



Reflection Bram Turkstra

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Reflection

AR3AH105 - Graduation studio
Adapting 20th Century Heritage

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1. | Summary of the research

The construction sector is responsible as one of the largest emitters of carbon and nitrogen, and as a user of water. In addition, it is a linear construction process that creates new materials from non-renewable resources. Furthermore, the built environment in the Netherlands is becoming overcrowded and there are insufficient regulations for the preservation of historical buildings. The aim of this research is to apply bio-based materials in the conservation of historical buildings for a circular and sustainable renovation. For this purpose, the following main question has been formulated: "How can bio-based materials enhance sustainability and circularity in architectural renovation while prioritizing the conservation & preservation of architectural heritage?".

Foundation of the research are the 10 R's of circularity, BREAAAM and LEED. In addition, software was used to select materials and properties based on sustainability parameters. Combined with a heritage assessment, it indicates which materials can be used in the conservation and renovation of heritage buildings.

This research has yielded a practical tool designed to enhance the sustainability and circularity of architectural renovations with a focus on bio-based materials. This framework also addresses the preservation of heritage qualities of buildings. Moreover, the outcome of the introduced tool contributes to the reduction of carbon and nitrogen emissions, as well as water consumption. It also actively supports the transition towards a circular building process through the use of new materials made from renewable resources.

The approach involves two main methods (see the framework below):

The first method aims to create a comprehensive framework of information to establish a sustainable pre-selection of bio-based materials. This involves gathering data from various literary resources to develop selection criteria and a database of potentially suitable materials. Insights into heritage values and past material applications in architectural projects will also be incorporated into the database.

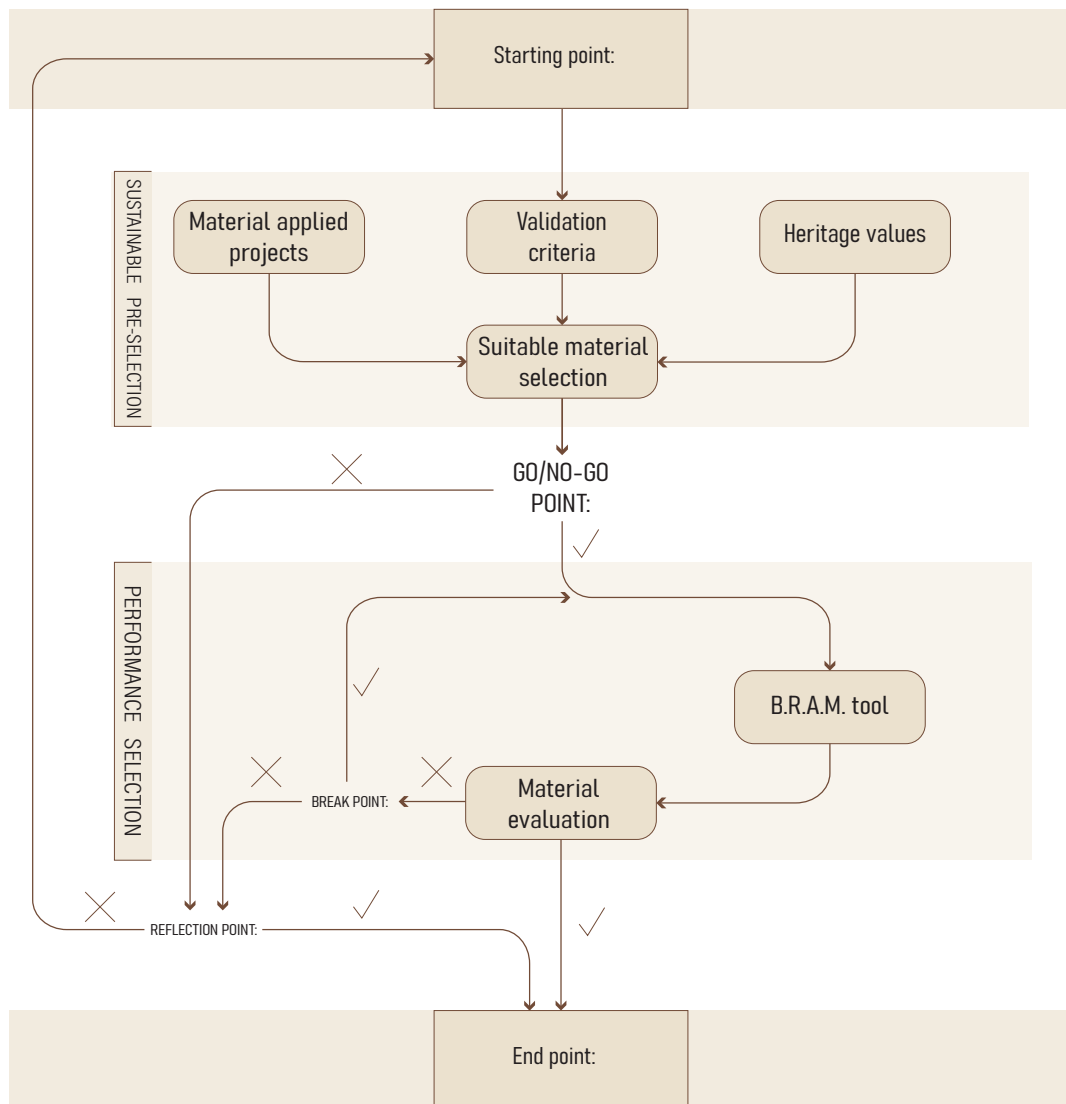
The second method involves leveraging the database to create a tool for material selection in projects. This tool will assist users in assessing material suitability and making adjustments if necessary. It also includes evaluating the implications for building techniques and potential adjustments needed in the construction sector.

Overall, the research combines theoretical and practical approaches, providing guidance for applying bio-based materials in construction. In the image on the following page, the framework for this research can be seen.

Based on the research question: "How can bio-based materials enhance sustainability and circularity in architectural renovation while prioritizing the conservation & preservation of architectural heritage?", the following conclusions can be drawn to answer this question.

The research has shown that in addition to the existing tools of BREEAM and LEED, there is a need for more research on a broader level to ensure that buildings (with heritage value) are preserved with as much care and bio-based materials as possible for future preservation. Together with information on building methods, determinations of heritage qualities and the need for adaptations within the Netherlands, a tool was created that enables the user to find bio-based materials for his project based on set validation criteria.

The final product of the study, the tool created, has limitations in a number of areas. Due to lack of time, the number of materials implemented is small. As a result, the number of options available to the user is limited. In addition, the research has shown that certain categories of a building are demanding more from a material. This does not apply to bio-based materials in their pure form, as they tend to degrade quickly outdoors. In the case of a heritage building, this is partly reflected in the architectural style of the building. Many exterior materials are not bio-based, but can withstand weathering well. The materials used inside a building are often of natural origin. This is partly due to availability and ease of use. The study's tool also shows that more materials are available for use in these categories. Materials such as straw, wood and traditional green roofs with overhangs, on the other hand, have demonstrated their viability outdoors in the built environment for centuries. The use of bio-based materials in the interior of new and old buildings is therefore potentially very feasible, but also shows that their use in the exterior is more challenging due to the quality of the building, but certainly not impossible.



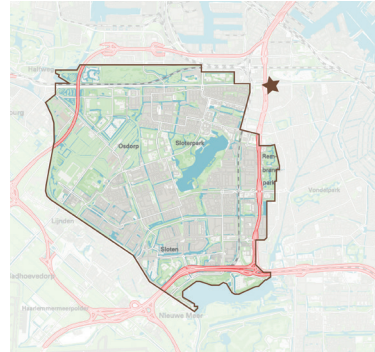
Simplified theoretical framework (Turkstra, 2024)

2. | Location introduction

The personal location for my graduation project is along the A10 as shown in the images below. The former printing factory “World Library” is located here. Built in 1922 by architect Van Zwiers. The building is characterized by a brick main building that has a lot of horizontality in the facade and uses both masonry and stone. Research into the building has determined that this main building, as well as the trusses that characterize the factory behind it, must be preserved to preserve the history of the building. Drawings also show the old construction methods that use bio-based materials on the inside of the building.

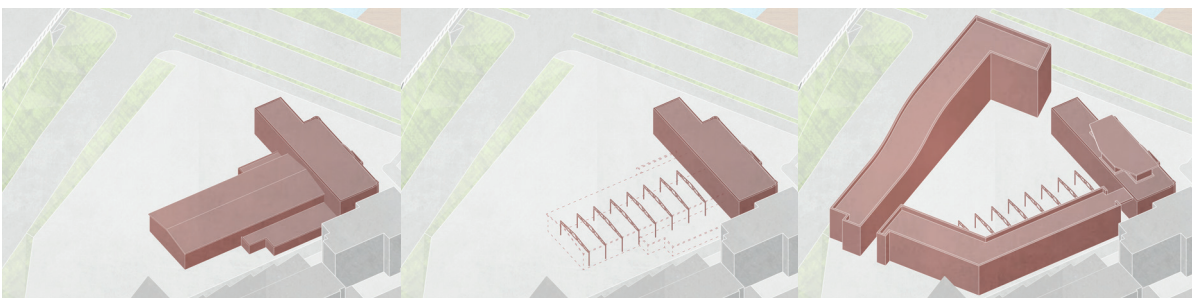


Original foto of the building, (Amsterdam archives, 2023)



Location within Amsterdam, (Turkstra, 2023)

Based on the research, it was proposed halfway through the P2 interim presentation to provide the building with a second building around the trusses. A kind of inverse of the factory hall that was there before. Further use of the tool from the research in combination with extensive location research has shown that this location is delicate and therefore requires a specific building shape to counteract the major negative influences of particulate matter, noise and heat, which are the greatest influences on the location. For this purpose, the original proposed plan was not enough value and the plan has been expanded and uses two L-shaped buildings that embrace the existing historic trusses in an inner garden and thus create a more pleasant climate within the ensemble.



Existing, (Turkstra, 2024)

Keeping, (Turkstra, 2024)

Adding, (Turkstra, 2024)

Bio-based materials in combination with actual plants are also of great importance for the desired living environment in the complex. This ties in with the subject of the studio, which focuses on circularity, heritage and inventive housing construction. The project basically consists of a building that is no longer used efficiently. In addition, it is located in a busy location where densification is possible, but this is a difficult task due to influences from the city. First of all, this building shows that it is capable of realizing inventive homes. but even more important is the use of plants and natural materials to ensure that the climate in the complex is actually of high quality.

3. | Graduation studio

The graduation studio Heritage & Architecture MSc3+4 Adapting 20C. Heritage: Resourceful Housing is located in Amsterdam new West. The urban extension of Amsterdam after the second world war originally conceived by architect Van Eesteren in order to combat the housing shortage in the Netherlands. The basis for it comes from 1935 but takes its principle mainly from the Western Garden Cities. A concept that was mostly used in the 1950s and 1960s. Within this location, the focus is on reviving this neighbourhood through the different graduation projects by students. The focus within this area is therefore on circularity, housing construction and heritage preservation.

4. | Value of transferability

4.1 - Project relation towards master track & -programme:

Firstly, to make the relationship between the project and the studio clear, the project is located in Amsterdam West, the focus of the studio. In addition, the project aims to create housing in a building that is currently not being used as efficiently as it could be. This ties in with the studio's theme of resourceful housing. The project is doubly relevant to the Master track Architecture, in that it looks at the architecture of an earlier period and seeks to complement and preserve it with the architecture of a future period. This makes it an appropriate study within the Architecture track. In addition, by investigating materials and their properties in order to arrive at a suitable selection, it also partly fits the direction of the Building Technologies track. Finally, the desire to fit in with the context and to see what heritage values can be brought back from an urban point of view is also a starting point that connects with the Urbanism track. As a result, the research into potential design fits well with the entire MSc AUBS Master's programme.

4.2 - Influence of design and research on each other

Much of the Dutch housing stock is in need of sustainability improvements. One of the reasons for this is poor thermal insulation. This is the case for about 50% of the housing stock, which were also built before 1970 without any climate regulations, so they may have significant heritage value alongside poor technical properties. Now that the preservation of the housing stock is also required by European directives (2050 regulations), in addition to a shift towards sustainable materials, it is of great value to address this issue in an integrated manner. The present study addresses both issues. Firstly, by looking at bio-based materials that can be used, and secondly, by doing this in combination with heritage buildings and values. This offers a potentially new way of making the built housing stock sustainable for the future with materials that are also better for the environment, without compromising the heritage values of the building. Providing an optimized proposal for the future of existing building stock.

4.3 - Reflection on used methods

The research conducted by me has its limits and it is good to realize that there are fewer materials available to compare with each other for implementation in the project. Nevertheless, the research has clearly shown that the application of bio-based materials in designs is of added value, both aesthetically, structurally and healthy. Personally, I believe that the methods chosen

for the research were sufficiently qualitative. This is because it is necessary to view this sustainability problem from multiple angles, and therefore make for a broad research. BREEAM and LEED look at it from a narrower perspective and therefore also show that they make mistakes and are not necessarily the best solution for a building. However, it is good to realize after conducting this research that it is a research that takes a lot of time and human input. This also means that part of the quality of research comes from the quantity. This allows this research to use more time and/or more people working on it for better elaboration to achieve the completeness and scope that the research requires.

This is a research that often deals with facts and properties that are given. That is why the research itself has become fairly factual and in some areas lacks personal influences, opinions and decisions. This comment also came from the teaching team, as well as the application of bio-based materials on an urban scale. I tried to incorporate the research and this feedback into the design as is presented in it's final form. In addition to the factual data that I have found on what is best for the building, namely shape and use of materials, I have tried to weave my own wishes, ideas and style into the design as much as possible. In the floorplan of the ground floor below is the design for the garden by me clearly visible as the heart of the project. With it's wooden terraces that connect to the buildings, it becomes an extension of the original building.



Symphony ground floor, (Turkstra, 2024)
(scaled down to fit)

4.4 - Academic value of the project

It has also certainly shown me to think critically about the choices you make and to ask yourself whether that is actually the best solution. Until this moment, the answer often turned out to be that I was heading in the right direction, but could certainly do better. Constantly refining ideas has helped me to bring more and more quality into a plan that I previously did not see was possible. I have always asked myself: Could I, and more important, would I want to live here? Only when it felt like an honest yes could I put an element to rest. This method worked very well for me and ensured that I could keep focus on the project.

For the project, this resulted in a depth that ensured that the design was not only of basic technical quality, but also created more depth in the homes made for different target groups. This made it possible to look for details within a dwelling that enrich the interaction between inside and outside and thus increase social connections within the complex. Also, the use of bio-based materials throughout the complex ensures a high-quality living environment for residents, while the complex is surrounded by seriously negative influences on the quality of living in the form of noise pollution, air pollution and temperature rises. This creates an appearance that harks back to local knowledge dating back decades to even hundreds of years in Western Europe. Ethically, the complex is open to all ages and target groups, without regard to where these people come from. The complex serves the purpose of creating a uniform living environment for any person who would want to live here regardless of origin or age.

4.5 - Transferability of the project

If one then looks at the design itself, here are also some aspects that can add value to other projects. First, the shape of the complex has been adapted to counter and decide the main influences on the site (noise, air pollution and urban heat island effect). Designing carefully with the surroundings ensures that a project tries to fit in as well as possible with the existing environment in which it will be realised. The design is not a blueprint for other sites and therefore cannot be copied repetitively. It is therefore the optimised solution for this location. Not necessarily the best solution, but tinkered with in such a way that it indicates the most optimal form from all points of view.

5. | Personal questioning & reflection

To summarize the project, I think it is a project that shows what the future can be and the past was. Reintroducing construction techniques, using materials that are grown/made locally and building with your environment have given me new knowledge and energy. I think the project can serve as an example of how we as a community can celebrate heritage, but also make cities even more liveable in various places and thus provide all kinds of different neighborhoods and people with more quality and joy in their homes. The use of bio-based materials as a technical point of view further helps to strengthen this vision of converting the future into a celebration of the past. This is also visible in the diagram on the next page where I show how much each part has influenced the design. In the end, most of my personal decisions came from using the bio-based tool. Location and Heritage values were of secondary importance to the eventual design, but do make the design complete and are inseparable for the design.

5.1 - How to determine value

At the beginning of the design process, it is important to determine the qualities of the existing

design before starting any interventions. For this design, the existing structures were examined and a trade-off was made between them. It was striking that a distinction could be made between 3 types. The main building, the factory hall and outbuildings. The latter turned out to be single-stone walls without any thermal insulation and therefore labeled as not of value and rather a burden for any further design options and decisions. The main building was what has some prestige from the street and therefore also characterizes the building from its construction period 100 years ago. The main building has therefore been labeled as indispensable for my personal design and is therefore completely retained in terms of facades, with only non-constructive changes to the floor plan. The factory hall, lastly, was a difficult one because the hall itself does not have a high thermal performance in addition to the fact that its architecture was purely functional and not of any value to preserve in the design. In addition, the construction was examined, which certainly still had both aesthetic and technical qualities. Because of this, I chose to keep the steel trusses as a tribute to the factory hall, but to create an outdoor space by removing the walls and roof all around.

5.2 - Is it added value for research at BK-City

At BK-City, research is conducted on 6 different subjects, being Sustainable urbanization, Healthy cities, Heritage with future value, Climate adaptation and energy transition, Digitalization and AI and Circularity in the built environment. If there was made a personal assessment of how well the final design of Symphony could benefit some of these subjects for their research, the following can be stated: Sustainable urbanization, Healthy cities, Heritage with future value, Climate adaptation and energy transition and Circularity in the built environment are 5 of the 6 topics to which Symphony can contribute. This also clearly shows that Symphony has become a design that contributes to the vision and direction within architecture for the future of the built environment and thus architecture.

