

# LINE

Bachelor Project in Industrial Design

*by*

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LUND  
UNIVERSITY

Degree project for Fine Arts in Design, Main Field of Study Industrial Design, from Lund University,  
School of Industrial Design

Department of Design Sciences

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# LINE

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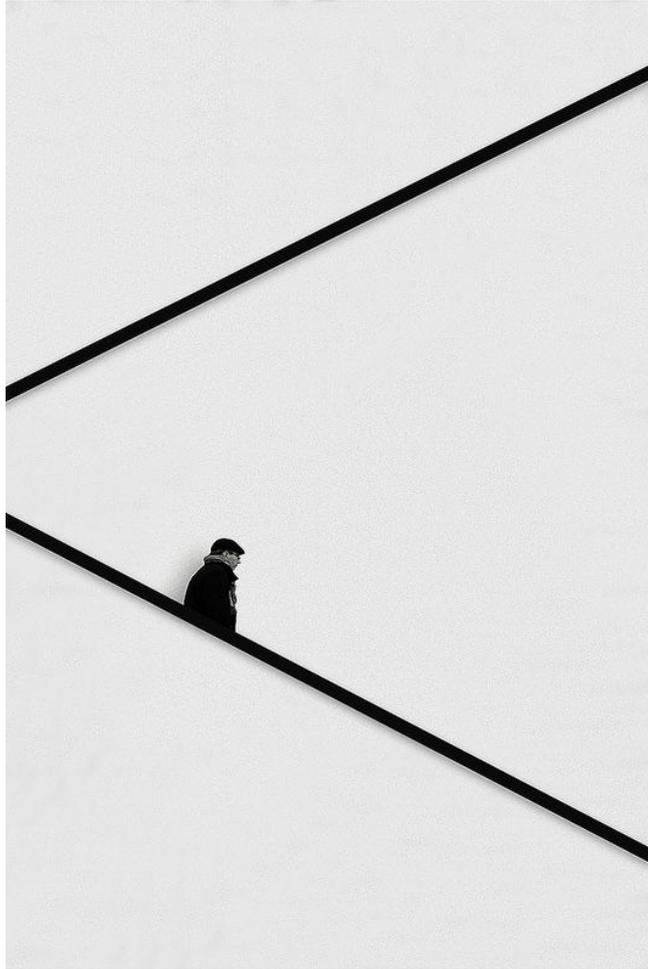
IF EVERYONE  
IMPORTANT  
IF EVERYONE  
SEEN

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NE FELT

—PATRICIA MOORE



# Abstract

The project started with the question “why wouldn’t a disabled or old person want it to look nice at home?” Many assistive products on the market are designed in a way that doesn’t fit the interior trends, which is an issue for several reasons. By the aesthetics assistive products possess, the users get labeled as people who are sick and abnormal. The brief was then created and the goal was to design toilet armrests with the universal design principles to make the bathroom atmosphere feel more appealing but also show that we can think differently when we design for these marginalized groups of people.

In Sweden, we have a specific system of how to get an assistive product if you are in need of one. The alternatives are few even though there’s plenty on the market. This system is good because everyone can get the tools they need, but since it costs a lot for the government there have been many cases when people aren’t getting what they need. This

means that there’s a possibility that the market will change and that the users will start to buy more of these assistive products themselves.

The research phase includes both psychological aspects, a market investigation, interviews with experts within the field and trend research. The conclusions from this lead to a functional analysis which was a merge between the highly important functions but with a focus on the visual identity.

The design process included sketches, foam models and 3D-models. The final result is a full-scale prototype that distinguishes a lot from the current market. 3D-renderings was also created to convince that the armrest fit in perfectly in a modern bathroom. The shape of the armrest offers better comfort but also better support than the ones on the market.

# Introduction

The fact that people are stressed is nothing new. But something we need to talk about more is how we should be able to calm down, to fight the stress. I believe that we need to have calming surroundings and especially at home. People pay a lot of money to visit spas to calm the stress, but just for a day. Why don't bring the spa home? A bathroom is a perfect place for relaxing, it's a place where we can have privacy and time to take care of ourselves.

When I was working with bathroom interiors I met a lot of different customers that, of course, wanted different things. Some wanted a spa-feeling, some wanted a sense of contemporary design and some were aiming for the classic royal atmosphere. What they all had in common was that the bathroom was a place for privacy and calmness. Also, they wanted the room to have an aesthetic connection to the rest of the home. This could be done by either colour choices or materials.

Since the last two years, I've been noticing that there's a big lack of assistive bathroom products that has a connection to the bathroom

trends and design that my former customers wanted. This made me look at every bathroom that was designed for people with disabilities I could find at hotels, restaurants, spas, and airports to see if they had put any effort to the aesthetics of these bathrooms. Not surprised, the bathrooms were quite different from the "normal" bathrooms. These bathrooms are only designed to work functionally, not to create a special atmosphere or experience.

I asked myself two questions:

Why isn't it important to keep the same aesthetics in a bathroom for people with disabilities?

Why do we design like we think that they don't care?





# Brief

”Design toilet armrests with the universal design principles to make the bathroom atmosphere feel more appealing”

# Research





# Identity created by others

Identity is something that we create and express by the things that we own, the things we have in our homes or things that we wear. Our identity is also defined by where we travel and work, it's affected by almost everything. Our identity is very important for us humans since it's the way we tell others who we are. This is of course also connected to the self-confidence. Though, if you don't have the money or if there isn't anything on the market for you, your identity changes to something you don't want it to be.

Humans use and create stereotypes and prejudices to understand the world easier. It's something that comes naturally for us and can save a lot of time. In many cases it's very useful. That we, for example, know that a machine will turn on if we press the green button. Though, when it comes to stereotyping people, it can become dangerous. In the worst cases, our prejudices can lead to a lack of empathy for others. Especially when we have started to think that they are not like me. There's a lot of different theories in psychology about this subject where the conclusion is that we are very affected by stereotypes even though we are aware of them.

A study made by two nurses in Vaasa, Finland, showed that the aesthetics in hospitals affects the patients more than we think'. They could see that by designing atmospheres and rooms that were more connected to the aesthetics of a home, the patients got a lot better in a shorter time than the patients in the "normal" hospital rooms. This clearly shows that by having things around you that you like, you feel a lot better.

What I believe is that many of the things that are designed for the disabled and elderly look like something that belongs in a hospital. This makes these people feel like they are sick and abnormal. I want to design things that make people feel included and not excluded by things that are as natural as a chair. Things like wheelchairs, walkers and toilet armrests are often introduced to the user in a hospital, but since it's then brought home I think it's more accurate to give these objects a visual identity that fits into your interiors rather than a hospital.

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<sup>1</sup> Granberg Linnéa, Smeds Sofia, *Estetikens och miljöns betydelse inom vården*, 2011, Vaasa, Finland

# Market analysis

The market is filled with different kinds of armrests, but there are four categories in the way they are installed in. They can either be mounted directly into the WC-chair, into the floor or into the wall with or without a support leg. After discussing the market with Per-Olof Hedvall (Certec) and Lilian Müller (Certec) I understood that the ones that are the best are the ones in terms of safety and functionality is the ones that are wall mounted with a support leg. They can take the highest load and also in different directions. If we are supposed to follow the Swedish regulations, are the ones that are mounted into the WC-chair not recommended at all.

Most of the armrests are grey or white with a hospital like aesthetic. Though there are two brands that distinguish in the design, inda (Italy)

and FROST (Denmark). These two have been focusing more on the aesthetic part and I believe they have taken inspiration from water taps. I think it works aesthetically but during the discussion I had with the two experts from Certec, these products can't take that high load and the shapes also make the user insecure when rising since the curve of the armrest makes it quite easy to slip off if your hands are shaking. This is something that's very important to think of since these products need to communicate a safe and supportive feeling to the user.

**inda**



Price on demand

**FROST**  
DENMARK



Armrest: 4300-5500



Seat with armrests: 5089 SEK



Armrests integrated in the WC-chair: 4195-4322 SEK

**PRESSALIT**  
care



Armrests adjustable position: 4500-5000 SEK

**ifö**  
Geberit Group



Armrests integrated in the WC-chair: 4105 SEK

Armrest: 2028 SEK  
Support leg: 1224 SEK

**etac**  
Creating possibilities



Armrest: 2150-3450 SEK



Armrest: 710 SEK



Armrest: 1120-1290 SEK  
Support leg: 525 SEK

# “It’s all about politics”

*Interview with Per-Olof Hedvall, Certec, Lund University:  
2019/02/11*

I met Per-Olof early in my process since he has been working with universal design for a very long time. His lectures about universal design, which is a concept about how to design for including as many people as possible, has inspired me a lot. The biggest reason why I met him was to confirm that my project was accurate and going in the right direction. Since I'm not in the in need (at the moment at least) of assistive devices I wanted an expert to confirm the idea, which he did.

We started to talk about stigma and how this marginalized group of people is very controlled by politics. The users often get the products they need from local authorities which means that they have a very small impact in which specific product they get. The fact that we can get these devices is of course very good since they can be quite expensive, though there has been a lot of cases when this system isn't working and people aren't getting the things they really need. The reason for these cases is the strict budget they have. This means that when the system

works, it works quite well but when it doesn't it doesn't work at all.

We started to talk about the universal design principles and he said: “if you design an armrest that would support the ones in need and at the same time be comfortable for everyone what would that be?” This question led us to a discussion about the target group. If I was supposed to design something that would have a real impact, the project needed to include the person in need, an assistant but also the people who could use it and enjoy the comfort of it, like the water taps with just one hand grip. One of the main goals would therefore be to design armrests that would be so closely connected to the bathroom atmosphere that the person uses it wouldn't think “this is a handicap bathroom” but instead “what a nice bathroom”.



# “The market will change”

*Interview and visit at Hjälpmedelsteknik, Lomma, Sweden.  
2019/02/14*

Hjälpmedelsteknik is one of Sweden's biggest companies within the field of assistive products and I went there to get to know more about the customers and users since I knew they had a lot of experience.

The first thing that we talked about was the system of how you get these products, as Per-Olof Hedvall and I talked about before. Since you get them from the local authorities you can't choose which ones you like. This is a problem both when it comes to taste but also the functionality. The people who make the decisions for the users are only allowed to choose from a specific list. This list is very limited and has a big lack of products with high quality in terms of support, ergonomics, and safety. The ones on the list are cheap and often very basic. This leads to that the people with money can afford the good things themselves, but the ones that don't have the same budget needs to use things that aren't working that well. The people I interviewed at Hjälpmedelsteknik said that they know and believe that this complex market will change within 20 years. At 2040, half of the population will be over 65 years old which means that the government won't have

enough money for everyone. They think that the users will buy more of these assistive products themselves in the future.

There are big generation differences. They mean that the customers that are around 60-70 years old are more willing to invest in something nice that has a good quality, in comparison to the customers that are 80-90 years old that rather buy something cheap. They believe that the reason is connected to the time the generation grew up in. We are more and more willing to purchase things impulsive but also put more money on ourselves, instead of saving it to our relatives when we die.

When I told them about my project they were happy that someone finally wanted to do something different but that it could be hard to get it on the market with private customers, mainly because of the system. Though, I believe that my project wouldn't necessarily be sold in an assistive product store but rather in a bathroom interior store. I especially think that architects would be interested in this concept when designing public spaces.





# “We need more harmony in our lives”

*Interview with Mia Wassberg, Project sales/Creative director  
2019/02/12*

Mia Wassberg has been working with bathrooms interiors for 20 years and has a really good sense of creating interesting atmospheres. She is mainly working with architects today and often works with things like spas, pools and exclusive homes. I decided to interview her since I knew she has a good knowledge of bathroom interiors and what people want.

When she started to work with bathrooms, people weren't aware of the bathroom aesthetics or felt like this room was an important part of the home. But nowadays the bathroom has become a more valuable part of the home. Like the kitchen, people want this room to be a core part of the home and that it should have a close aesthetic connection to the rest of the home.

We live in a very hectic and stressful society and we need a place where we can get some harmony. A bathroom is a perfect place for that. It's the place where you start and end your day and can have time for your own rituals in privacy. She believes that we can gain new energy

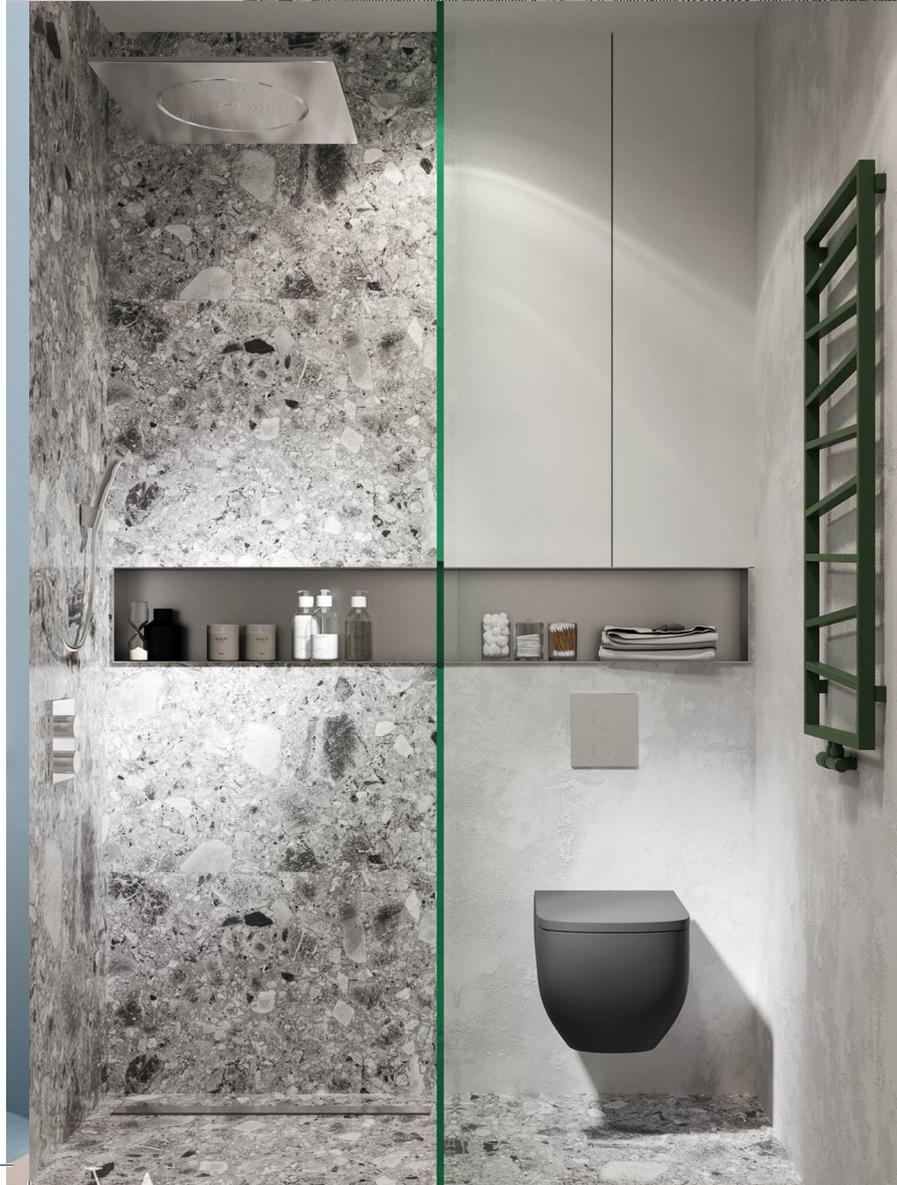
from these rituals and that is a way of meditating.

One reason for the awareness of the bathroom she thinks is mainly through social media and websites like Pinterest. By having easy access to interior pictures everyone becomes “experts”. She means that the customers know more often what they are aiming for than before.

Many customers think that to be able to create a good looking bathroom you need to be rich. This is not true and she says “you can create a spa atmosphere in a room of 3 square meters”. The amount of space and budget is not what matters, it depends on what colour and material choices that are available and how to combine them.

When we talked about my project she believes that architects could be very interested in this kind of product. Many restaurants, spas, and hotels are designed with clear storytelling and it's very important to have everything connected in every space. Nowadays architects just following the regulations because “you need to” instead of making these regulations a part of the whole process.





# Concept



# Functional analysis

Be safe	■ ■ ■ ■ ■
Ergonomic	■ ■ ■ ■ ■
Aesthetics and shape connected to bathroom atmospheres	■ ■ ■ ■ ■
Take high load	■ ■ ■ ■ □
Comfortable for anyone	■ ■ ■ ■ □
Easy to clean	■ ■ ■ □ □



# Target group and situations

Primary user:

The person in need



Secondary user/s:

The person in need + assistant



Tertiary user/s:

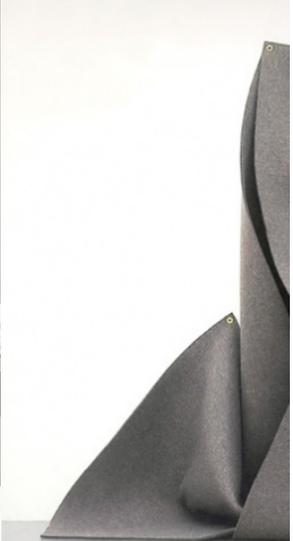
People who can enjoy it



Where?

at home...  
in restaurants...  
in hotels...  
at airports...  
...everywhere!









# Goal

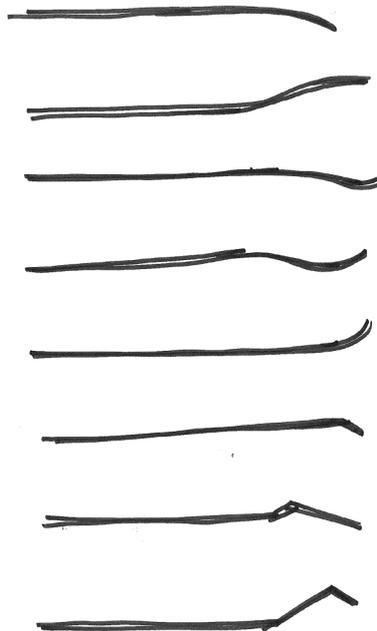
Design a product that goes well with bathroom interiors and that doesn't look like an assistive tool at first sight.

With the design of the new toilet armrests, show that we can change our idea of how to design assistive products.

# Design phase



# Lines

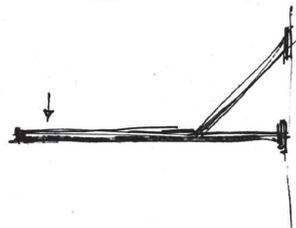
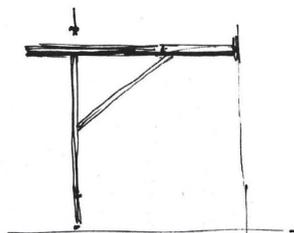
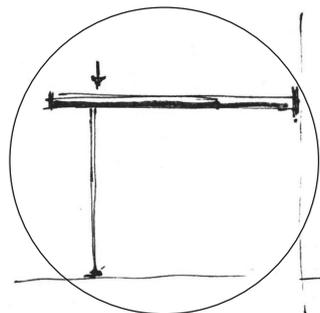


To make the armrest safe and supportive like the good ones on the market, I realized that the armrest needed to be mounted in the wall and with a support leg. This design is better than the ones that are only mounted in the wall but without a leg, or the ones that are mounted directly into the floor. The reason is that this design can take a higher load and force in more than just only one direction.

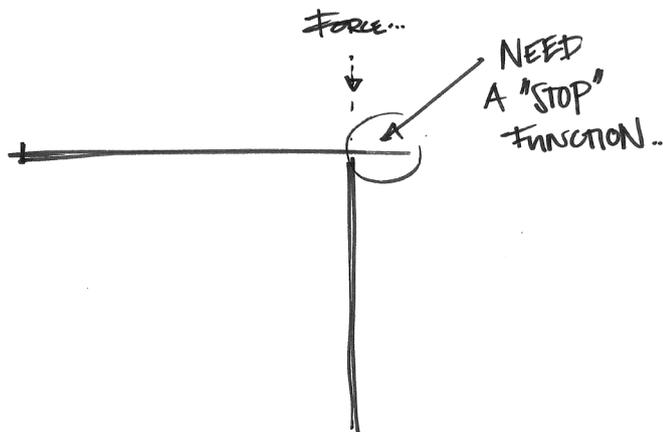
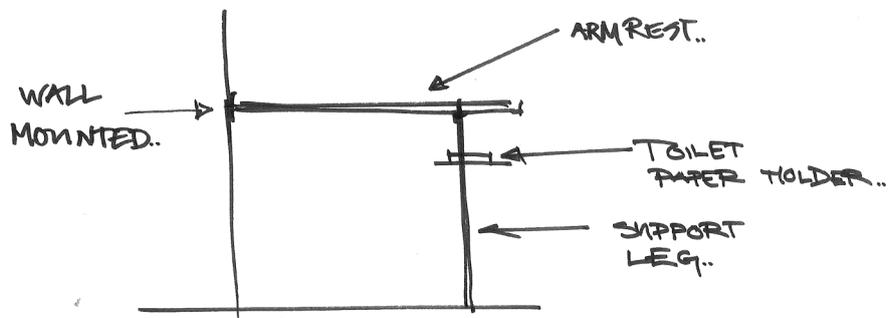
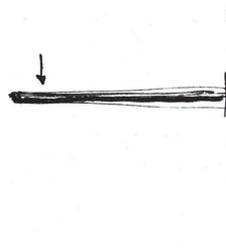
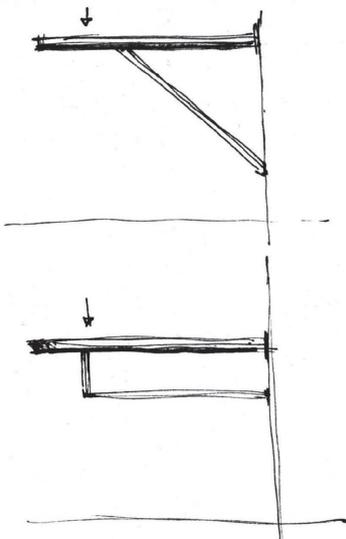
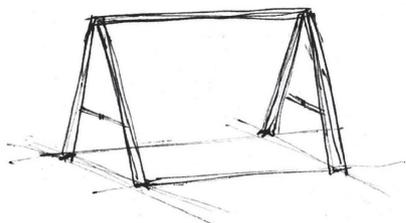
With this in mind, I started to sketch very simple profiles with only using one line. I wanted it to have a smooth curve that would feel comfortable when your arm is resting on it, but I also wanted the shape to have a natural “handle” where you could push yourself up. In comparison to the FROST and Inda armrests, I wanted to have something at the end of the armrest that would offer you some kind of “stop-function” so there’s a very little chance that you could slip off with

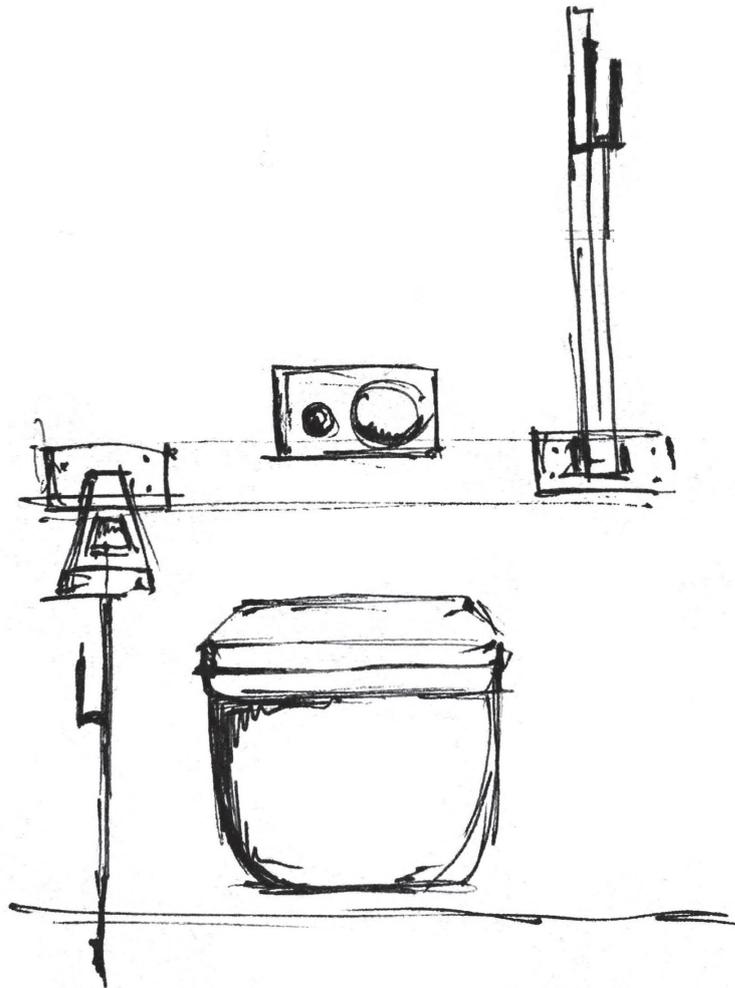
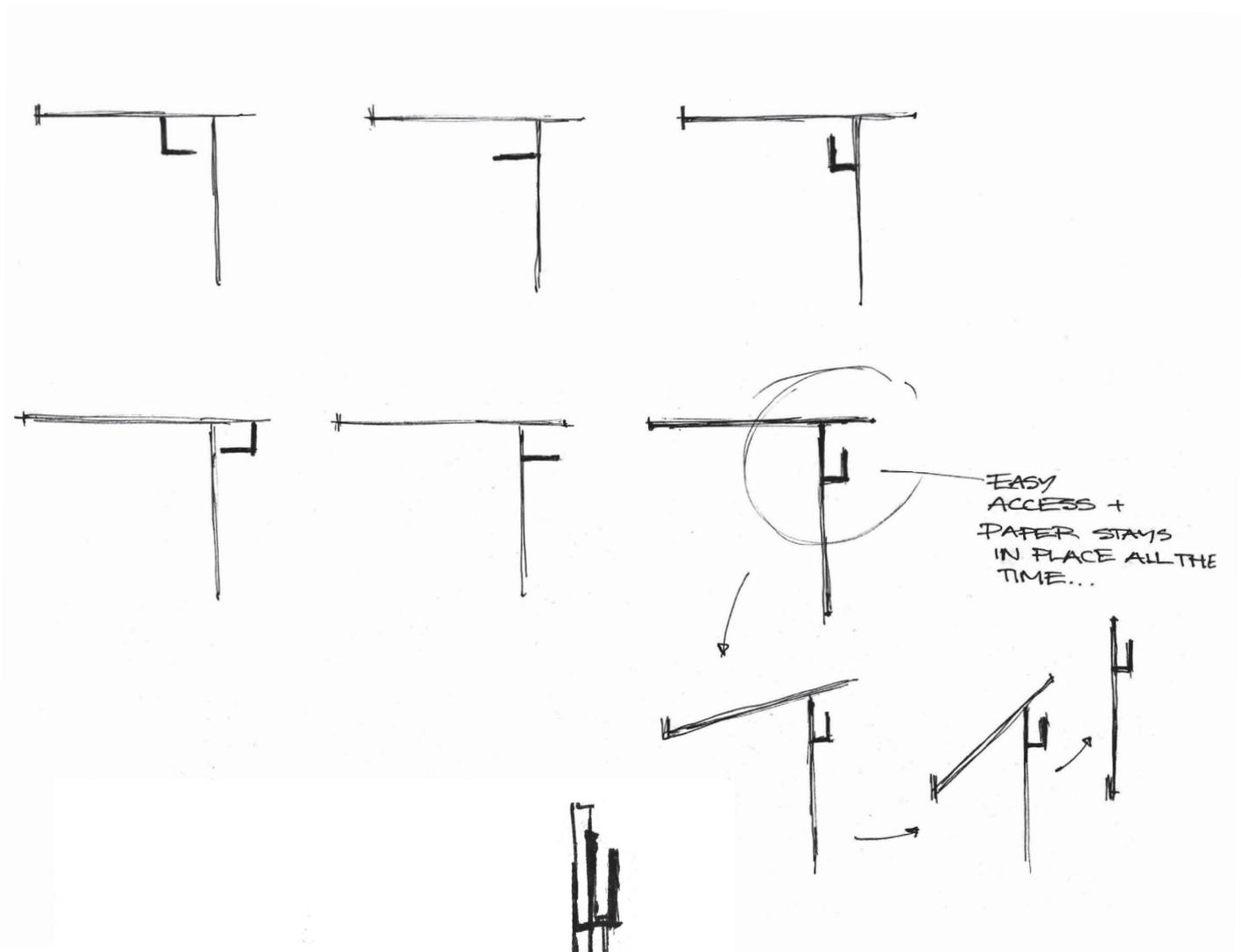
your hand. I started making foam shapes quite early in this sketching phase since I felt like the only way to really understand which shapes that could work needed to be done through experience. I decided to go for four different soft curves since they felt less “aggressive” than the ones that had hard corners. I was aiming for an inviting feeling and it was therefore important to make the shape sleek and soft.

Later, I chose to go with the shape that had a very soft curve where your hand fell natural into the concave curve. It also created a natural “stop” since it was tilted upwards in the end. After making some fast user tests I also came to the conclusion that this shape was nice because you didn’t really think about the concave curve that much, it was just there, giving you both comfort and support.



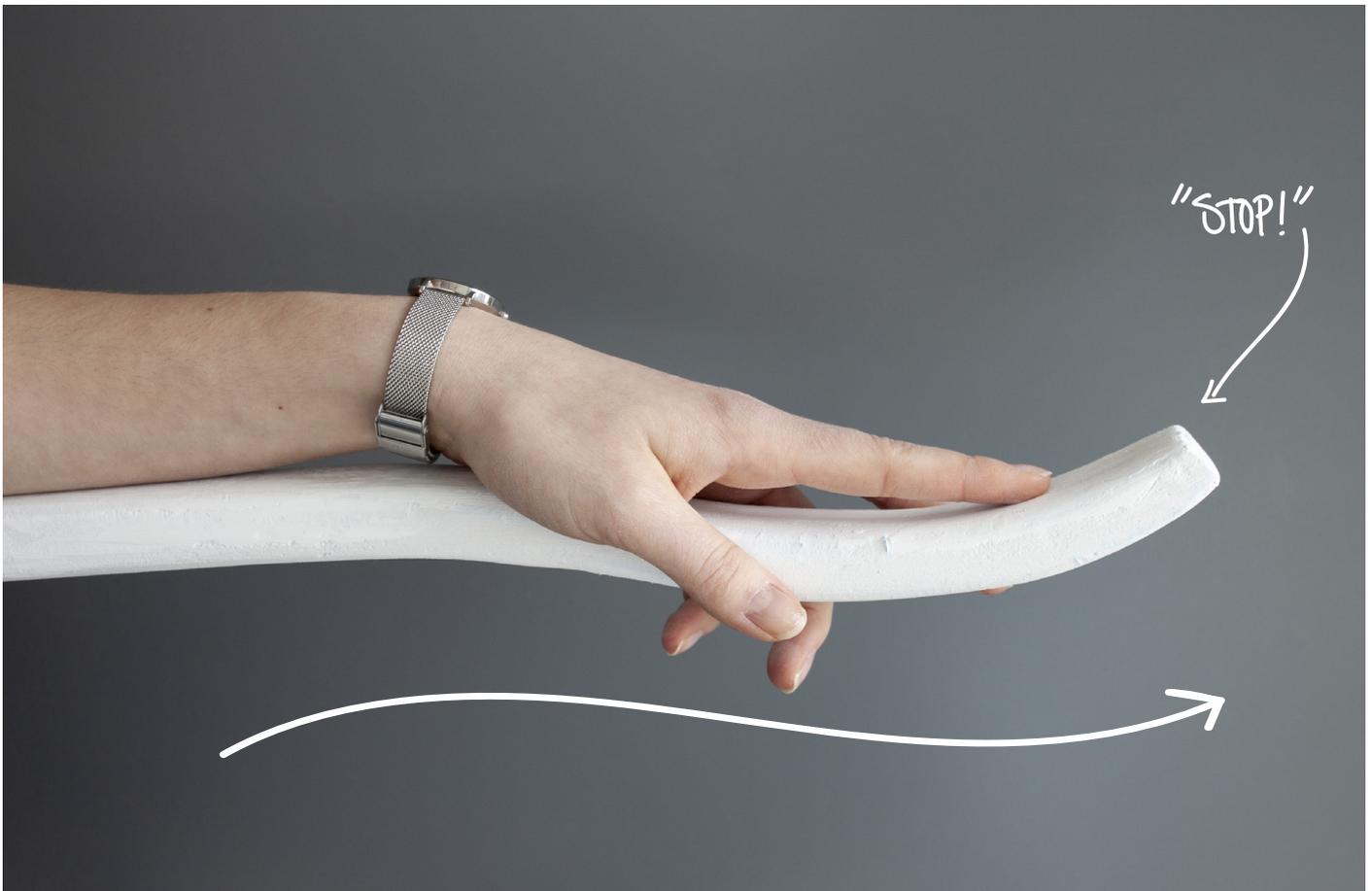
Free standing?

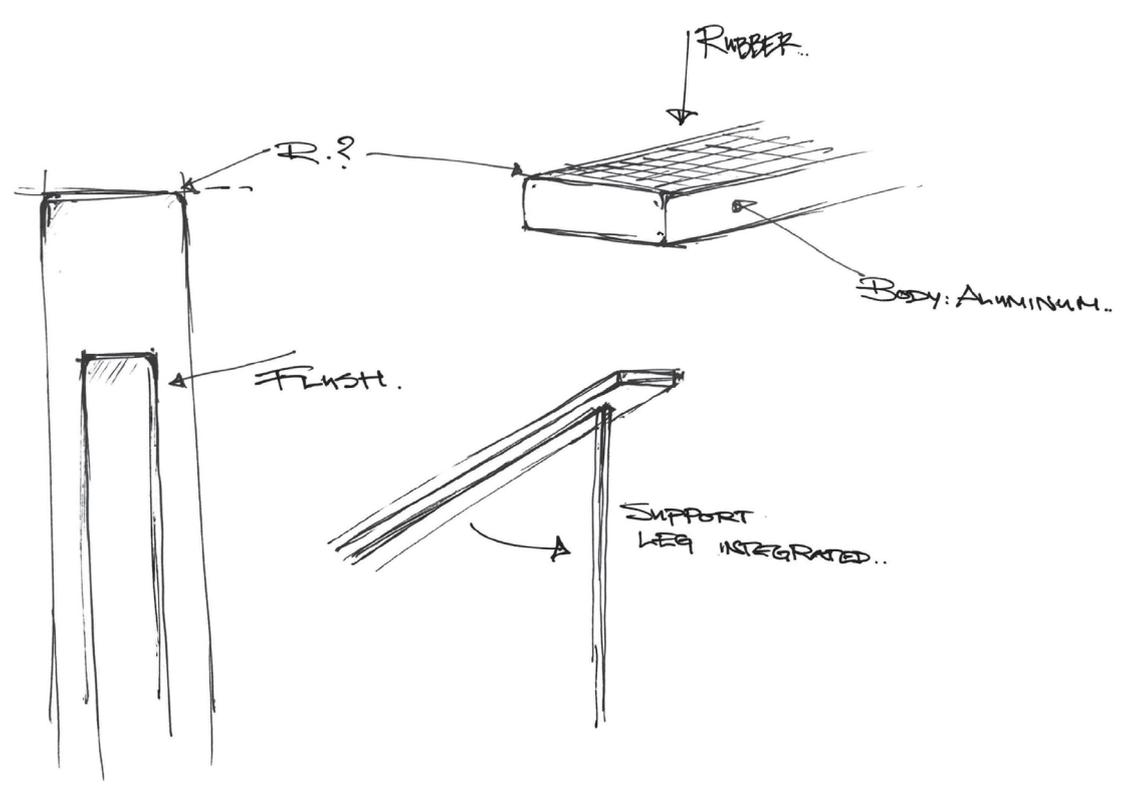
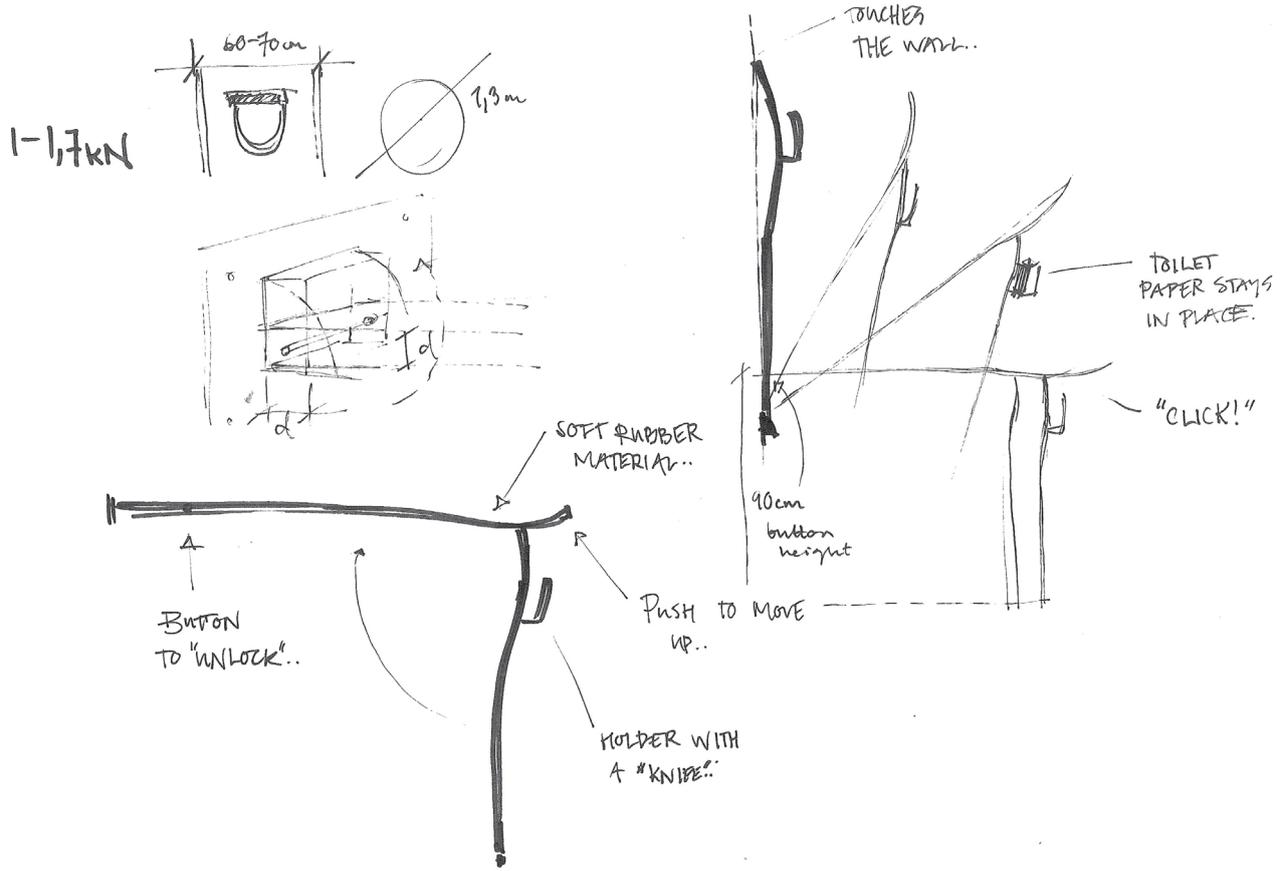


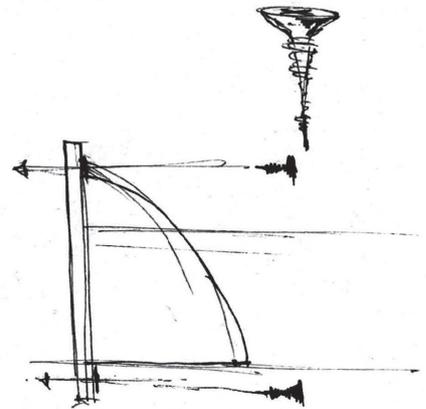
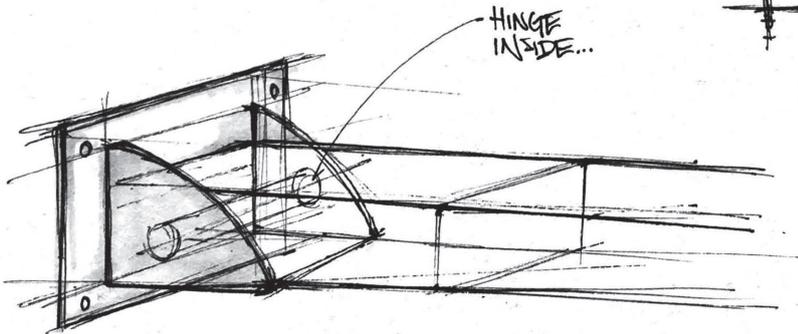
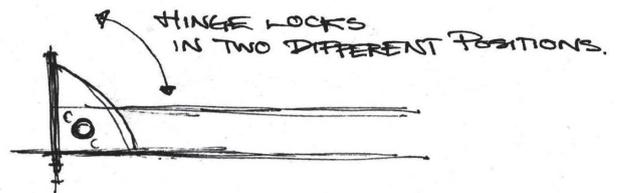
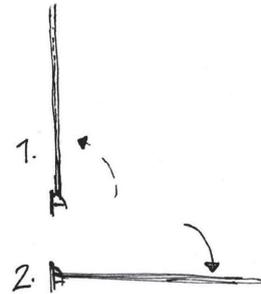
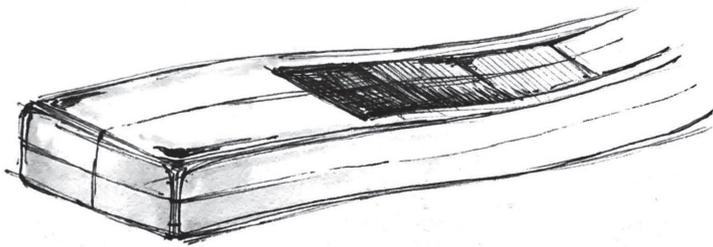


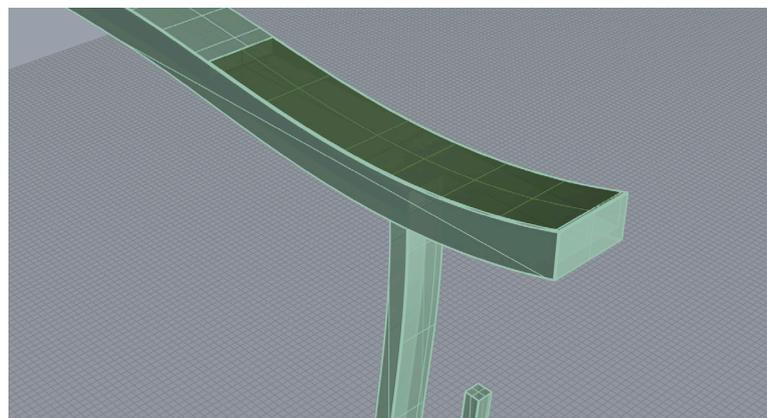
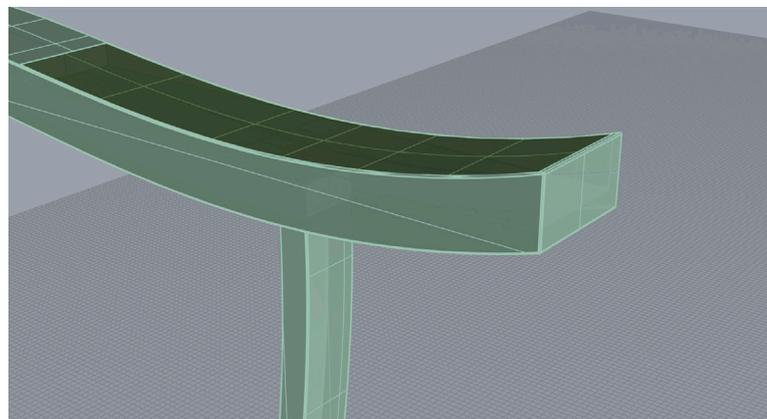
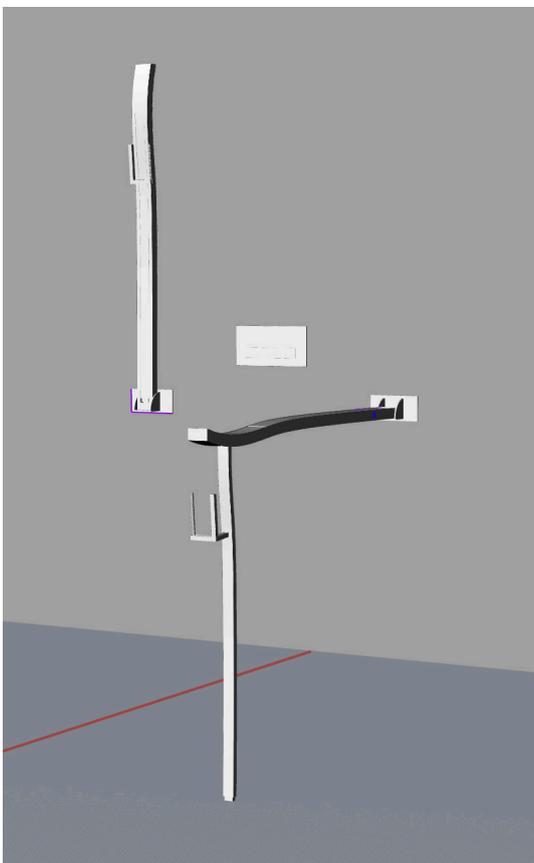
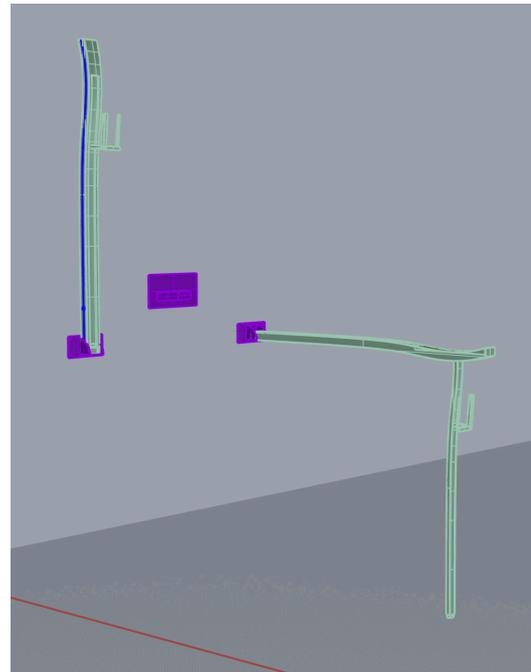
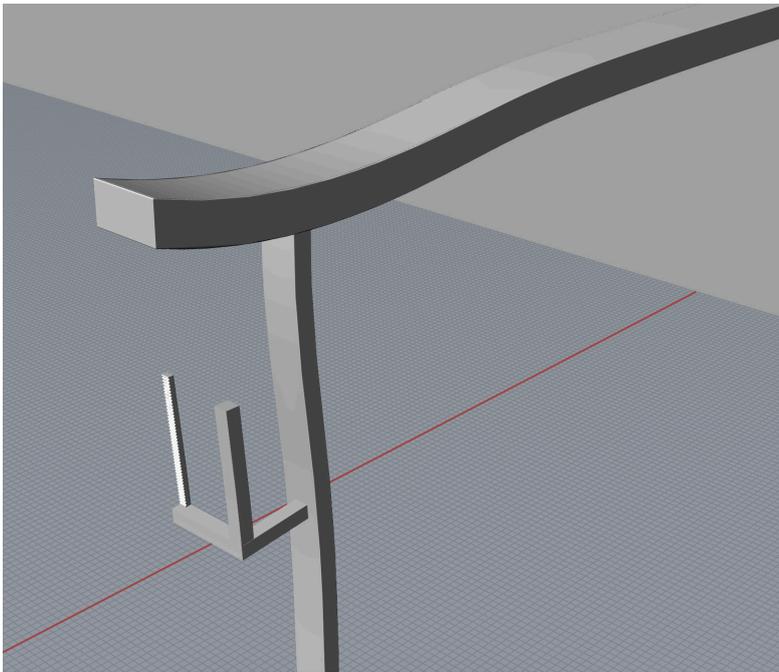






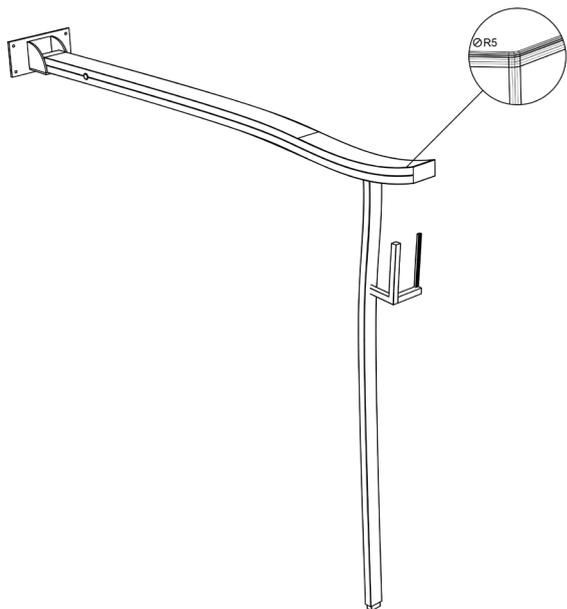




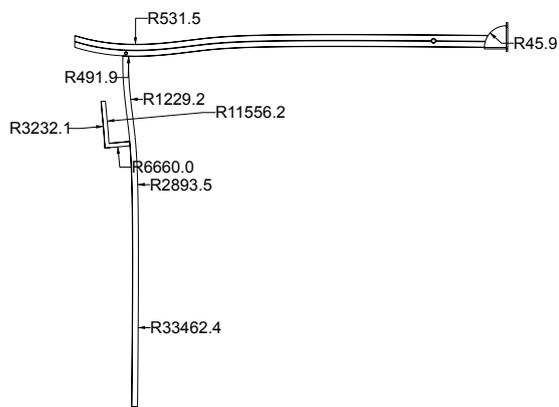


The support leg was designed with the same curve as the armrest since I wanted it to be flushed into the form when it was folded up to the wall and not in use. By the regulations of how to design aid products, I got to know that a paper holder was a feature that was a requirement to have. This was also naturally shaped by the curve of the armrest, to make it follow the profile both when it's in use and when it's folded up to the wall.

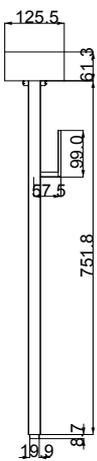
Often the armrests on the market come in three different length choices: 65, 75 or 85 cm. For this prototype, I decided to go with the longest armrest since it fits for many people and because I wanted the armrest to look sleek even though it was the biggest model of it.



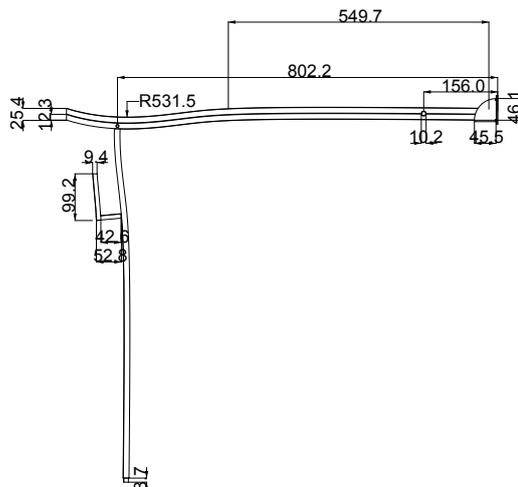
Perspective  
Radius edges



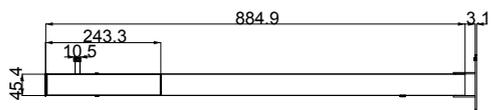
Side view  
Radius/Curves



Back view  
Measurements



Side view  
Measurements



Top view  
Measurements

**" LINE "**

*Technical Drawing*

*Measurements*

*Radii*

*Millimeters (mm)*

# Material and colour



The material choices came natural, the body needed to be cast in aluminium to make it strong and using a rubber material on the top front to make it soft and comfortable when you raise. A rubber material would also be put on the bottom part of the support leg, to reduce the sound when the leg touches the floor.

About the colour, I decided quickly that I needed to design something that did not look like any of the hospital like products on the market. The colours white and grey could therefore not be used. The easiest way of really contrasting to the market would therefore be to make the product very dark, in this case black. I also believe that the colour black goes well with other bathroom interior products, and since I wanted this object to be a part of the atmosphere it felt natural to make it black. Though, in the future, I believe the armrest could come in other colours too.

The material needs to be...

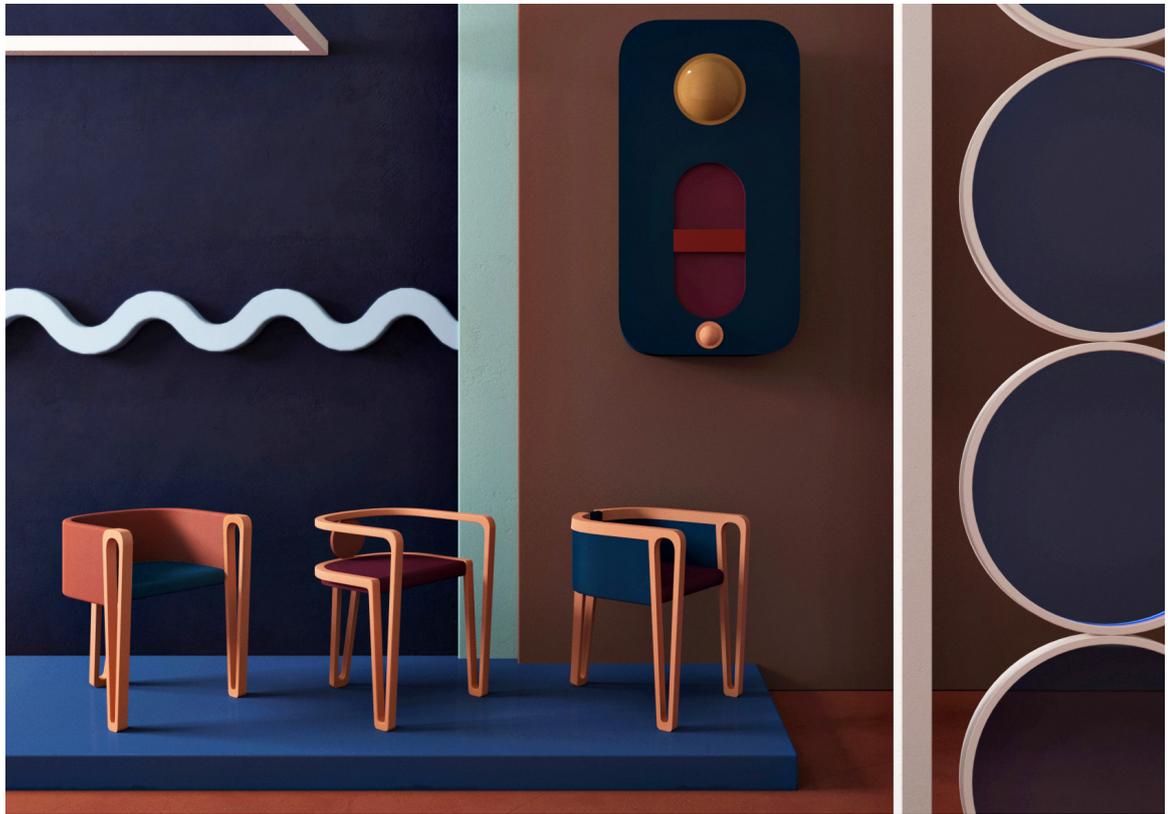
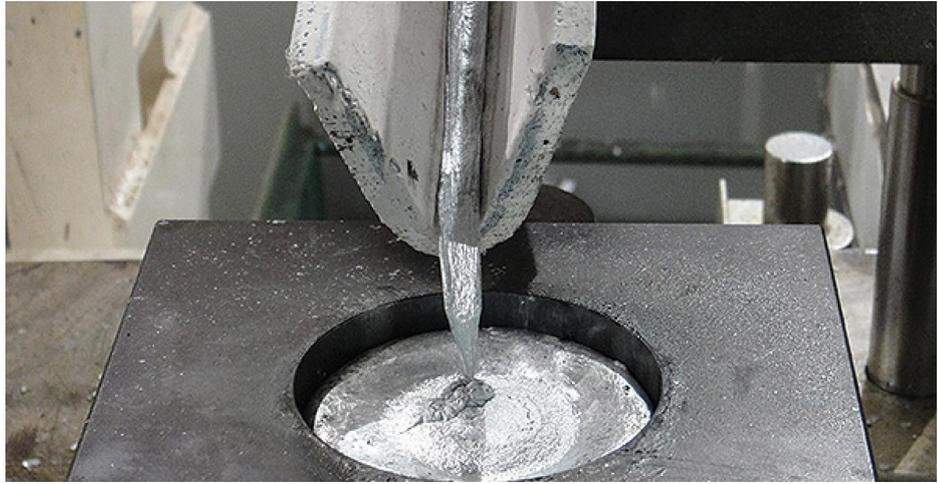
... able to cast for mass production

... of light weight

... a strong material to take high load

... able to be powder coated

... aluminium!



# Prototyping

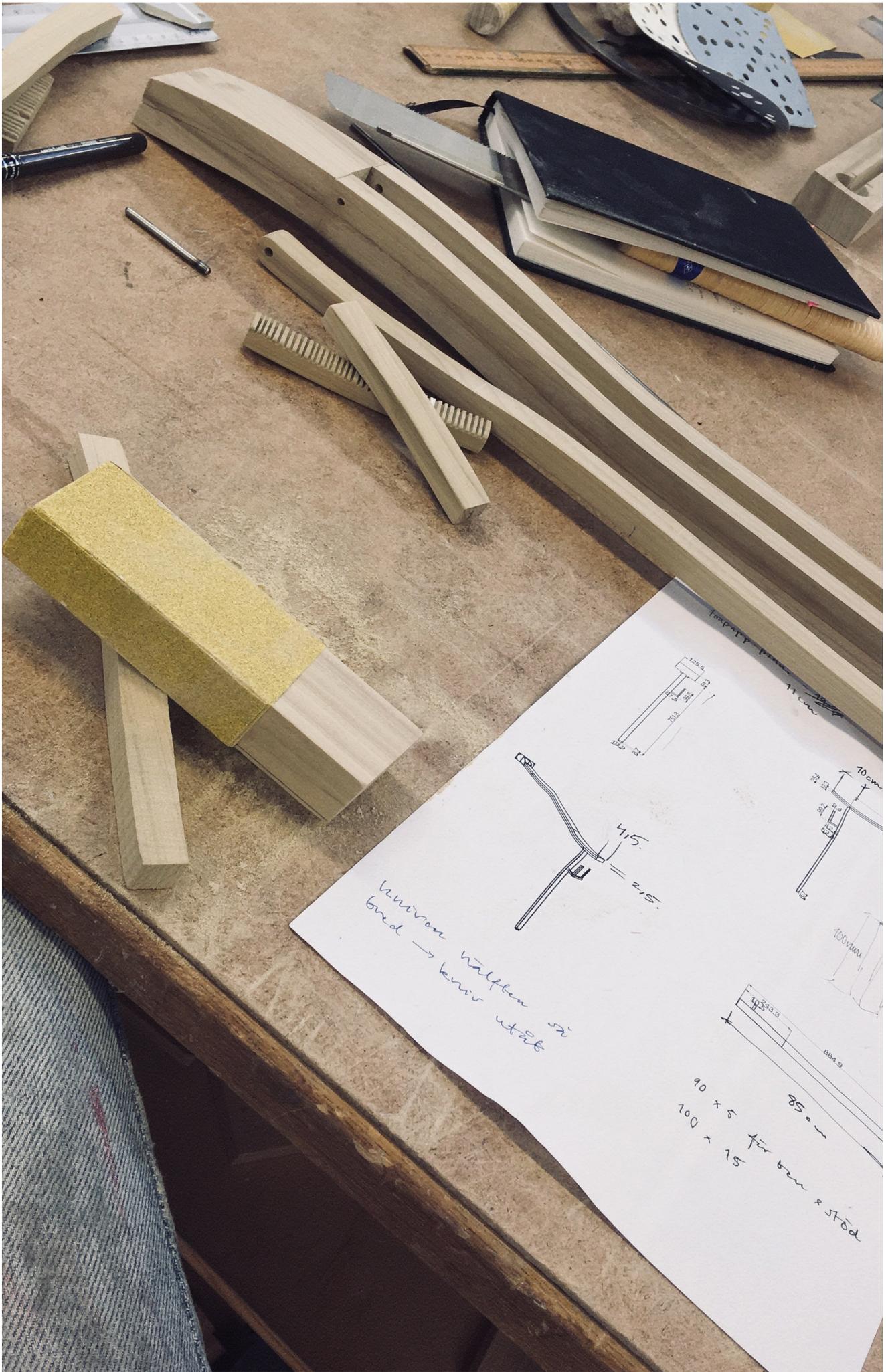


After making the technical drawing I went down to the workshop. To save money and time I decided to work with wood, poplar, for the prototype. I bought a solid piece of poplar and then sawed out every piece in the band saw. After this, I could easily sand the soft curves and make it super smooth. The sanding took a quite long time but it was something I had prepared for.

When the pieces were ready I glued the things together and made hinges for the support leg and for the mounting plate on the wall. Then everything was covered spackle and sanded once again. It was impor-

tant to sand everything properly so there wasn't any possibility to see the wood grains through the spray paint.

I didn't really have any struggle in the workshop, everything worked quite as planned but I think that was because I had planned every step in detail.





SANDING  
SANDING  
SANDING

G G G







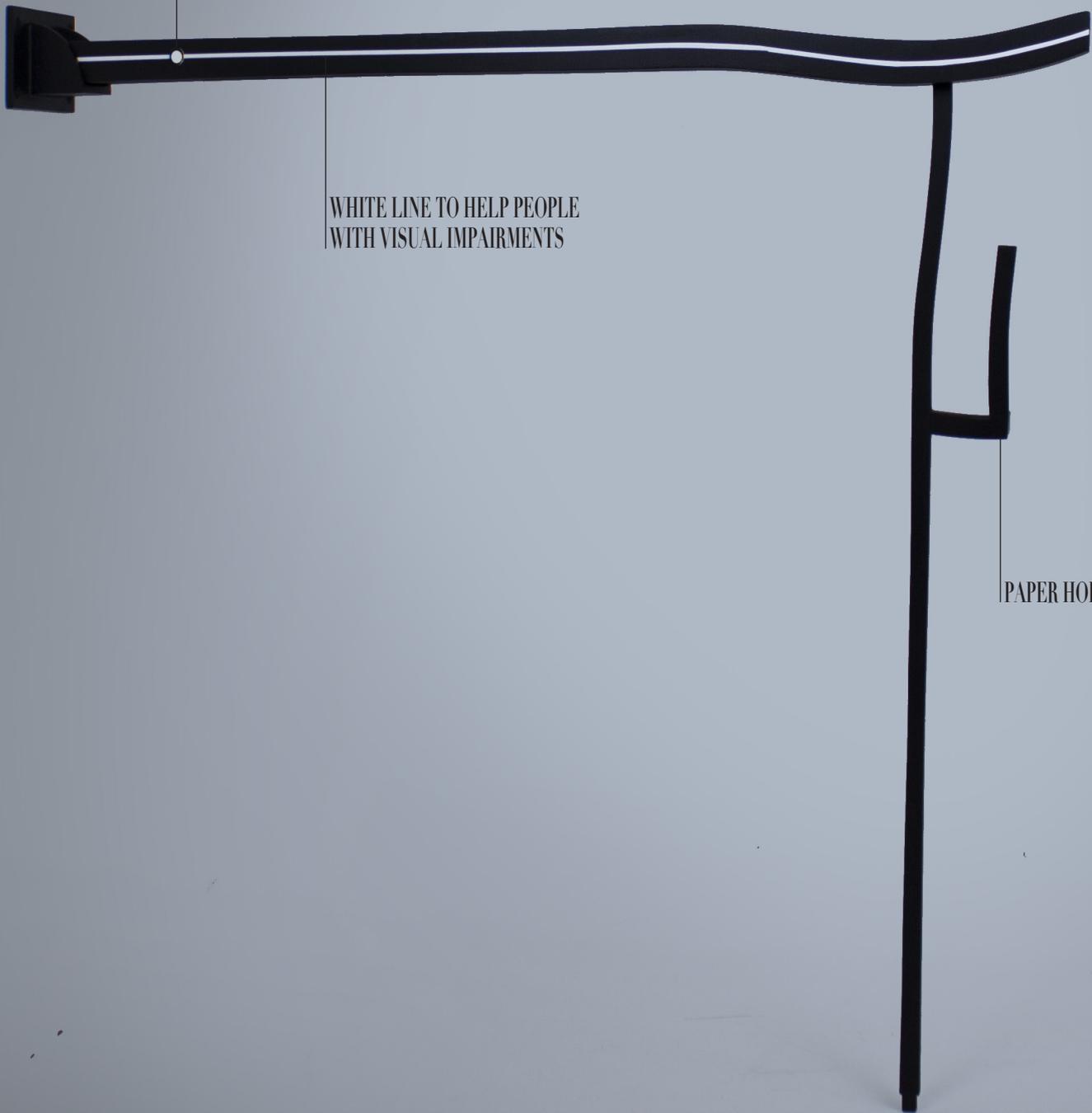
# Final result



BUTTON TO RELEASE  
LOCK MODE

WHITE LINE TO HELP PEOPLE  
WITH VISUAL IMPAIRMENTS

PAPER HOLDER



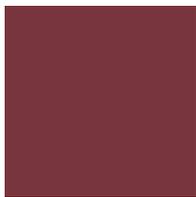
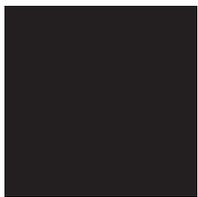
















# Discussion

I believe that I've succeeded with my goal. The armrest is designed in a way that fits into the interior but also contributes to the atmosphere. It shows clearly that we can design in another way than we do today. The style that the armrest has, a graphical contemporary visual identity, is not necessary the style that needs to be used in every situation. It's just an example of how we could think when we design, and my aim is that it would come in different finishings and colours such as brass and chrome.

As I mentioned before, the market nowadays is very strict and works in a specific way since the system we have in Sweden is so strongly influenced by the governments' decisions. Though, I think that this product could be interesting for architects when designing public spaces. This is something that I would've investigated more if I had more time, it would be very interesting to interview architects. When I had the

interview with Mia Wassberg, she said that her impression is that architects and interior designers have nothing to choose from. These two professions would really enjoy my product. It's mainly this gap on the market that I want to fill, and by this, I would also create a new target group.

The aim for the future is to see how this piece would work in other colours and other environments. But the next big step would be to design assistive products as a part of a bathroom furniture series to really make a statement, instead of designing them separate.

REFE

RENCI

# ES

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**Thanks for reading!**



LINE

*by*

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