tuvan

bachelor project 2020
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LUND UNIVERSITY

Tuvan - Molly Lindgren

Degree Project for Bachelor of Fine Arts in Design

Main field of study Industrial Design

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abstract

The main goal of this project was to gain a greater understanding of the creation of furniture. Not only the design process but also the construction process. This opened up to me creating an armchair with inspiration from Gemla Fabrikers Ab.

By combining conventional ways of working with new ones I wanted to merge the traditional aspect of Gemla with the possibilities of today.

table of content

introduction

background & motivation

I grew up in the small town of Diö, located between a lake and a river. Since 1884 has Gemla Fabrikers AB been located in the same small town, and even if they are no longer the biggest employer their history and way back is very interesting.

Some of my old relatives have worked at the furniture factory and many family friends have.

I felt like I wanted a deeper knowledge of furniture making, this combined with my interest in the old, local company led me to decide to create an armchair. So my focus is to gain a greater understanding of the manufacturing, design process and material choices.

gemla fabrikers ab

Gemla is a company with a long history, originally starting as a toy factory in another town, they eventually started producing furniture in the small town of Diö.

Founded in 1861 in Stockholm under the name Svenska Leksaksmagasinet (the Swedish toy garner), it was soon renamed as Gemla Leksaksfabrik (Gemla toy factory) as the business was moved from Stockholm down to Gemla in Småland. When a big fire took the whole factory down they instead moved to new facilities in Diö where they are still located today.

At the turn of the century, they began producing bentwood furniture instead of toys. With inspiration from Austrian pieces, som even direct copies of Michael Thonet's pieces, they began working in the furniture business instead. Soon Austrian workers came to work at the company and in 1927 all toy manufacturing had discontinued.

During the 20th century, they went on to work with many of the time big designers such as Nils Strinning, Carl Malmsten, and Gunnar Asplund among many others.

In 2011 the new owners did a revival to turn the company around after some rough years. By working with contemporary designers such as Jonas Bohling, Lisa Hilland, Front, and Mats Theselius. Many of the new models have gained a lot of attention, especially Vilda by Jonas Bohling which was launched in 2012.

Today Gemla Fabrikers AB is the only company in Sweden which master wood bending. Since 2016 they are also working in a more sustainable way with certified wood and vegetable-tanned leather as two examples.

WIEN / Gemla Archives, 1907

VIENNA / Gemla Archives, 1907

LYON / Gemla Archives, 1910

DONAU / Uno Åhrén, 1930

CATTELIN / Axel Kandell, 1948

SOLFJÄDERN / Sonna Rosén, 1948

GRACELL / Yngve Ekström, 1956

OPERA / Peter Celsing, 1958

ROTUNDA / Jack Ränge, 1958

MICHAEL / Nisse Strinning, 1982

In their current assortment of models, they are providing a mixture of new and old designs. Some of them are from the beginning of the century such as WIEN, VIENNA, and LYON. These are interpretations of the classic bentwood chairs from Austria.

These combined with mid-century classics such as SOLFJÄDERN by Sanna Rosén and chairs by other known names such as Carl Malmsten and Gunnar Asplund.

Their main focus has been- and still are their chairs, even though many other types of furniture have been manufactured in their factories during the years. Today they are also offering tables, mirrors, hooks, and a headboard even though they have subcontractors for tabletops, mirror glass and metalwork. In their factory, they are focusing on woodwork, upholstery and, varnish the furniture.

CLARA / Sara Helder & Gert Wingårdh, 2014

CROW / Sara Helder & Gert Wingårdh, 2019

MAJOR / Carina Seth Andersson, 2018

COLLAGE / Front, 2013

As mentioned earlier they are providing more furniture than their original focus, chairs. This is because they are concentrating on working their way back into the hotel market again. They used to have a big market in the hotel business which they hope to retrieve again. So by providing furniture which is very durable, high quality and adjusted for a public environment, they will hopefully make it back.

The headboard CLARA is a good example of this, specifically designed for the, at the time, newly opened hotel Miss Clara. A boutique hotel located on Norrmalm in Stockholm. Its shape is inspired by the beautiful windows of the hotel building, previously an old all-girls school.

present day

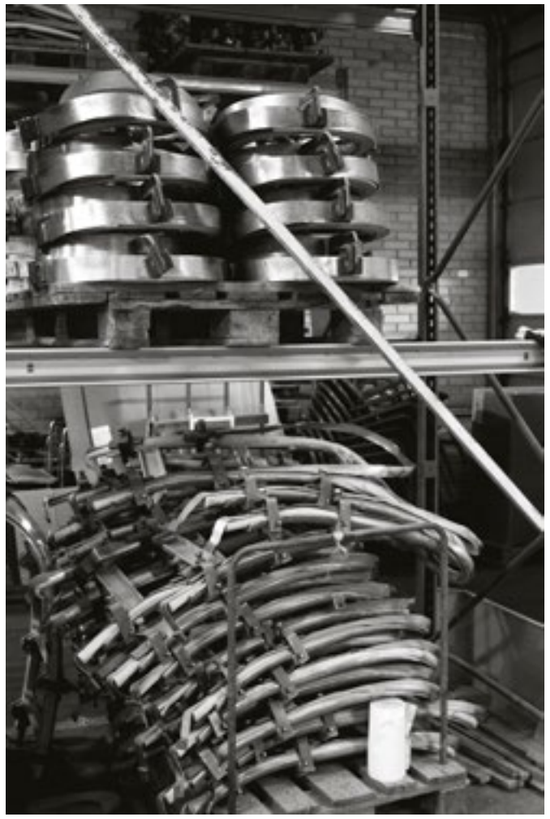
During the later years, Gemla has had somewhat of a boom after some rough years with bankruptcy. By collaborating with known designers such as Jonas Bohlin, who in 2013 designed the Vilda-series for them, Lisa Hilland, creating the Bow-series and the design duo Front among others.

As mentioned earlier they are since 2016 working in a more sustainable way. By focusing on creating high-quality furniture with sustainable materials they want to produce furniture that will last longer than a lifetime.

brief

create an armchair
inspired by Gemla,
combining new and traditional production methods

research



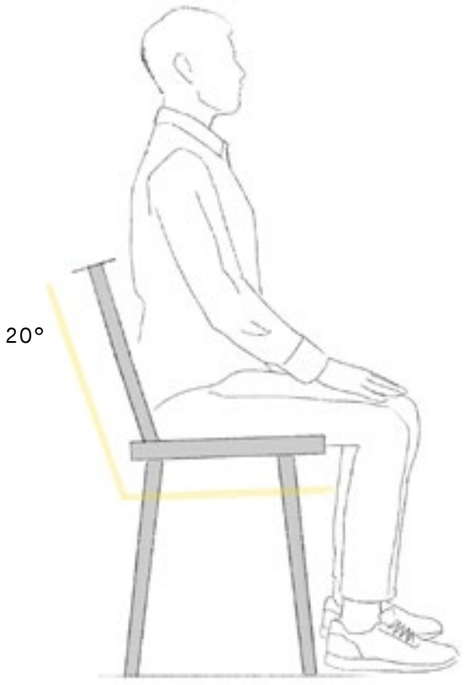
factory visit

On the 4th of February, I visited Gemlas factory in Diö so I could gain a better understanding of manufacturing. There I met Thomas Stenqvist who is the production manager of the factory. He showed me around and explained how they do not only make new furniture, they also renovate their old previously sold products. It was very interesting to see how much of the process is still done by hand, even if they wanted to be able to streamline some parts of the process.

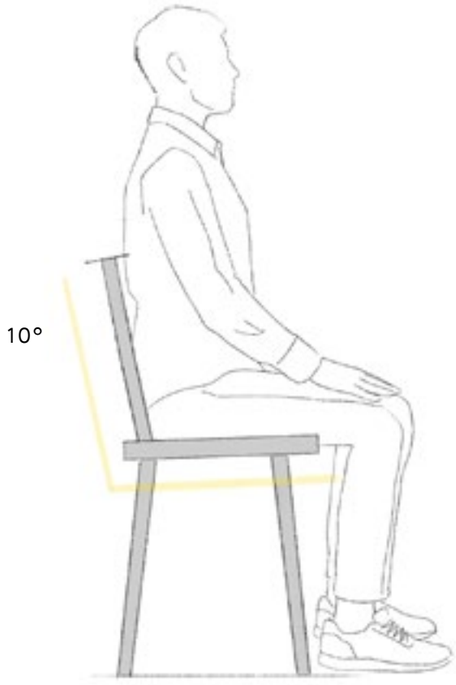
They had also recently purchased a new CNC-mill and lathe to be able to do some of these parts more effectively, especially some of the projects they are leased to do. This inspired me to work in the direction of mixing traditional and new ways of manufacturing wood furniture. By making the traditional way of working more functional with the help of new approaches it will also help it from disappearing.

focus / target group

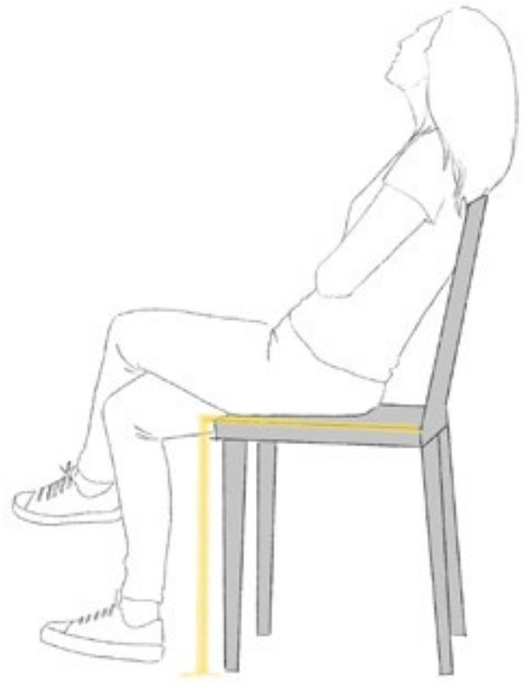
Gemla's primary focus has for a long time been public spaces such as restaurants and hotels. As mentioned earlier they are trying to put a bigger focus on working their way back into the hotel market. Hotels with a focus on the experience and quality products are therefore the focus- or target group in my project. A durable, comfortable and high-quality armchair are what I set out to create.



Lounge chair



Work chair



Seat height

angles and measurements

To start in the right direction I began researching what measurements on chairs are considered standard to adults. The ultimate measurements are different depending on the height of the user and would be customized after each physique. Since this is not a possibility there are some average measurements that I will be working around.

Seat height between 43 - 46 cm is common and comfortable for people of different heights. The depth tends to differ quite a bit, anything from 42 to 50 cm. There are also different standards regarding the angle for the backrest depending on what the chair is aimed to achieve.

functional analysis

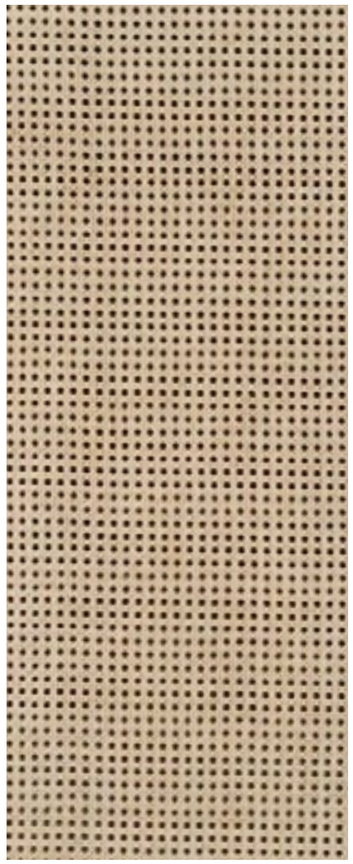
Main function:
provide seating for one person

Functions:
be comfortable
provide a coherent visual experience
be made of natural materials


ash


beech


vegetable tanned leather


rattan


horse hair


wool

materials

Since Gemla primarily works with a few basic and well-considered materials I wanted to focus on keeping the same direction. Natural and high-quality materials tend to be the better option if you want to create a piece of furniture that should last a very long time. They primarily work with Swedish, certified wood together with vegetable-tanned leather, wool, and horsehair for the seating.

Ash and beech are their most used wood-types since the fibres in the wood can make a big difference during the bending process.

By combining this with the natural stuffing options for seating and/or backrests the whole chair will be biodegradable. A very good idea, especially in today's climate.

structural skin

experimental materials

Structural skin - by using leftover leather from factories Jorge Penadés created a new kind of resource. A way of turning a traditionally 2D-material into a 3D one. Any resin and chemical components that have been used in the production were carefully considered for their environmental impact.

Foresso - is a British company who uses timber, wood dust, and plastic waste to create a composite material. It is created from 85% recycled material and all of which are sourced from Britain.

I investigated these among others to see if it would be a good option for my project. After some consideration, I instead opted for the traditional material mentioned earlier. I did not want to risk the quality aspect or add to the environmental impact of the product more than necessary.

foresso

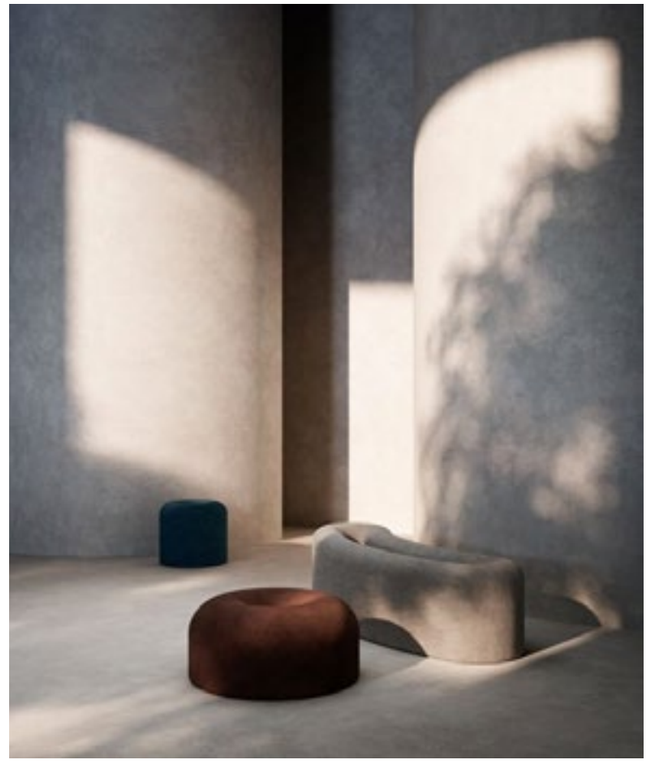
wood bending

Gemla is doing the bending by hand. After cutting and processing the wood they begin the process by steaming the wood between six to twelve hours. This makes it flexible and soft so that it then can be shaped by hand and strung by hand into specially made metal moulds. It is then left to dry for multiple days until it is again worked by hand to make it into the desired furniture.

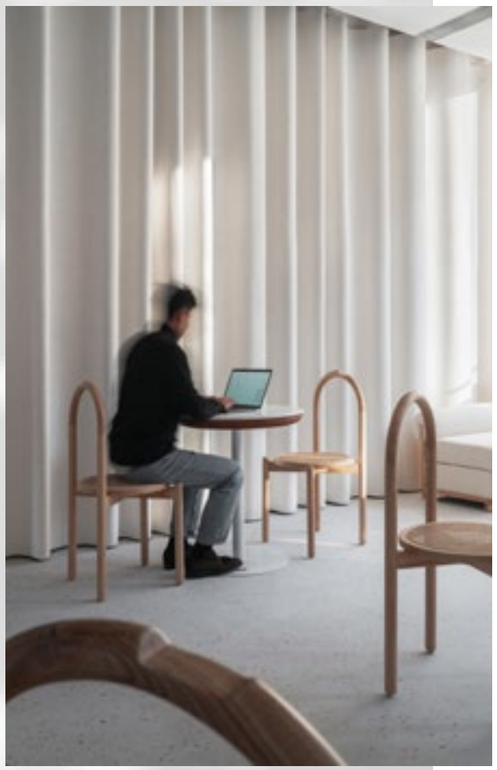
CNC-milling

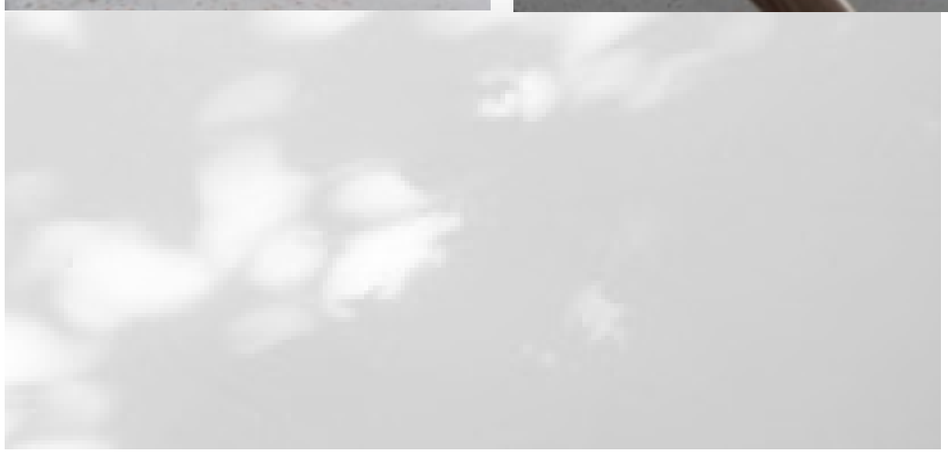
Since they recently have purchased a new CNC-mill and late I got very inspired by the idea of combing these two manufacturing methods. The steps in this method are that you take a 3D-model which has been converted to the right file format and let the machine work. It will layer by layer mill or late out the desired shape and create a replica of the 3D-file.

process



mood board

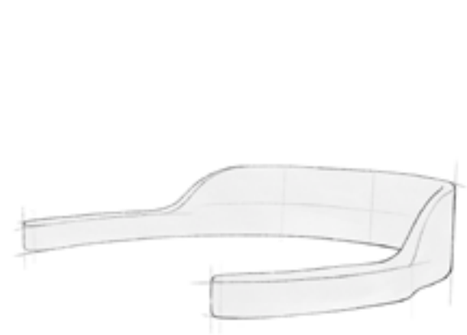


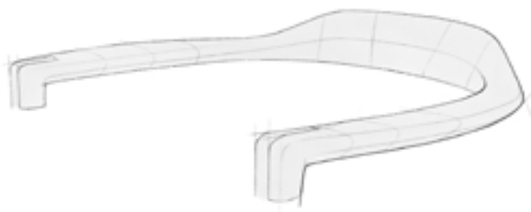


mood board - environment

sketching

To begin the design process I started with sketching. First small, quick profiles, and then went on to more detailed drawings to explore various ideas. Trying different connections, seats, and transitions before moving on to 3D-sketching.

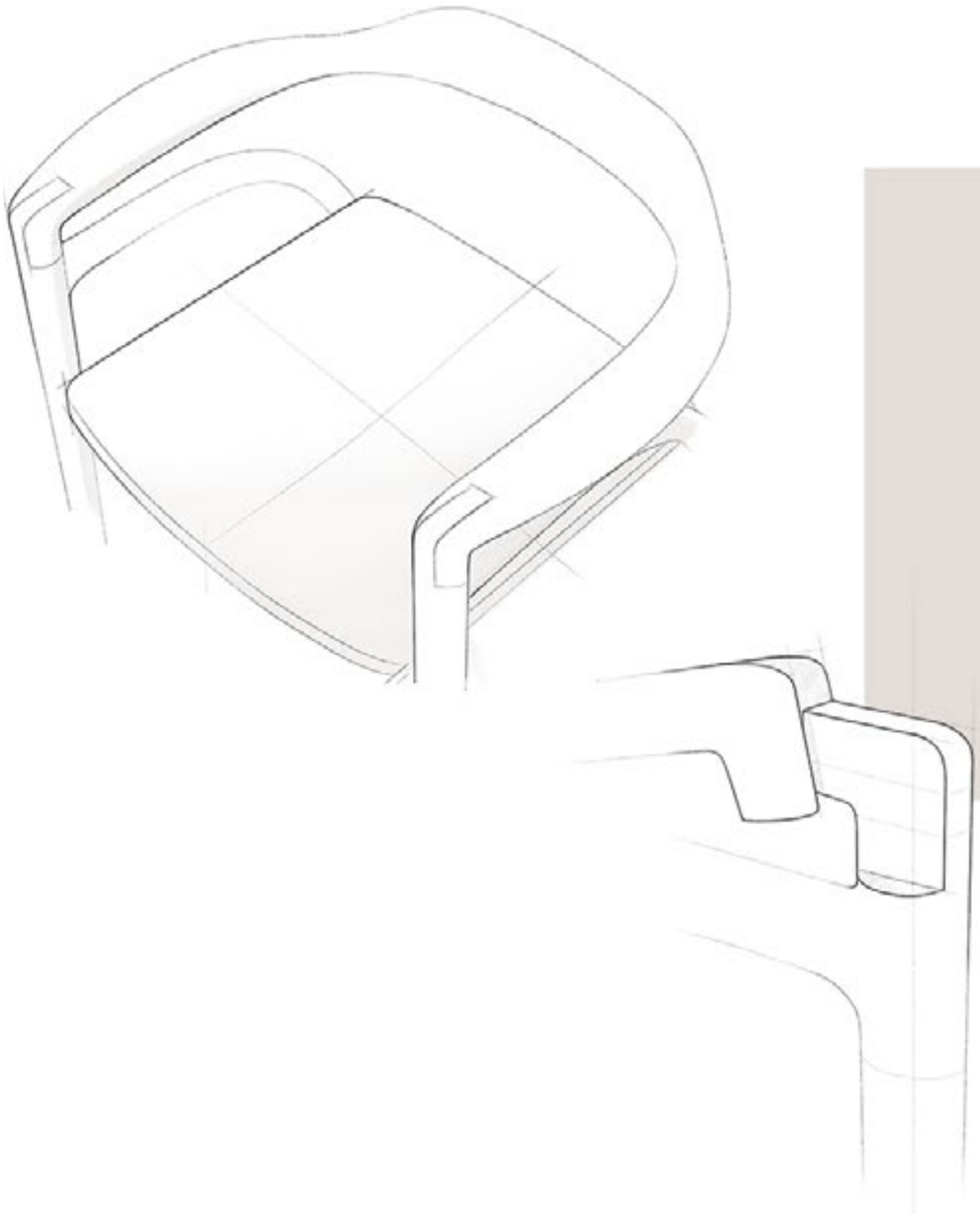




inspiration:

During the sketching process, I gained a lot of inspiration from one of Gemla's classics. The Cattelin chair, designed in 1948 for the restaurant Cattelin, located in Stockholm.

I really like how the backrest of the chair gives the impression of hugging its user. I wanted to take that feeling and interpret it into my chair.



final concept sketch

The height of the backrest plays a big part in the chair's level of comfort. Due to the current situation, I have yet been able to build and test a mock-up on different people of different heights. I have tested different chairs and taken note of the measurements and asked my friends for input.

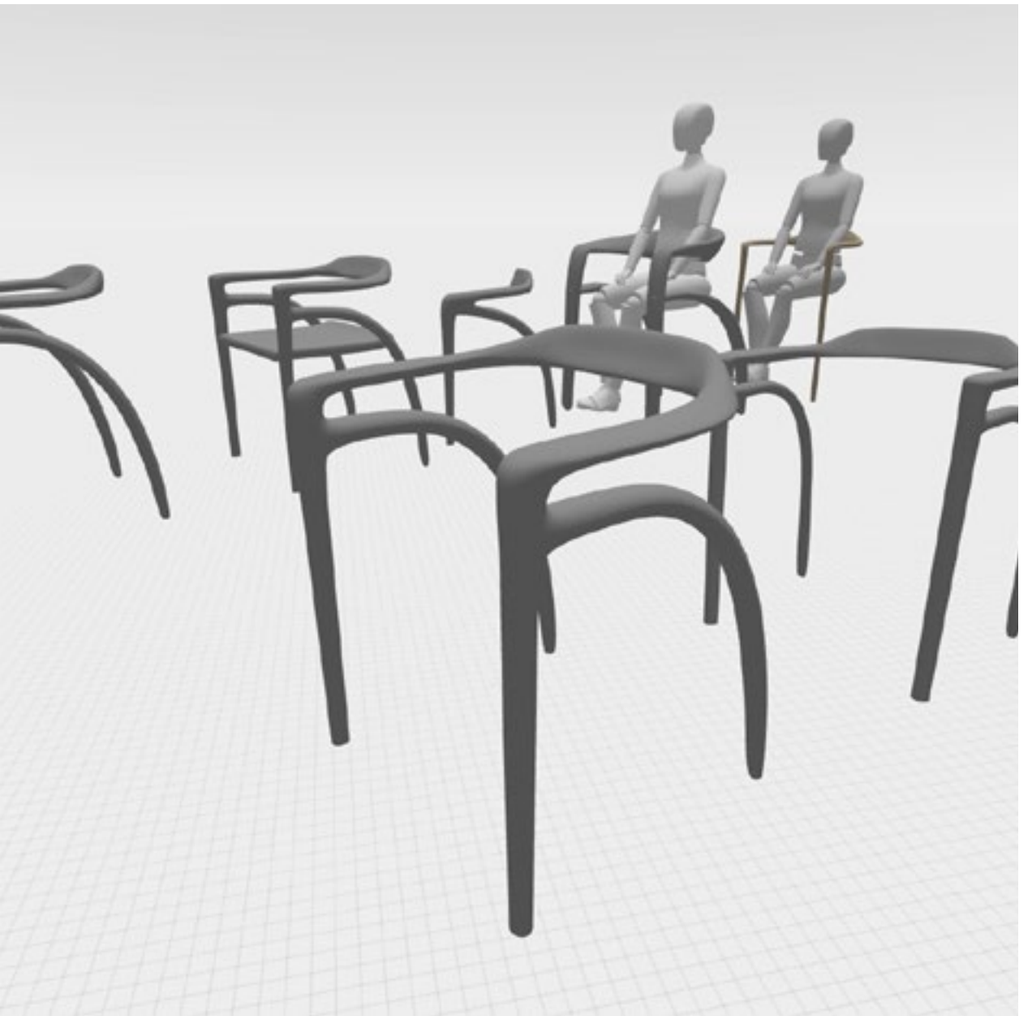
To quickly be able to see how the tested measurements looked with a person I tried overlaying sketches on photos of sitting people. By doing so I could at least gain a small understanding of where the backrest would be depending on the centimetres.

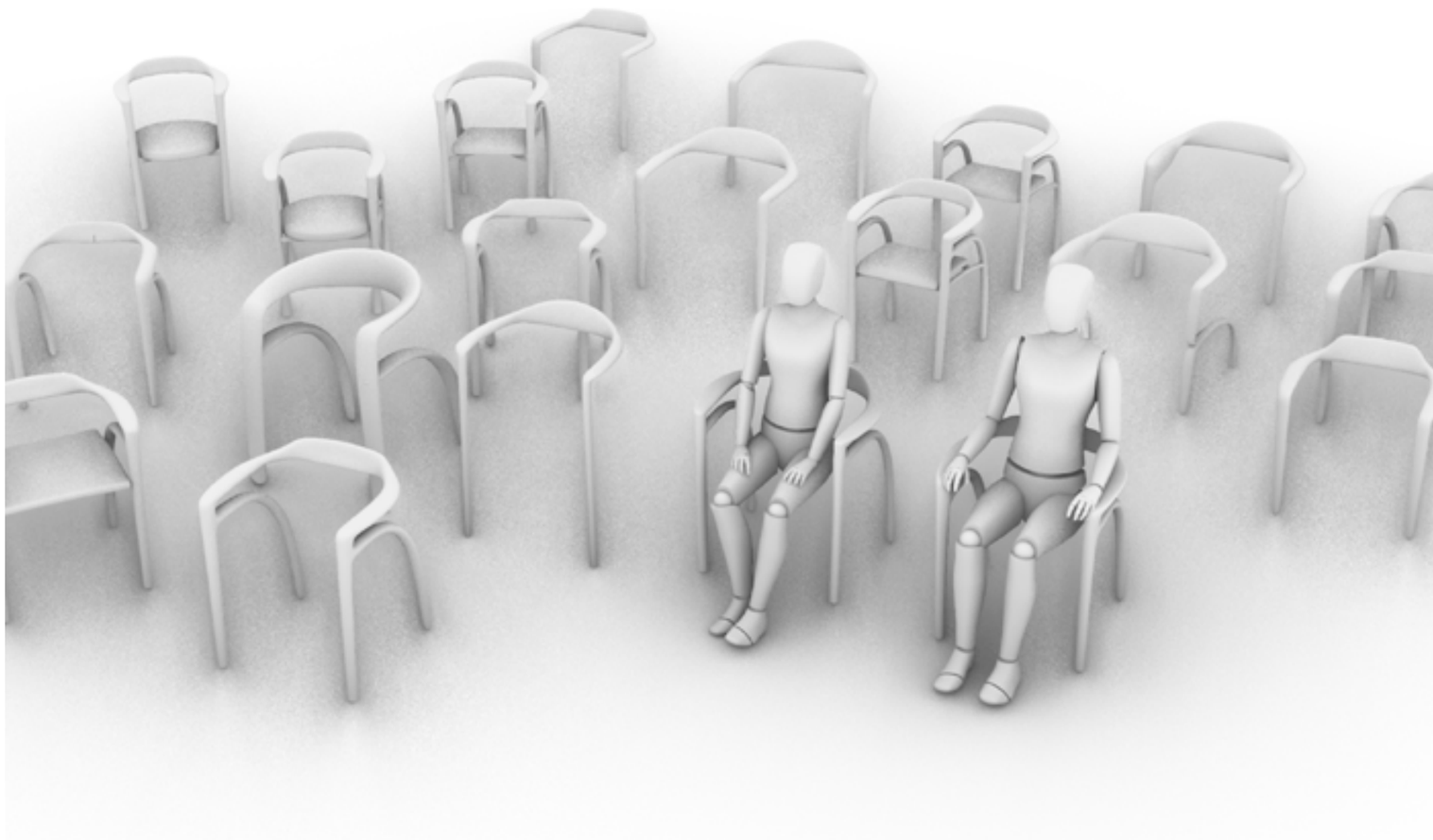
To continue the process I moved on to digital 3D-models so I could begin working on the actual design of the chair and simultaneously test different heights and widths.

vr-sketching

I needed to be able to create quick sketches in 3D at the beginning of the process. By using Gravity Sketch I was able to promptly create organic shapes that I had great control over.

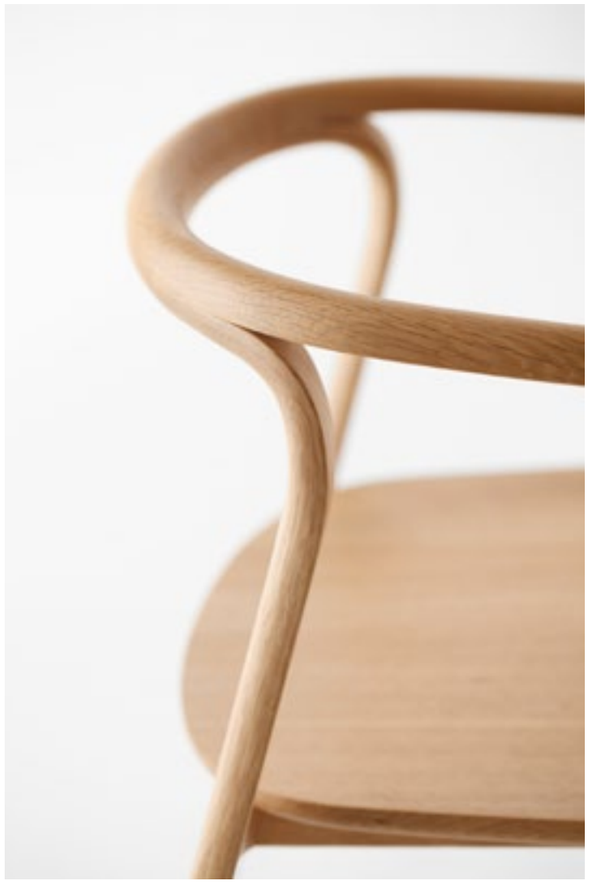
It also eased the process of working with the dimensions of the chair.
By using a human dummy during sketching and building it was easier to understand the height, width, and angle of the different parts.





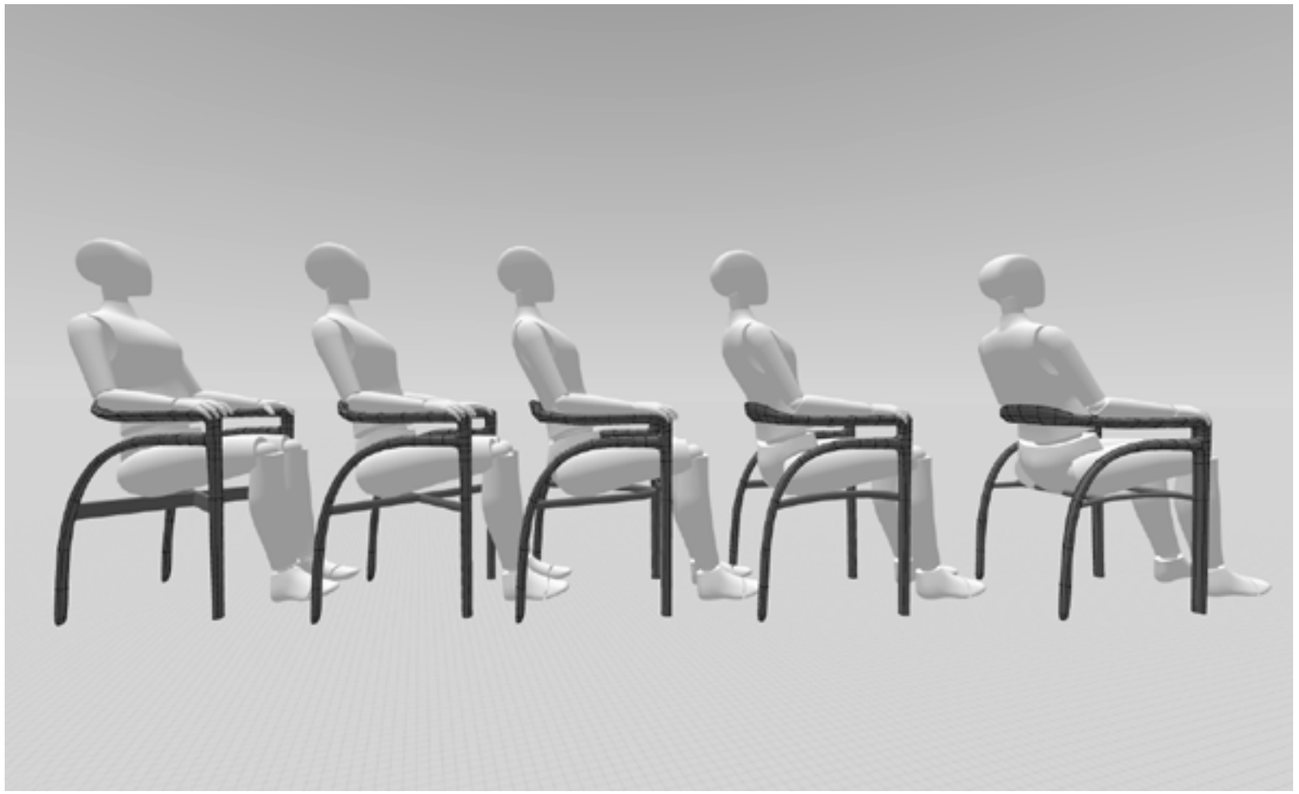
Many models were made during this part of the process. All of them with minor tweaks to test all my ideas out in 3D. After doing this for quite some time I ended up with a couple of versions that I was quite fond of.

I then exported the Gravity Sketch-model into the computer and completed it in Fusion 360. This so I could have more extensive control of the measurements and details of the chair since this is still lacking in Gravity Sketch as a software.



transitions

Since my chair is about organic shapes and curved wood I really wanted to focus on the transitions of the back- to armrest. By looking into other chair models, both new and old, I could pinpoint better what needed to be done.



the seat

The seat has been a challenge for me, after determining the measurements and the angle I would have wanted to be able to do a good mock-up and test it on different people. Sadly this was not possible and I hope to be able to elaborate this testing and knowledge further later on.

Instead, I focused on sketching and digital 3D to be able to build bodies and at least gain a perception of the seat.

The final seat concept during this design process with limited testing ended in an all-wooden seating, with an angle and softly curved middle to provide more comfort. I opted for wood instead of upholstery since this will last longer before needing renovations.

3D-printing

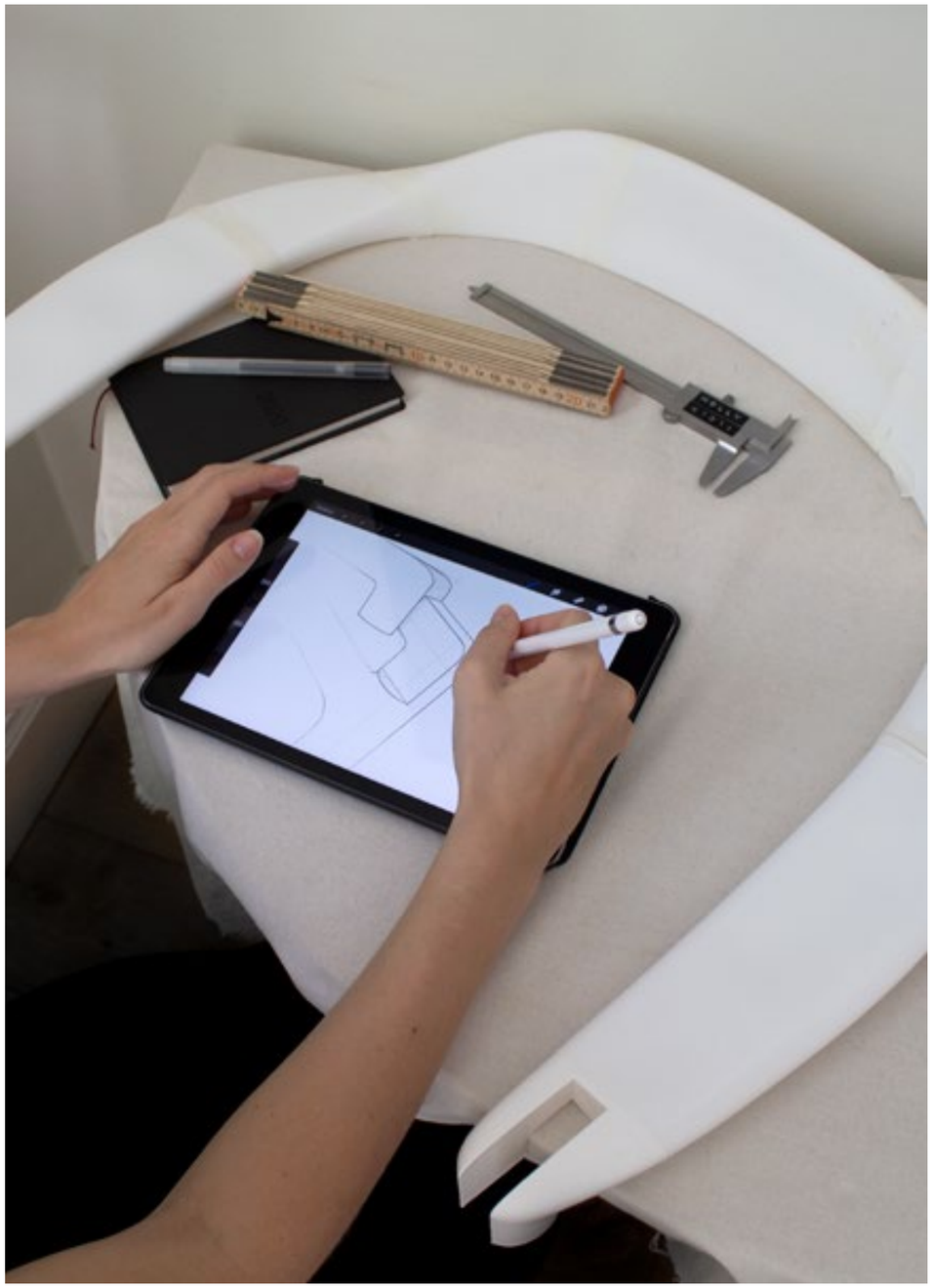
I have mostly been working at home during the design process. Because of this, 3D-printing small models have been a great help to understand the dimensions of the chair but also the transitions. I have also been able to print specific transitions so I could really see how it will look in real life.

By going back and forth from the computer to a printed model it was easy to see the progress and which mistakes that needed to be corrected.

1:4 scale model

To continue the evolution of my chair I decided to print a 1:4 scale model piece by piece after doing some final decision based on the smaller models.

By printing it piece by piece I could also gain a better understanding of how the assembly of the chair would work and feel. Now I only needed to see it on scale 1:1.



1:1 mockup

As mentioned earlier, I felt like I needed to see my project on the correct scale to understand the curvatures and ratios better.

So I decided given the current situation to do what I could at home. I began 3D-printing my chair in scale 1:1 with my Ender 3 printer and E-PLA.

finalisation


the result

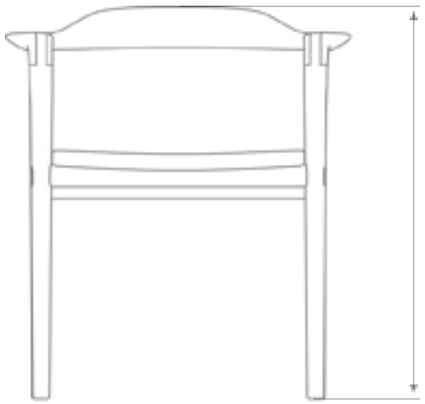
tuvan

The result of my project is the armchair Tuvan. A wide and soft chair with plenty of room to allow movements and conversations.

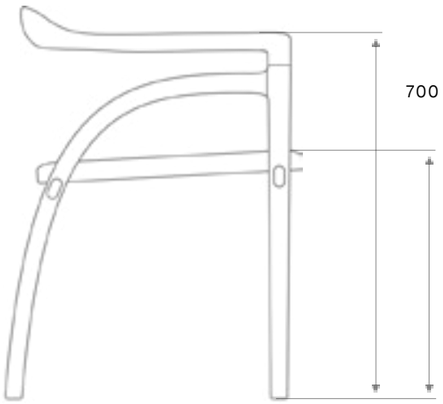
It is designed with a hotel in mind, blending in nicely in a lobby, lounge area or, in a hotel room.

In the pictures is my 1:1 scale model, printed in 33 pieces, weighing in on 560 grams. It only took a total of 3 days to print all the necessary pieces which then were assembled with a lot of superglue, baking powder, and Karlsson's klister.

On the following pages the measurements, renderings and, pieces are portrayed.



750 mm



700 mm

475 mm

670 mm

The chair is to be made in a total of eight pieces, which then are assembled with glue and no screws at all.

The idea is to steam-bent back legs and base for the backrest which then will have all the details CNC-milled. The front legs and seat will also be created with CNC-milling. To combine traditional manufacturing methods with newer ones.

From a top view you can see the spacious seating and roomy arm- and backrest. Allowing the user to move more freely during seating.

The massive wood chosen as material is a good fit for the wearing hotel business.

evalutation

As everyone knows this project ended up quite different for all of us. Due to the Covid-19 situation, all classes and presentations where done from home and the workshops were unavailable. This forced me to re-think the last part of my project which would be the building phase. I started with the desire to learn more about building and creating furniture but I instead had to find new ways.

Since I could not use the workshop for mockups or my classmates for testing I replaced it with VR. I could not create my actual chair in wood, so I replaced it with 3D-printing.

During this project, I have learned more than I thought from the beginning. Maybe not so much about furniture construction but instead learned how to work around unexpected situations and limited resources. I am very happy with how my project turned out in the end even if it was not the way I intended it to.

If I have the possibility in the future to redo some parts of this project it would be the mockup- and testing-phase primarily. Since the possibility to create sturdy and testable mockups was missing a bit and I was not able to meet a lot of different people I feel like this could be improved in the future.

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