

**PORTFOILO** Vol.02  
BA Architecture

Mikkel Frisbæk Sørensen  
frisbaekstudio.com

STORY

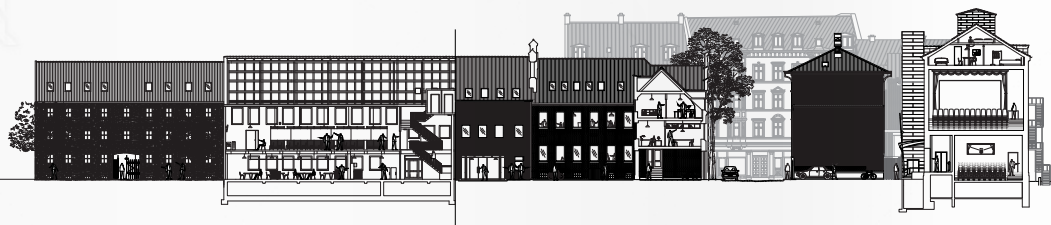
Bachelor Portfolio

Mikkel Frisbæk

Unit 2/3C, AAA

Spring 2020

148 x 210mm



## Contents of folio

project / 01

### **'Amphibious city'**

An urban transformation of Randers industrial harbour pier. 'A speculative project about transformative, water-symbiotic habitations.'

project / 02

### **'Design for Disassembly'**

Proposal to "upstream re-use" an old tram depot station facing demolition and re-purposing the values in Thun, Switzerland.

project / 03

### **Augmented architecture**

Exploring how creative design process can be augmented by machines - merging the human and robotic coordination.

project / 04

### **1 : 1 series of furniture**

I started a design company that focused on consumer products and decorations. Partnering with an international business student at CBS.

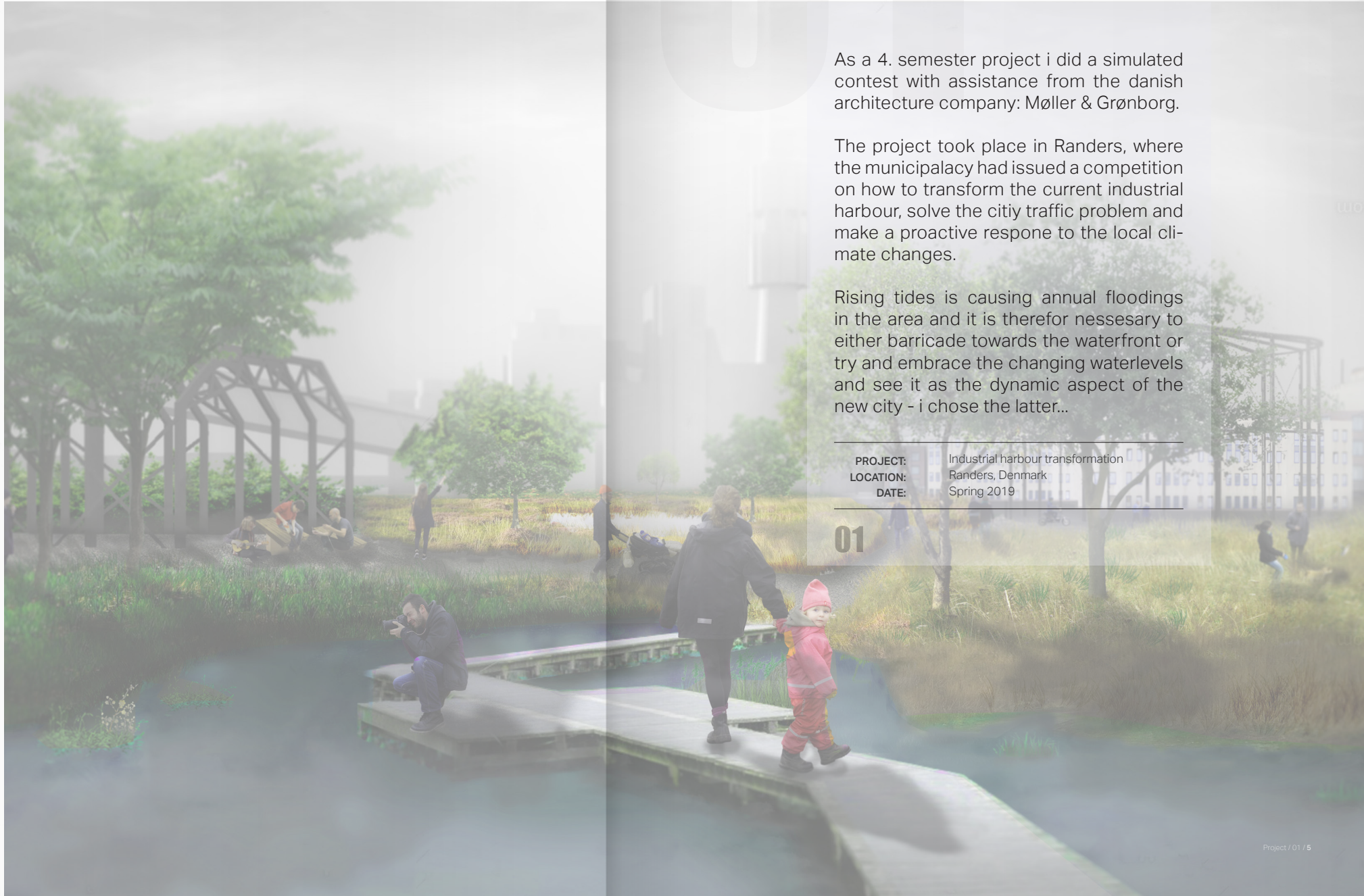
project / 05

### **A house for dwelling**

Programmic design, technical drawings and building approvals. Hired design and construction of coastal vacation home in Ebeltøft, Denmark.

# THE AMPHIBIOUS CITY

Rendering 'wetlands'  
(554 x 365 mm original)



As a 4. semester project i did a simulated contest with assistance from the danish architecture company: Møller & Grønborg.

The project took place in Randers, where the municipalacy had issued a competition on how to transform the current industrial harbour, solve the citiy traffic problem and make a proactive response to the local climate changes.

Rising tides is causing annual floodings in the area and it is therefor nessesary to either barricade towards the waterfront or try and embrace the changing waterlevels and see it as the dynamic aspect of the new city - i chose the latter...

PROJECT:	Industrial harbour transformation
LOCATION:	Randers, Denmark
DATE:	Spring 2019

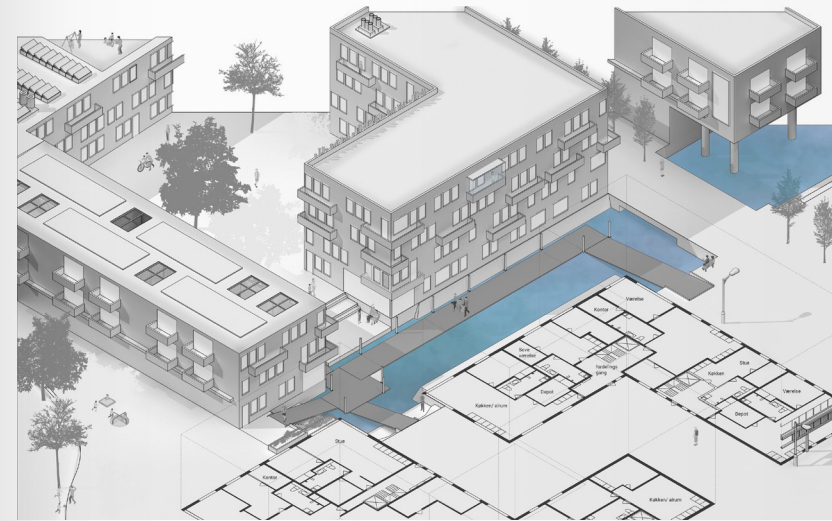
01



The core of the proposal is to emphasize the natural cycles of that surrounds the site: Floods are rising and falling, temperatures are changing, downfall occurs occasionally, and wind is autonomously shifting in both strength and direction.

Therefore, a wetland park might not be the same as when you last visited it. The water levels might have changed, allowing you to traverse a greater field or it may restrict your choice of pathways to higher boardwalk as lower once becomes inaccessible. An urban square may one day be used as a dry basketball court; the next, as a puddle for minors or in winter it could freeze and be used for ice skating. A plaza in the middle of the harbour is sometimes a playground and an outside seating area for a café - or it may be the central gathering place for a flea market. Maybe a few hours later, the flea market may become an island of merchants – because the water is flooding the surrounding lower level. At day, the high tides may create the optimal condition for a remote-controlled boat race in the shallows and at night, it could become the perfect venue for gathering at the monthly full-moon party.

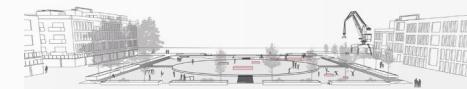
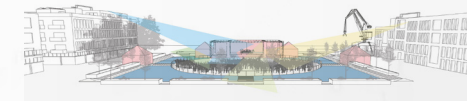
This sensation of living a water symbiotic lifestyle can be explored in many ways – from the spaces we visit to the things we do at different times of the day. Even as unconscious as the pathways we walk to get from home to work can inform us about the current cycles of the habitat we live in... A buoyant pathway can give us different experiences every time we walk it – sometimes it hinders, obstruct or deviates us from the path we intended – other times we are led along synchronized, flowing surfaces.



Isometric drawing  
(554 x 315 mm original)

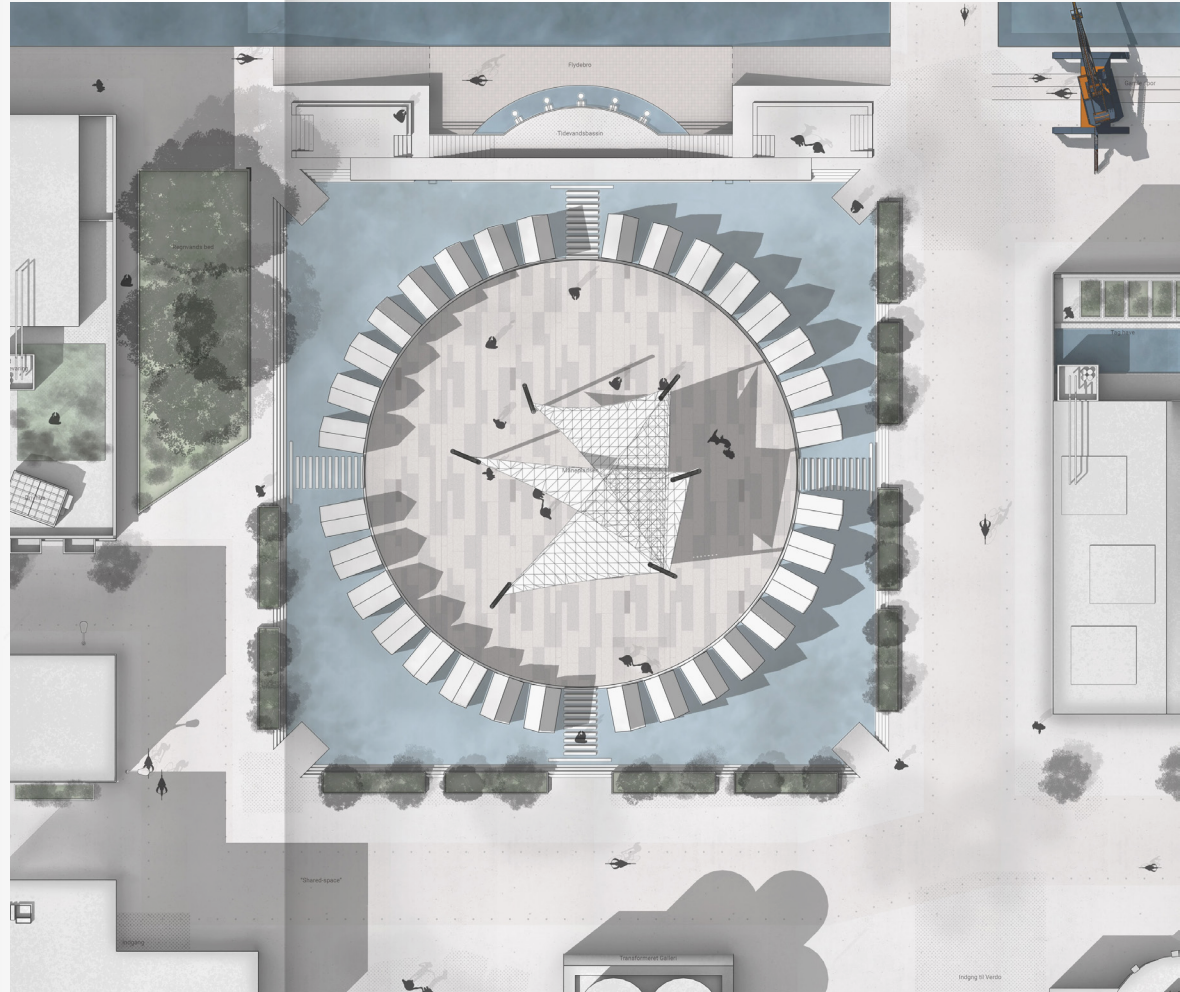


Perspective section  
(554 x 364 mm original)



Function diagram  
(270 x 315 mm original)

Plan drawing 1 : 200  
(270 x 476 mm original)



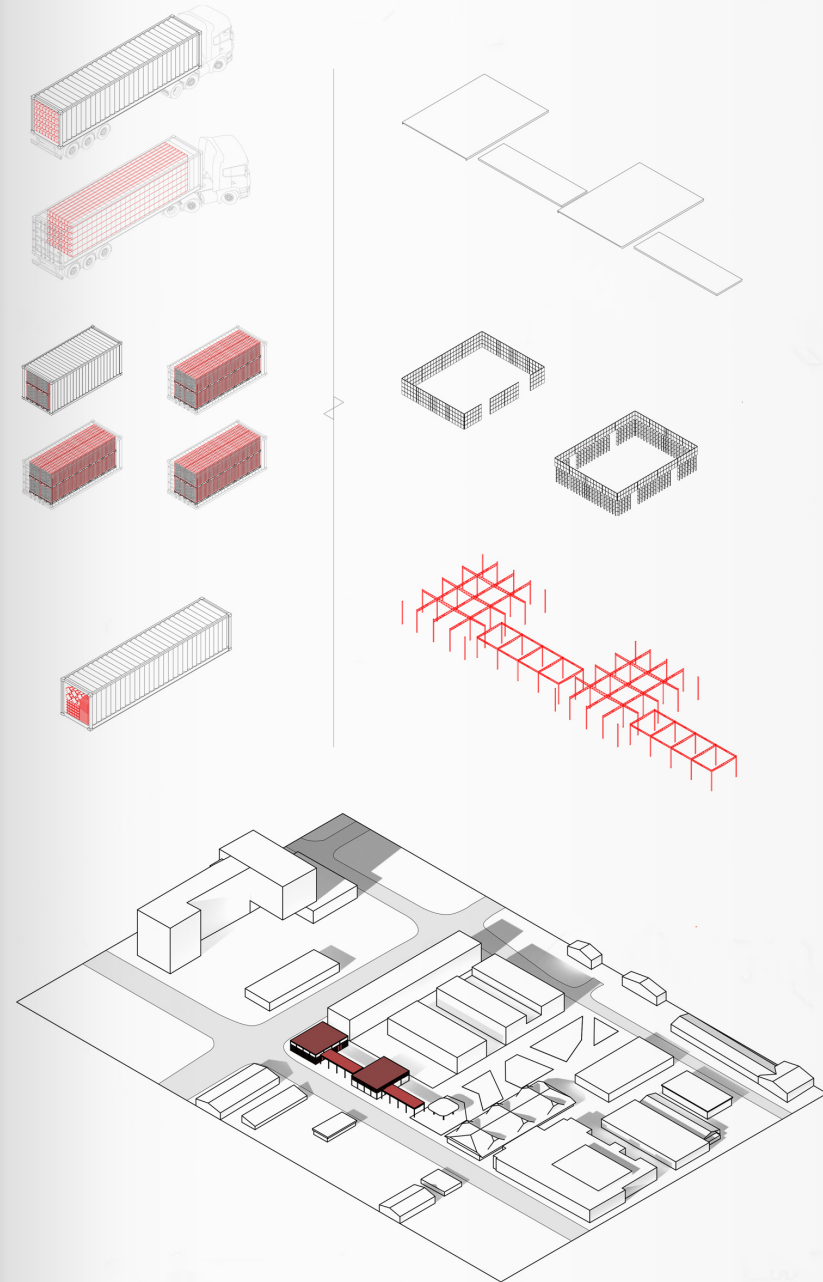
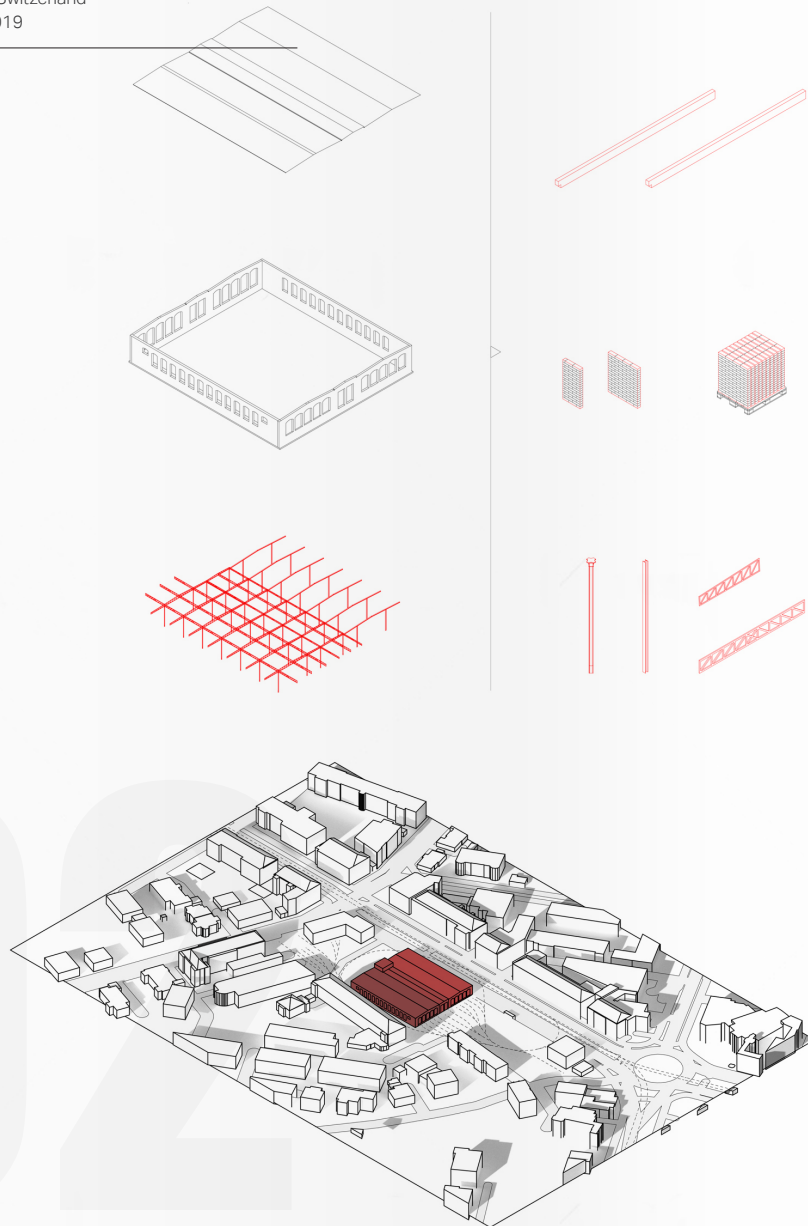
Read a comprehensive description of the project on  
[frisbaekstudio.com/amphibious-city.html](http://frisbaekstudio.com/amphibious-city.html)

Plan drawing 1 : 200  
(554 x 476 mm original)

# 'Design for Disassembly'

PROJECT: Upstream re-using a Tram Depot Station  
LOCATION: Bern, Switzerland  
DATE: Fall 2019

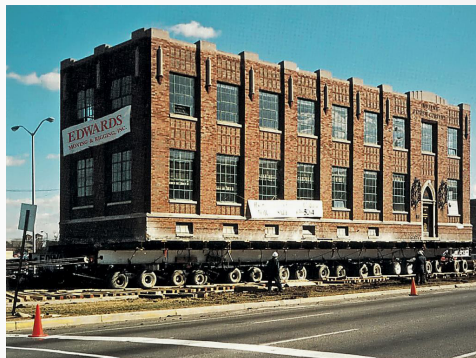
02



Disassembly diagram  
(620 x 492 mm original)

In my exchange semester i studies at École polytechnique fédérale de Lausanne (EPFL) in Switzerland. During the studie we had an excursion to a tram depot station in Bern, where the existing structure was about to be demolished. Through a 3-day workshop we discovered many of the qualities of this building- like its steel structure, the brick envelope, the windows, roof etc. Instead of demolishing the building, the company Losinger Marazzi (the owners) wanted to deconstruct it and replace it with apartment housing.

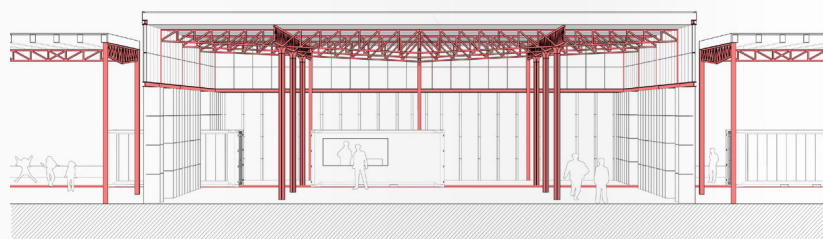
It was then proposed, to repurpose the structure as a flexible multipurpose building in Thun, 30km away from Bern. The site in Thun is also owned by Losinger Marazzi and are part of a developing site, where a new office building will be built on the same plot 10 years later - but in the meantime, this structure could be used to pre-activate the area. Losinger Marazzi gave us some requirements of what they envisioned could happen inside the building. We ordered these in 4 groups: art & culture, sports, shopping and gastronomy.



Disassembly render  
( 472 x 320 mm original)



Model 1 : 20  
(2250 x 2700mm)



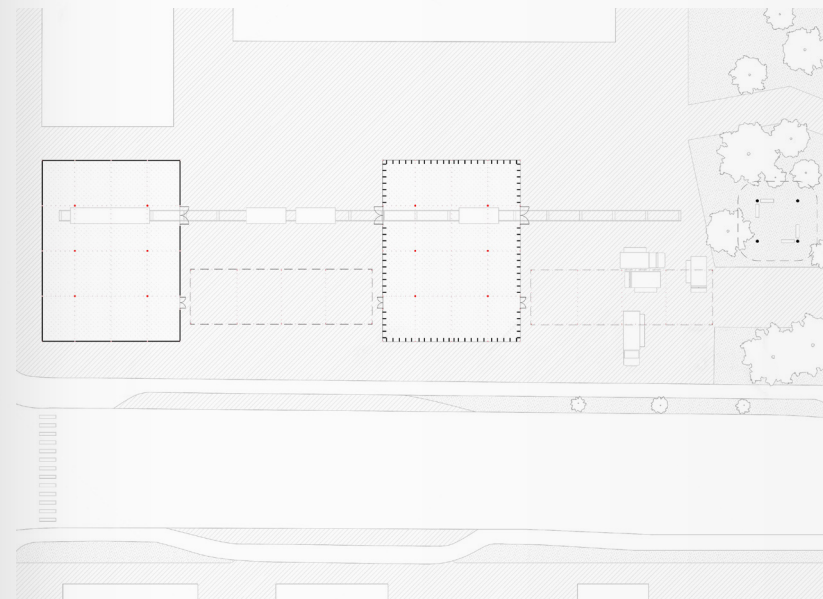
For the site in Thun we composed 2 very different buildings, that would inevitably contradict each other. One being an introvert, monumental exhibition space and the other an extrovert, inviting social space. These buildings have different ambient atmospheres and therefore also facilitates different functions. Common for them both however is the two opposing linear axes' in which the flow of people and functions inscribe. The one creating circulation under the rhythmic colonnades and the other providing movement to the functions on reused rails. These moveable, repurposed shipping containers, can slide in an out of the building volumes and provide functions and actions for both the inside and the outside areas.

- The project was made in collaboration with Simon Fischer. [GER]

Read a comprehensive description of the project on  
[frisbaekstudio.com/design-for-disassembly.html](http://frisbaekstudio.com/design-for-disassembly.html)



Disassembly diagram  
(620 x 492 mm original)



Plan drawing 1 : 200  
(620 x 492 mm original)

# Augmented architecture

---

PROJECT: "Steampunk pavilion"  
LOCATION: Tallin, Estonia  
DATE: Summer 2019

---

## 03

In the summer of 2019, I was invited to partake in the fabrication and construction of the "Steampunk" pavilion in Tallinn, Estonia. The pavilion was designed for the Tallinn Architecture Biennale (TAB) but will also stand in front of the national architecture museum of Estonia for 2 years after.

The structure is built from steam bent timber elements, using traditional crafting techniques and analogue tools augmented with the technology of holographic projections.

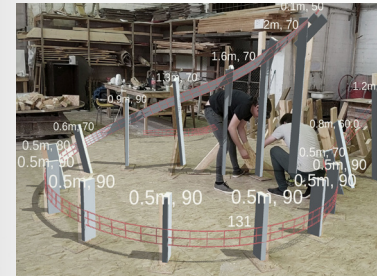
The elements were prefabricated and assembled following holographic construction information viewed in augmented reality through the Microsoft HoloLens. The interesting thing is that not a single construction drawing was produced for this pavilion. Everything was constructed by following the holographic information and then nudged into shape with nuts and bolts. The project aims to expand the understanding of automated craft and production in the augmented age.

A collaboration of computational power to grasp complex geometries with the human senses, hand-to-eye motoric, and overall empiric knowledge of crafting for the body.

The design bends, twists, and weaves standard lengths of hardwood and stainless steel into complex curving parts. There are 1092 meters of timber and 414 unique brackets in the structure.

I wish to thanks "Fologram" for the oppertunity to par-take in this exiting project.

watch a comprehensive album from the project on [frisbaekstudio.com/](http://frisbaekstudio.com/)



Augmented model seen through the hololens



The bend structure is drying while in the form



AR model guides the craftsman in bending



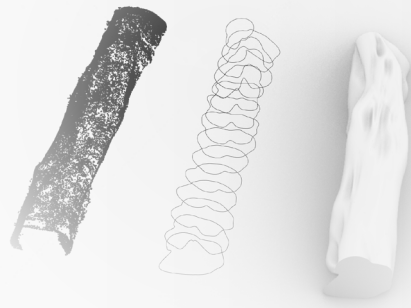
Assembly is directed by digital model on site



No mesurements are used in the positioning of the beam



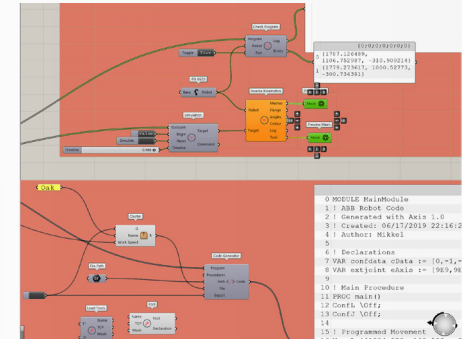
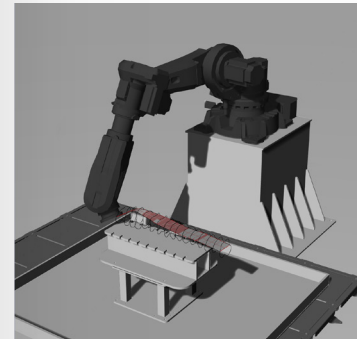
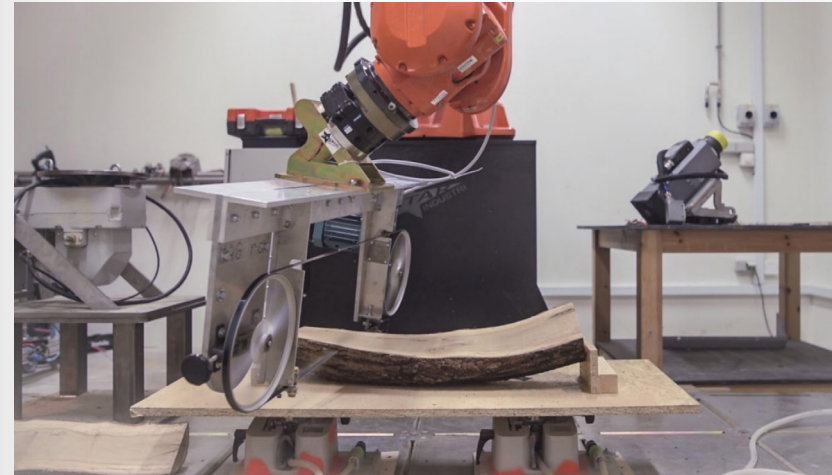
Beams and brackets are fastened with simple bolts, nuts and washers



**PROJECT:** Digital fabrication workshop  
**LOCATION:** AAA, Denmark  
**DATE:** Winter 2019

In a workshop, we used laser scanning, robotic fabrication, and digital design tools to explore new possibilities for using natural materials in constructions. By tracing crooked wood's natural form and importing it into a digital design environment (Rhino). By using Grasshopper plugins to handle point clouds, define structures and growth patterns - it was made possible to transform the natural shape of the wood into arbitrary building components. We later manufactured these polymorphic components by programming a 6-axis ABB robot and a 5-axis CMS router.

Wood is normally used as a standardised construction material that has been transformed from the natural log to box-shaped timber. This workshop was about rethinking the way materials are use and how we can limit the resource-waste. By collecting, scanning, and analyzing - we were able to cut complex geometries in the wood and create new bespoke building components.



Grasshopper script  
(to control 6-axis robot)



digital scanning  
(manipulable pointcloud)

# 1 : 1 Series of Furniture

In 2018, I created a series of oak furniture in collaboration with Asbjørn Bratsbjerg [DEN]. In the series were sets of table legs, benches, and stools in varying heights. They were all made from old reclaimed tabletops that we gathered locally – some even dating back to 1921! The furniture was made by using both computational and analogue fabrication methods for what they are best for. This meant introducing numerically controlled machines (CNC) and exploiting its precision and speed for the detailed joinery and rough outlines. After which the pieces were further processed, sanded, and assembled by hand. We started making 13 pieces, which we were going to sell at the annual Christmas market (first weekend of December) at Aarhus architecture school – we were, however, sold out in 35 minutes...

---

PROJECT:	Robotically Fabricated Furniture
LOCATION:	Aarhus, Denmark
DATE:	Autumn 2018

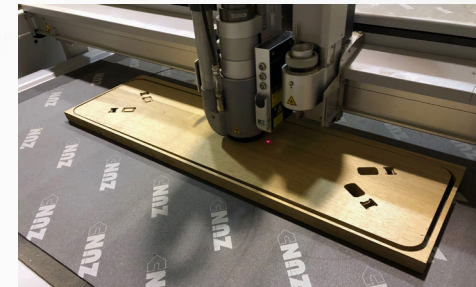
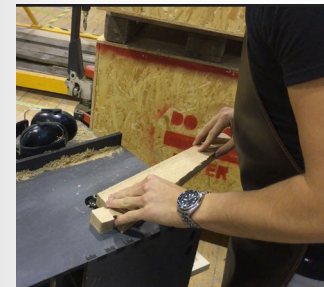
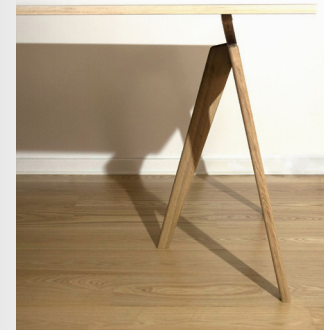
---

04



The main difficulty of the project was ensuring the material quality, since a lot of the furniture ads we examined were vague and unspecific. Wrong wood types, high internal moisture, slim material thickness and altered/hollowed out pieces were all parameters that we saw to avoid. Luckily, after a while we were able to screen out most of the bad tabletops by asking questions and receiving supplementary images. In total we reclaimed about 200kg of oak.

See more about the project on [frisbaekstudio.com/furniture-series.html](https://frisbaekstudio.com/furniture-series.html)



---

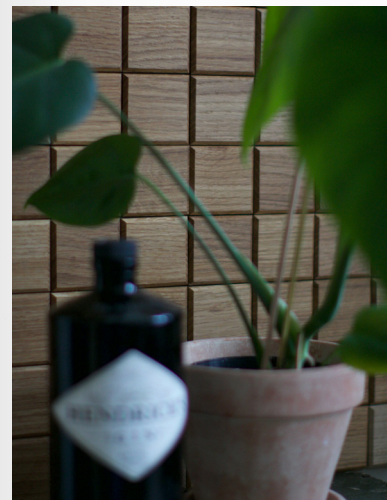
PROJECT:	Company development
LOCATION:	Copenhagen, Denmark
DATE:	Summer 2017

---


I founded a company with Alexander Hammergart [DEN]. "Taktile IVS" was a design brand based on a simple geometrical profile and its way of communicating the internal material qualities of wood. The design was constantly revolving around the growth patterns of wood, trying to resolve its complex materiality in the form.

The project is also meant as a critic on how modern-day consumer products are untrue to the natural materials they are imitating. The growing trends in mass-produced products are often to refer to a materials properties - without actually using them. Today we can see rugged "leather-like" plastic surfaces, on the dashboard of cars. Plastics and vinyl surfaces coloured to look like exotic stones and marbles slabs.

See more about the project on [frisbaekstudio.com/taktile.html](http://frisbaekstudio.com/taktile.html)



# A house for dwelling



In my sabbatical year, I worked full time as a carpenter assistant, constructing and renovating houses and gaining empiric knowledge about the craft. I was hired to design and partake in the construction of a vacation home in Ebeltoft, Denmark. I directed the entire process from sketch to final building. I was also corresponding with the regional office, submitting technical drawings and acquiring the building approvals.

---

PROJECT:	Industrial harbour transformation
LOCATION:	Randers, Denmark
DATE:	Summer 2016

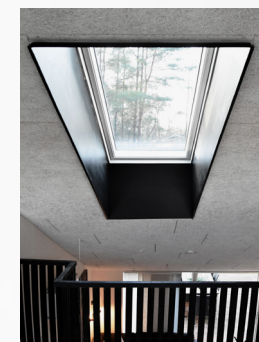
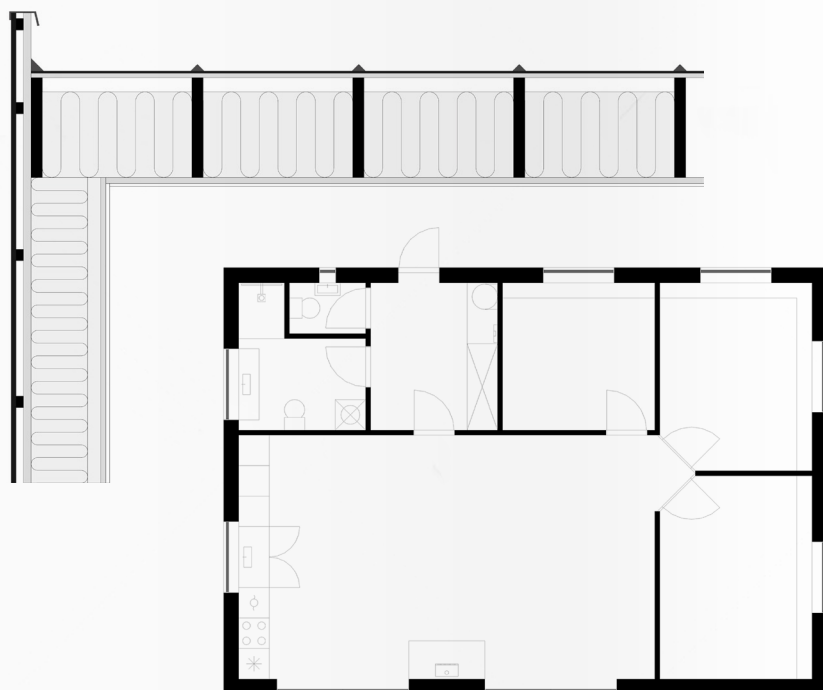
---

05

The main idea was to create a 100 m<sup>2</sup> building, with a 200 m<sup>2</sup> suspended timber terrace around it - allowing the inhabitants to move barefoot around the house. The entire floor structure rests upon walls of concrete and consists of long beams of timber. This made for an easy and affordable construction which allows the surrounding nature to rapidly regrow and merge with the terrace. The slanted roof creates a hybrid interior space, where the central living area can be directly connected to the alcoves in the loft. Movable kitchen units, extend-able tables and an open floor plan allow for flexible use and can suit a varied number of occupants.

More pictures of this project can be found on [frisbaekstudio.com/summer-residence.html](https://frisbaekstudio.com/summer-residence.html)

Plan drawing 1 : 100  
(380 x 170 mm original)



Foundation construction  
(Jul. 2018)



Wall construction  
(Sep. 2018)

FRISBÆK

**PORTFOILO** Vol. 02  
BA Architecture

Mikkel Frisbæk Sørensen

M: [mikkel@frisbaekstudio.com](mailto:mikkel@frisbaekstudio.com)

T: +45 20978500

W: [frisbaekstudio.com](http://frisbaekstudio.com)