2002), the political economist John Kingdon describes the multiple streams-model by means of several factors and actors, such as problems, solutions, political events, which have an influence on the politics and policy attention to a certain subject. When these three streams meet each other, a positive/good climate arises to undertake initiatives. This action develops a flow of decisions and a 'policy window' or a window of opportunity is opened.

The main problem for the Lamot site was the negative image of this cancer spot for the city center. A solution was given by the value determination which was formulated by the staff of the Monument department of the city of Mechelen (Callens, Van den Mooter 2000). This research gave an insight in the potentials of the site. The elections led to a new political government which decided to launch a competition as the starting signal for this project. The F6 model comprises six factors, each of which is pronounced with the letter F: Fool, Functionality, Philosophy, Financial, Flow en Phasing. This model is formulated by the Netherlands Institute for industrial heritage in 1995 (Nelissen 1999).

The Swot analysis, a business-analysis method, is also very well applicable to re-use projects. This strengths-and-weakness-analysis is a strategic planning method used to evaluate Strengths, Weaknesses, Opportunities, and Threats involved in a project. The aim is not only an analysis of the current state of the art but also to stipulate a strategy for the future. The confrontation matrix (Mandour, Bekkers, Waalewijn 2005) is helpful to see what we can use from the SWOT analysis. Here the most important opportunities and threats are confronted with the most important strengths and weaknesses. The determination of the issues leads to the formulation of strategic questions. These questions help in advance to tackle the main problems and to turn them in a positive way as a result of which the qualification chance of re-use becomes considerably higher.

Strategies can contribute to a good development of the re-use project because they increase the desirable re-use by stimulating the historical and cultural consciousness and the protection of this remarkable industrial heritage.

Phase Models.

The application of models gives insight in the re-use assignment and forms a good preparation to complete the project successfully.

At Lamot, the PPS³ step-by-step plan was used. This plan is rather general and shows resemblances with the phase model of Oskam and Krabbé (Krabbe, Oskam 1985), the phase model of the TU-Delft and the phase model of Doornenbal⁴ (Nelissen 1999). All these models are developed apart from each other but (nevertheless) they show a lot of similarities. Although the steps differ from each other, they have the same objective, to be a catalyst which starts the implementation of the work. The phase model of Doornenbal is presented in this paper because this model can be considered as a synthesis of all these phase models. This model has the same concept as the PPS plan.

The phase model of Doornenbal is based on the following phases;

Feasibility research

The re-use of the Lamot building was not preceded by any feasibility investigation. This is regretful; as a result of this, a number of buildings of the site disappeared even if they were in a good state. One has only been preserved. For the brewery part of the building, a quality analysis was carried out.

Inventory of use possibilities

The inventory of both the exterior and the interior reveals which parts are valuable and are of good quality.

Inventory of sticking points concerning the construction decision

Because the brewery is not classified as a monument, no special demands to the building are made. The construction decisions must be in accordance with the legal national and European requirements such as fire safety, EPB⁵ standards, sustainability criteria, accessibility and sound and heat insulation.

Design definition and programme requirements

The competition for the re-use design was won by the architectural firm 51N4E. A new programme and the final design was introduced.

Construction preparation and implementation

The local authorities obtained sponsorship from the Flemish government for this project. In 2001, the execution of the plans started. The restoration and renovation ended in 2005.

In spite of the fact that only one model was applied and no strategies for success were investigated, the result of the re-use of the Lamot brewery is a success and the aim is attained. The city renewal project of the Lamot site has a positive impact on the city. The project has a favourite role in the domain of re-use.

DISCUSSION AND CONCLUSION

According to Buchli and Lucas (Buchli, Lucas 2001: 3-18), the reading of these industrial buildings has the potential to express the absence and invisible values in the recent past and present of our society. This 'absence –presence' reveals how vital abandoned areas can be and confirm that they form a crucial heritage because they bridge the gap between past and present.

There are two ways to interpret historical sites and monuments: on one hand there is a historical reading while on the other hand there is an actual and more modern way of reading. The combination of both readings results in the best fusion of horizons, a dialogue between the horizon of the past and the one of the present. Historical sites are like a palimpsest. They are formed through different layers of overlapping fragments without erasing the traces of the past. The discovery of these layers of significance is a contingent process (Pred, 1986: 297).

When the qualities of the historical monument are determined, the design team will try to conserve the characteristics while upgrading the building to the new standards required by the new function. Since these demands are conflicting, the design team has to make decisions which are based on architectural as well as on technical facts, leading to diverse solutions. The applied strategies helped

³ PPS , Private, Public Cooperation This process approach is a cooperation by which the public and private sector work together without losing their own identity en responsibility. The aim is to give a surplus value to the project. A project leader, a working group is established A timing is drawn up and the essential financial support is found.
<http://www.vlaanderen.be/pps/proces>.

⁴ TU- Delft, Technical University of Delft, in the Netherlands.

⁵ EPB norm: Energy Achievement Requirements.

converting the historical and recent data into a valuable rehabilitation of the building and their surroundings.

A renovation asks for the comprehension of the significance of the monument and a present-day interpretation. A new identity needs to be created for an abandoned space. The right balance has to be achieved between the values of the monument on the one hand and the technical interventions on the other hand. Only a well-considered economic and cultural function will secure the long term survival of the historical monument. There are no unequivocal procedures to conserve these structures because these industrial monuments are too multiform in character and meaning.

If cultural heritage wants to reach a peaceful co-existence with sustainability, we can not rely on standard solutions but have to assume the characterisations and the cultural values the buildings itself wants to stipulate as an effective result. Each monument requests an exceptional approach and treatment.

REFERENCES

- Abramson, D., (1999), *Make History, Not Memory*, in Harvard Design Magazine, n.9/1999.
- Buchli, V., Lucas, G., (2001), *The absent present: archaeologies of the contemporary past*, Routledge, London..
- Callens, T., Van den Moorter, M., (2000), *Onderzoeksdossier 'Het oude brouwerijgebouw van de site Lamot te Mechelen'*, april 2000, Mechelen.
- Crimson, (1995), *Re-Arch, New designs for old buildings*, Rotterdam,
- Gierstberg, F., Vroege, B., (1996), *Wasteland landscape from now on*, 010 Publisher, Rotterdam.
- Kingdon, J., (2002), *'Agendas, Alternatives en Public Policies'*, New York.
- Mandour, Y., Bekkers, M., Waalewijn, P., (2005), *Een praktische kijk op marketing- en strategiemodellen*, Sdu Uitgevers, Den Haag
- Van Gerrewey, C., (2005/2006), *"Leven in de brouwerij. Congres- en erfgoedcentrum in A+ , 2005/06 nr. 197, p. 52-59*, Brussels.
- Krabbe, R., Oskam, A., (1985), *Een beoordelings- en planvormingsmethodiek voor herbestemmingsvraagstukken*, Delft.
- Nelissen, N., Smits, J., Bogie, M., (1999), *Herbestemming van grote monumenten, een uitdaging*, 's Hertogenbosch.
- Pred, A., (1984), *Place as historically contingent process: structuration and the time-geography of becoming places. Annals of the Association of American Geographers* 74, 279
- Powell, K., King, L., (1999), introduction in K. Powell, L. King, *Architecture reborn: the conversion and reconstruction of old buildings*, Laurence King, London.
- Price, C., (2003) ,*Cedric Price - the Square Book*, Wiley Academy, Oxford.