Name: Nina Kuipers
Student number: 4008278

Address: Hendrik Tollensstraat 366
Postal code: 2624 BV
Place of residence: Delft
Telephone number: 0611470897
E-mail address: cmkuipers90@gmail.com
Argumentations of choice of the studio

The studio of Architectural Engineering inspires me mostly because of the broad design opportunities it allows and provides since every graduation student will formulate their own graduation assignment based on their technical fascination related to architecture. This means that during the graduation year a lot of inspiring and interesting technical and architectural ideas will be developed for a couple of contexts.

The Architectural Engineering studio, to me, is an opportunity to design something which improves the experience and the aesthetics of architecture to its occupants and making it more sustainable by specifically applying an improved or new technique. This is the main reason why I have chosen the studio of aE. I think that the search for the combination of a (innovative) technique, with the functionality and beauty of a design can bring architects to new insights and hopefully architecture to a new and higher level. What motivates the most is the innovative part of this studio; looking for new and/or better solutions to contemporary problems in the built environment. Not by re-inventing what already exists in another conformation but by improving this and for instance applying it in a different context.
From Static to Kinetic
The potential of kinetic façades in care-hotels

Problem statement

The area of Parkstad Limburg is dealing with several difficulties. After the de-industrialisation of the area, which was characterized by the mining industries, Parkstad had lost its core meaning in terms of identity. Unemployment pressed upon the area. The young generation is leaving the region, trying to find jobs elsewhere, which caused the ageing of society to be accelerated more than in the rest of the Netherlands.

The mining period has been an important period of history of Parkstad Limburg. However, the history of the area goes back in time much further than the mining period. According to Jo Coenen, the primal nature of Parkstad invites people to stay. It is something that is written in the genius loci of the place. (Coenen & Diels, 2015) The ageing of the population and younger people leaving the area is therefore a break with the normal circumstances and flows. People used to come to Parkstad and would settle there. It is important for Parkstad to turn the flows of inhabitants and business around and turn Parkstad Limburg into an inviting, interesting and blooming area again. The qualities of Parkstad are not as obvious at the moment because the landscape of Parkstad is very fragmentised, meaning that the boundaries between nature and the city aren’t clearly distinguished, but also the cities do not have a clearly distinguished city centre. Nevertheless, the area has a lot of qualities, and it is of economic and environmental importance to stress these intrinsic qualities of Parkstad Limburg. To make this possible the area needs to be restructured.

The ageing of society leads to a lot of need for care housing and other care facilities. A lot of elderly have to move because their house isn't safe or suitable enough for them, or because they are not able to care for themselves, even if this is just for a certain amount of time (i.e. after having had a medical surgery). Along with the ageing of society comes the great amount of vacant buildings in the area. Both in the dwelling sector as other types of buildings. Furthermore, the building stock that Parkstad has at its exposal is out-dated. Most of the buildings don't meet the needs of the users, both for residential or business related activities. Neither do they meet the endeavour of an energy conscientious way of using these buildings. All these buildings need to be revitalized before they are suitable for usage again, and in order to become more sustainable.

The IBA-Parkstad initiative will facilitate in the transition from the current state of Parkstad to a digital city while stressing the intrinsic qualities of the area again. The transition will be realised by means of destruction and creation. In doing this, the organisation will be focussing on the out-dated building stock, the ageing of the population, integration of sustainable and innovative solutions and creation of new business opportunities (i.e. Tourism) and vacancies. Together with destruction of the current unsuitable building stock comes the redesign of the context that has new and different qualities. In this destruction, creation and redefining Parkstad Limburg, three themes play an overarching role, which is to turn Parkstad into a Flexible city, an Energy city and a Recycle city.

To conclude, it is most important to give Parkstad Limburg a new identity again, to create employment opportunities for its residents, to counteract the further ageing and reduction of the population and to make the area appealing again for living, working and visiting. This all should be done in one overarching and complete story for the whole area, in which the flexible city, the energy city and the recycle city are the main themes.
Objective

The slogan of the IBA-Parkstad initiative could be: “From Black to Green”. Black being the mining period, the unemployment of the inhabitants of Parkstad and the collapse of what the area used to be. Green could stand for renewal, nature, a clean environment and a more sustainable use of energy and materials in the area, giving meaning to Parkstad as a complete entity again. The quality of Parkstad Limburg should be regained by stressing the many unique assets, like the large amount of nature nearby the residential areas, the natural streams and their valleys, the rich and cultural history of the area and the opportunities it has for leisure and new businesses. All the bits and pieces that Parkstad Limburg has fallen into should be brought together in one story that gives a new and strong meaning to the area. The area needs a master-plan that invites initiatives in all scales of the built environment to hook unto.

In order to react to the ageing of the society in Parkstad, I will design a care hotel. People should be able to live at home as long as possible. A care-hotel will facilitate in this. It provides care for a short amount of time, with the duration of a few days to a few weeks. This service could for instance be used when a patient needs more intensive care for a short amount of time, after a medical surgery.

In a care hotel, the well-being of the patient is the main focus. Just like a normal hotel, privacy and luxury are important. Patients using a care hotel are able to leave the hospital sooner, creating more space in the hospitals. Furthermore, recovering in a care hotel is less expensive than in a hospital and the patient can be in a more pleasant environment, which will be a “Healing Environment” (Mens, 2009). In addition, a care hotel could provide as an accommodation for people who need permanent care but do want to go on a holiday. The care hotel will provide both in the feeling of being in a hotel and provides professional and personal care.

IBA Parkstad has a beautiful landscape at its exposal and holds a lot of qualities that are characteristic for the Southern region of Limburg. The region is therefore very suitable as an holiday destination.

A master plan that is already acknowledged as an “Attention project” for the IBA initiative is the Gardencity 2.0 plan of AnnA. Based on local characteristics, this plan provides a coherent and renewed landscape for Parkstad. Thematic view lines, two accurately placed circles providing the area with slow traffic routes and landmarks in the shape of the former mining towers are the main components of the master plan.

The location of the care-hotel in the vacant building of the former Clara-college in the city centre of Heerlen is located in one of these slow traffic circles. Being in a city centre many facilities are at hand, i.e. public transport, but also leisure program such as the theater. The area around the building will change in the coming years (if the master plan will be realized) and turn into a more quiet location, connected to other cities and towns in Parkstad by a green cycle path. Simultaneously, the building is located near all the facilities and liveliness of the city.

By re-using the vacant buildings for both private and (semi)public functions, the impoverishment of the city centre should be prevented.

My personal technical fascination and objective for this project is to design a façade that can adapt to the changes in its direct environment, in such a way that the occupant of the building can provide from that. Both in creating a more pleasant interior climate, and by generating energy in an efficient and sustainable way using infinite energy sources such as wind and sunlight. Typical for kinetics in architecture is that it is nowadays mostly applied in offices and public places. These moving façades are often only applied as a feature, with aesthetical purposes in order to create an iconic building. The concept of kinetic façades is nevertheless promising when applied in order to improve the energy efficiency of a building. A kinetic façade allows a building to respond to the weather changes in its environment. Compared to a static building, the façade will adapt to its direct environment and provide from that adaption.
The kinetic façades will work best in combination with an atrium that can function as a buffer zone. For the users this also creates a semi-outside space. It gives the users the opportunity to get in contact again with the outside world after having to be inside to recover. Furthermore, these semi-outside spaces invite people to gather, interact. Especially when the atrium is designed well, both in a biophysical and spacial way.

The smart kinetic façade will be a layer or zone that can be placed in front of a static façade. This static part of the building could either be a building from the empty building stock, or a new building, in which the smart kinetic façade can be integrated more in the total design.

The smart kinetic façade should improve building in three ways; the building should become more sustainably creating higher energy efficiency. It should provide in the wellbeing of the building’s occupant and the kinetics will add an aesthetical value to the envelope. Even though a smart kinetic façade will most likely be more expensive than a normal façade, when applied with the right intentions and results, it will be worth the investment on the long term.

**Overall design question**

‘How can kinetic façades be valuable for a care-hotel in the Netherlands?’

**Thematic research question**

‘How can kinetic façades be valuable for both improving a building’s sustainability and energy efficiency and forming while creating a poetic ensemble for a care-hotel in a vacant building in the city centre of Heerlen, in the Netherlands?’

**Subquestions**

I - What type of kinetics in the architectural façade are the most effective and durable?
II - How does nature react on continuous changes in the environment by movement, and can we use these principles for bio-inspired design façades?
III - What type of kinetics is best to apply in care hotels in the Netherlands in order to achieve a Healing Environment?
IV - What program is needed in a care hotel, what are its characteristics?
Methods

For the research
- Make a large appendix with reference projects using kinetic facades, use this appendix to see correlations in appliance. Determine six categories to categorize all the projects. Categories are:
  - Elements that it responds to (1),
  - Type of movement that follows - either active or passive - (2),
  - Size of the moving elements (3),
  - Types of movement (4),
  - Level of integration in climate system (5),
  - New designs, or renewal of buildings (6)
- Locate projects on map and sort by climate
- Appendix with movement concepts from nature
- Literature on kinetics in architecture / Biomimetics
- Investigation on scale, structure and shape

For the design
- Analyse the area, what is needed, what are the best places
- Hook onto the masterplan of AnnA (green slowtraffic cirkeles)
- Research by design
- Investigate energy use and need of care-hotels
- Test some kinetic types for facade, both in models and detailing / Grasshopper

Relevance

Buildings are static, the environment is always changing. Just as nature (living things) reacts to the changes in its surrounding. Why can't we do the same with our built environment in order to respond better to our surroundings. This way it is possible to create a better intern climate in a more sustainable way. The facade form the zone between inside and outside. The additional kinetic and responsive layer facilitates in the optimum interaction between internal and external spaces.

Although there is not much content to learn from yet and costs are still high, the concept has a lot of potential. The facade will help creating a good internal climate which helps in creating an Healing Environment to ensure the wellbeing of the patients/users.
### RESEARCH

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- History Thesis
- Writing Graduation Plan
- Finding usable literature
- Location visit BA
- Location visit Emscher Park Germany
- Site Analysis
- Survey of case studies - kinetic facades
- Survey of case studies - care hotels
- Survey of facade transformations
- Survey on biomimicry - movement in nature
- Research on IBA Parkstand and region vision models
- Gathering plans and sections at city archive Heerlen

### DELIVERABLES:

- Pavilion Plan
- Facilitation Process
- Graduation Plan (draft)
- Graduation plan (final)
- Research Paper
- Design drawings (drawings, plans, sections)
- Presentation: Overviewing our GRM
- Research paper first draft GRM
- Research Paper submission (2000 words) LSRM
- Presentation

### DESIGN

- Concept development and preliminary sketches
- Concept design options
- Design development
- Dwelling (type)
- Structure system research
- Structure design integration
- Structure detailing
- Façade system research
- Façade design integration
- Façade detailing
- Climate system research
- Climate design integration
- Climate detailing

### Final design deliverables:

- Drawings
- Digital prototype (movie?)
- Model
- Presentation
- Reflection
Literature

Books or Booksections


Conferences


Journals


Reports

Thesis
