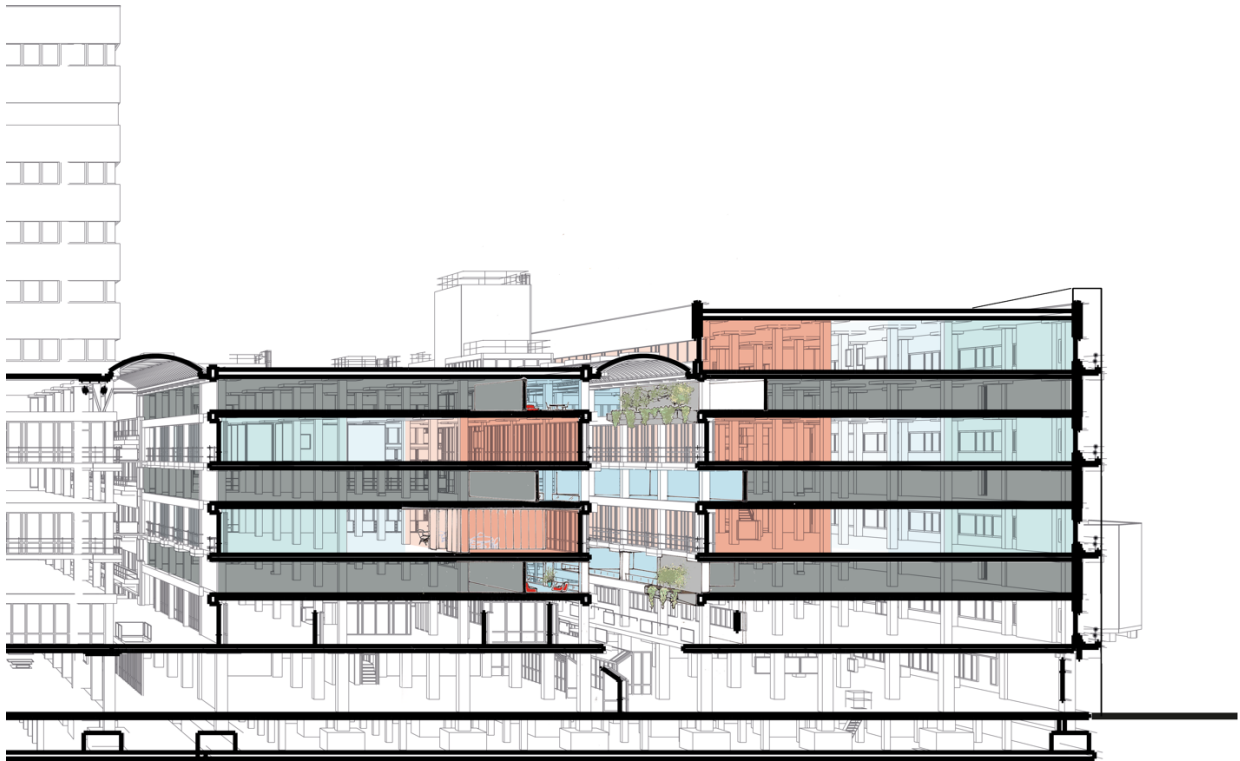


Subtitle

Reflection P3 and P4

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Introduction

After having spent the past period developing my design using the findings of my thematic research and having passed the P4 assessment has come the time to finalize the presentation of my vision and its embodiment in a project.

The development of the design, although being mostly a research by design, has been fuelled largely by the results of my thematic research.

The following reflection shortly looks back on how the research and the design relate to each other, and on how appropriate the chosen approach appears after hand.

Research and design

Prior to the choice of a graduation topic pre-existed my desire to address passive climate and bioclimatic design. Since those approaches require climate design and the related technical aspects to play a role very early in the design process and to strongly influence the design choices, the graduation studio of Architectural Engineering appeared like a suitable place to explore those themes in a meaningful way. Within this studio, where engineering is not serving the design but is a fundamental part of its essence, the lab entitled Second Life appealed to me for the chance it could offer to address passive climate design not in a new building (which, however interesting and challenging, has been dealt with extensively already) but in an existing building, what's more a brutalist concrete structure of the 1980's in the Netherlands. The aspect of renovating an existing building strengthened the sustainable aim for my graduation project. As for the choice of a building within the Second Life lab, the AMC teaching hospital in Amsterdam, being in several ways the most extreme of the list (largest permanent concrete structure in Europe by the time of completion, very brutalist choice in materials and colours) while having a couple of very specific traits (the network of inner streets and the technical subfloors), offered the possibility to approach my graduation project as a Case Study for the possibilities of sustainable renewal of that typology of buildings.

Being in the Architectural Engineering studio, it seemed only fitting to aim for a thematic research topic related to the engineering aspect, the results of which would provide elements to design through technique. The studio's general line of inquiry is research by design, which is also what I aimed for. I however chose, for the (passive) climate aspects, to research a certain aspect in the literature to provide the elements that could be researched further by design.

As I will describe in the coming paragraph, the design provided a research question, the answers to which in their turn provided tools to develop a climate concept.

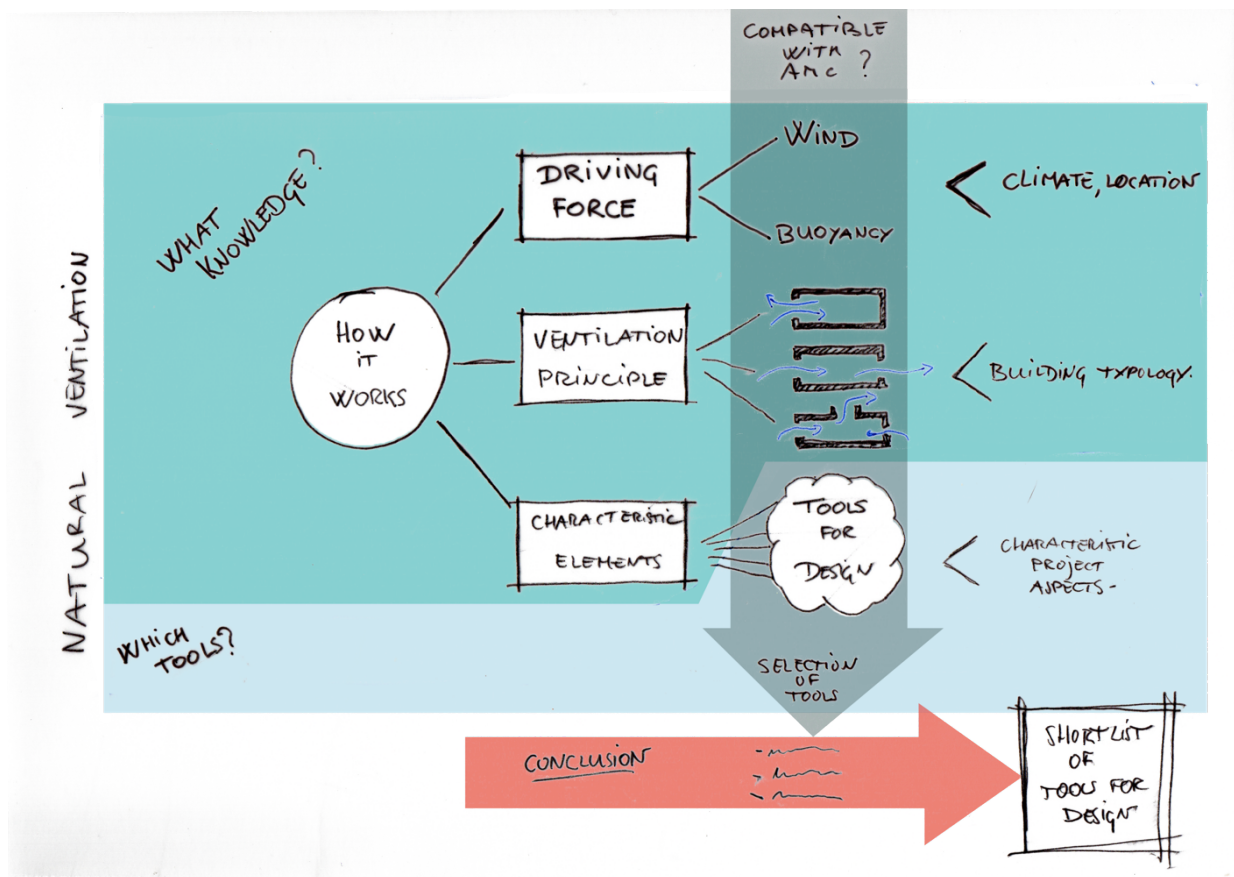


Fig. 1 : diagram of the research structure until re-insertion into research by design (Personal work)

Research method and approach

The research topic was chosen accordingly to a design question which rose during the preliminary design phase and which required a specific knowledge in order to be properly answered. In the light of choosing a technical research topic, during the preliminary design phase I analysed the existing building in the light of shortcomings and chances for sustainable climate control.

The chosen design question regarded the possibility to apply natural ventilation to the renovated hospital building. While answering this question would ultimately be achieved by research by design, that research by design required a comprehensive understanding of natural ventilation, the forces and principles at play and how existing architectural elements related to those aspects. The goal of my thematic research ended up being able to theoretically assess which elements would be suitable in any design situation, depending on climatic conditions and building typology.

The following diagram sums up the findings of my thematic research in the following framework: natural draught can be the result of two different phenomenon's, or driving forces ; the ventilation principle refers to how the air is circulated through spaces in the building and particularly how the in- and outlets are placed relatively to each other ; characteristic elements are the architectural tools that can be chosen depending on how they operate in terms of driving force(s), ventilation principle (building typology) and climatic conditions. The elements mentioned in the following diagram are those selected for the AMC building.

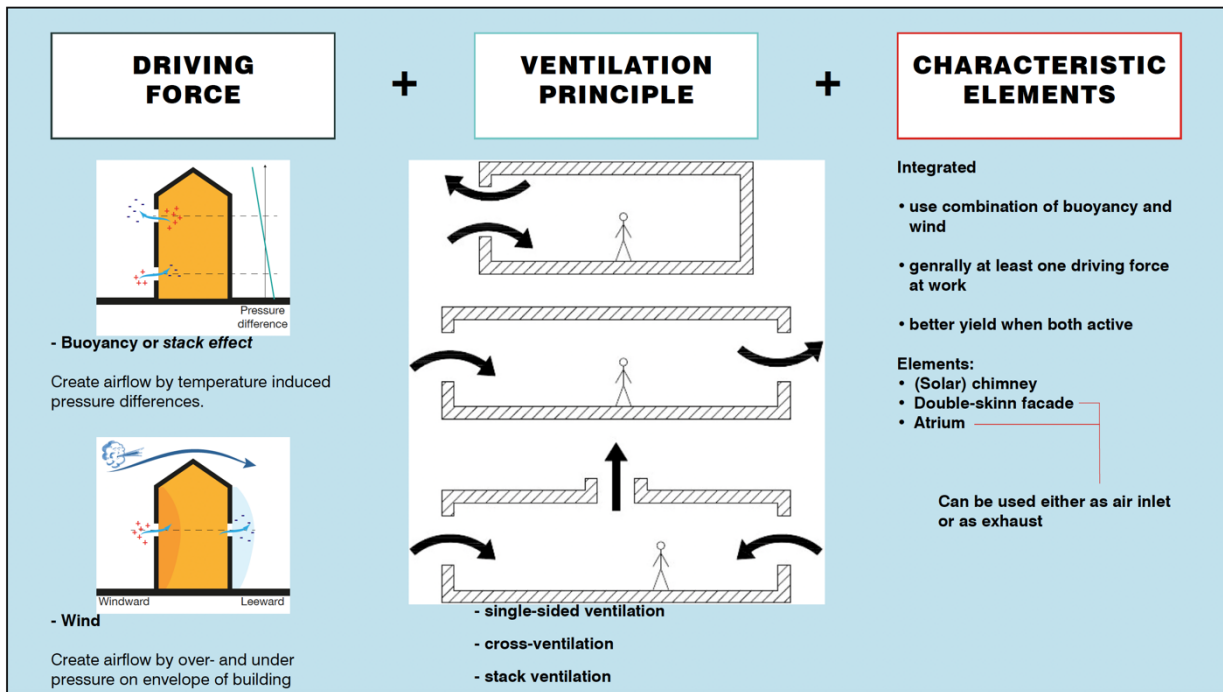


Fig. 2: Natural ventilation concept according to Kleiven's framework (2003) (Personal work)

The findings of the thematic research provided me with a selection of elements that could be applied to the design of the renewed AMC building, coupled with an understanding of how they operate that allowed me to design a climatic system. In that light, the approach yielded the results I hoped. However, it should be noted that the calculations necessary to quantify the functioning of each possible system appeared too complex to be able to provide guidelines in terms of efficiency of the systems.

Other aspects of the design

While the climate design, as it helped choose my thematic research topic, was quite a prominent aspect during the preliminary phase of the design process, a second aspect to my design emerged and became one of the two guiding themes of my project. This aspect, to which I often referred to as “the social aspect”, addressed the other way in which the age of the building caused it not to be in accordance with the current needs and expectations. Beyond the omnipresent raw concrete hardly fitting the contemporary idea of a nice place to stay, the

zoning and layout of the research facility of the university doesn't meet the needs of a medical lab nowadays. The structure of the offices for researchers, consisting almost entirely of little offices without places to meet, is not in accordance with the newer views on fruitful research, that require people to exchange a lot about their work.

My design of central spaces making encounters possible and inviting, combined with the addition of warmer materials than concrete (wood and vegetation) shows that a make-over of a concrete mega-structure can create spaces of great quality

Conclusion: Relevance of the project results

The combination of a case-study-like research by design and a scientific substantiation of the elements used in it and how to choose them could in theory allow the approach to be transferred to other buildings. The AMC teaching hospital being quite an extreme example of its typology due to its size and complex structure, it could be assumed that in many cases, transferring the approach to another building could end up easier than the process applied to the AMC.

The typology represented by the AMC, namely large concrete structures built in the 1980's, however generally structurally sound nowadays, suffer from a bad image. Next to being poorly insulated and therefore energy inefficient, they are often considered as "ugly" and "un-cozy".

With my renovation project, axled on two main aspects, namely an inviting, open interior and natural ventilation, I aimed to demonstrate that rather than destroying those ugly, unsustainable buildings to build anew (which in its turn wouldn't be very sustainable), a renovation as well in terms of functionality and appearance as in terms of climate and energy is possible, and that even passive climate systems are possible.

My design having just received approval to be brought further to a P5, the main task remaining is to elaborate the story to make my design a strong case study that could be used as a reference to address the large portfolio of larger buildings in dire need of renovation.