



Norwegian University of
Science and Technology

Designing a baby bouncer

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Department of Design



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SET IT UP





SLIDE THE FABRIC SEAT ON





LOOSEN/FASTEN THE HARNESS





ADJUST THE ANGLE





BRING IT WITH YOU







GUNNAR EIDSVIK TVEDT

DEVELOPING A BABY BOUNCER

Master Thesis - Department of Design - NTNU - Jan 2018

Master thesis for Gunnar Eidsvik Tvedt

Developing a baby bouncer

Utvikling av vippestol for barn

Stokke is a well known producer of products for children with worldwide distribution. Their main categories are indoor articles and strollers, with the Tripp Trapp chair and Xplory stroller as their most iconic. Stokke works from a vision of creating products that “grow” with the child and focus on closeness between child and parent.

A baby bouncer is a product used by newborn children until they can sit up straight by themselves. Its intention is to create natural soothing motions to keep the child calm. The motion of a bouncer can usually be started either by the child itself or by an adult. This means that it can also be used to keep the child busy. Today Stokke has a bouncer on the market called Steps Bouncer, which can be used both in combination with their highchair Steps and by itself.

The goal of this assignment is to develop a new bouncer in collaboration with Stokke. This is meant to broaden their portfolio and target market segments their current product is not reaching out to. It is meant to be a standalone product, and will be expected to compete with current market leaders.

The assignment will mainly include:

- Analyzing similar products and market leaders
- Gathering of information from users and other relevant sources
- Identifying user needs
- Physical prototyping and testing
- Exploration of relevant materials and their properties
- Considerations for production and cost effectiveness

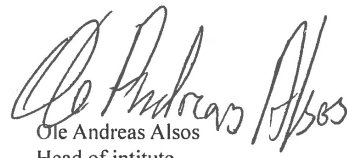
The thesis is conducted through “Retningslinjer for masteroppgaver i Industriell design”.

Responsible tutor: Ole Petter Wullum, NTNU
Business contact: Hans-Cato Slotterøy, Stokke AS

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ABSTRACT

This assignment was initiated by Stokke as a possible start of a new internal project. The objective was to develop a new baby bouncer to supplement their current portfolio. The assignment was largely based on challenging existing perceptions of the baby bouncer as a product, with focus on balancing form and functionality in an understandable package. To achieve this, emphasis was put on gathering user insight, studying relevant sources of inspiration and physical prototyping. This resulted in a product that differentiates itself from the competition through discussing the essence of user needs and how to make functionality understandable.

SAMMENDRAG

Denne oppgaven ble foreslått av Stokke som en mulig start på et fremtidig internt prosjekt. Målet var å lage en ny vippestol som passer inn i deres nåværende portefølje. Oppgaven ble basert på å utfordre eksisterende oppfatninger av vippestolen som produkt. Hovedfokuset var å balansere form og funksjonalitet til noe enkelt og forståelig. De vektlagte metodene for å oppnå dette var omfattende brukerundersøkelser og tester, innhenting av relevant inspirasjon og fysisk prototyping. Dette resulterte i et produkt som skiller seg fra mengden ved å diskutere essensen av brukerbehov, samt hvordan å fremstille funksjon som noe forståelig.



INTRODUCTION

Background and objectives

BACKGROUND

This project was initiated by Stokke after first cooperating with them on the course “Design 9 - Specialization Project”. As this first cooperation was very rewarding in terms of learning and developing as a student, continuing to work with them on a master’s thesis was tempting.

The project was chosen because of its presumably fitting level of complexity and its potential to be developed further as a commercial product.

What I personally wanted to gain from doing this assignment was a more form oriented way of working. My previous projects had form wise largely been based on intuition and following ideas on functionality. My motivation was of this reason to gain a better understanding and a stronger confidence working on the shaping of a product aesthetically. To not compromise functionality, this approach would be supported by a continuous focus on prototyping and testing, making use of my knowledge in the workshop.

For help and support through the project, I had the pleasure of working with Ole Petter Wullum from NTNU and Hans-Cato Slotterøy from Stokke. Combining Ole Petter’s strong sense of aesthetics and Hans-Cato’s more functional approach and insight proved to be a good match.

MISSION

The goal of this assignment was to develop a new baby bouncer in cooperation with Stokke. The bouncer should communicate Stokke’s brand image and values while being a natural addition to their existing product portfolio. This implied focusing on appealing aesthetics, clever functionality and safe solutions, but also differentiating from the competitors. The bouncer should aim to be an exciting new product on the market, creating attention and challenging current leaders.

In addition to delivering a realistic suggestion to Stokke for further development, the project should also challenge traditional ways of solving the problems at hand. As a master’s thesis, strengthening current weaknesses and daring to take chances should be of high importance.

The role of a designer can in general be defined to challenge existing norms, pushing boundaries. What distinguishes a product designer and a classic engineer should be the drive to improve and simplify, not only make things work and look acceptable. These thoughts would need to be key aspects to stick by during the assignment. Constantly questioning, understanding and reflecting on decisions made and their relevance to the project as a whole should be of fundamental importance.

STOKKE

Stokke is an internationally acclaimed producer of products for children. Their main segments are strollers and indoor articles, including the Xplory stroller and Tripp Trapp chair. Stokke makes products to encourage child development and to strengthen the bond between parent and child. They do so under the philosophy of designing for the best interest of the child.

Since Stokke was founded in 1932, the company has shifted focus from making bus seats and adult furniture to becoming a renowned producer of premium children's furniture and equipment. This phase started with the launch of the TrippTrapp chair designed by Peter Opsvik. The TrippTrapp was also the product defining the company's values.

In recent years, Stokke has put most of their energy into making strollers. Their first stroller "Xplory" was presented in 2003, challenging existing strollers by introducing a high parent facing seat.

Looking at Stokke's product portfolio, a clear distinction can be made between their outdoor and indoor products. Where the indoor products are based on scandinavian traditions of using wood, subtle colors and simple functionality, their outdoor range embraces the automotive, technical and purely functional.

The following pages show images accentuating these differences and a personal impression of how Stokke wants to be perceived by consumers.

Stokke Products





PREMIUM



CLOSE,
INCLUDING

PRACTICAL





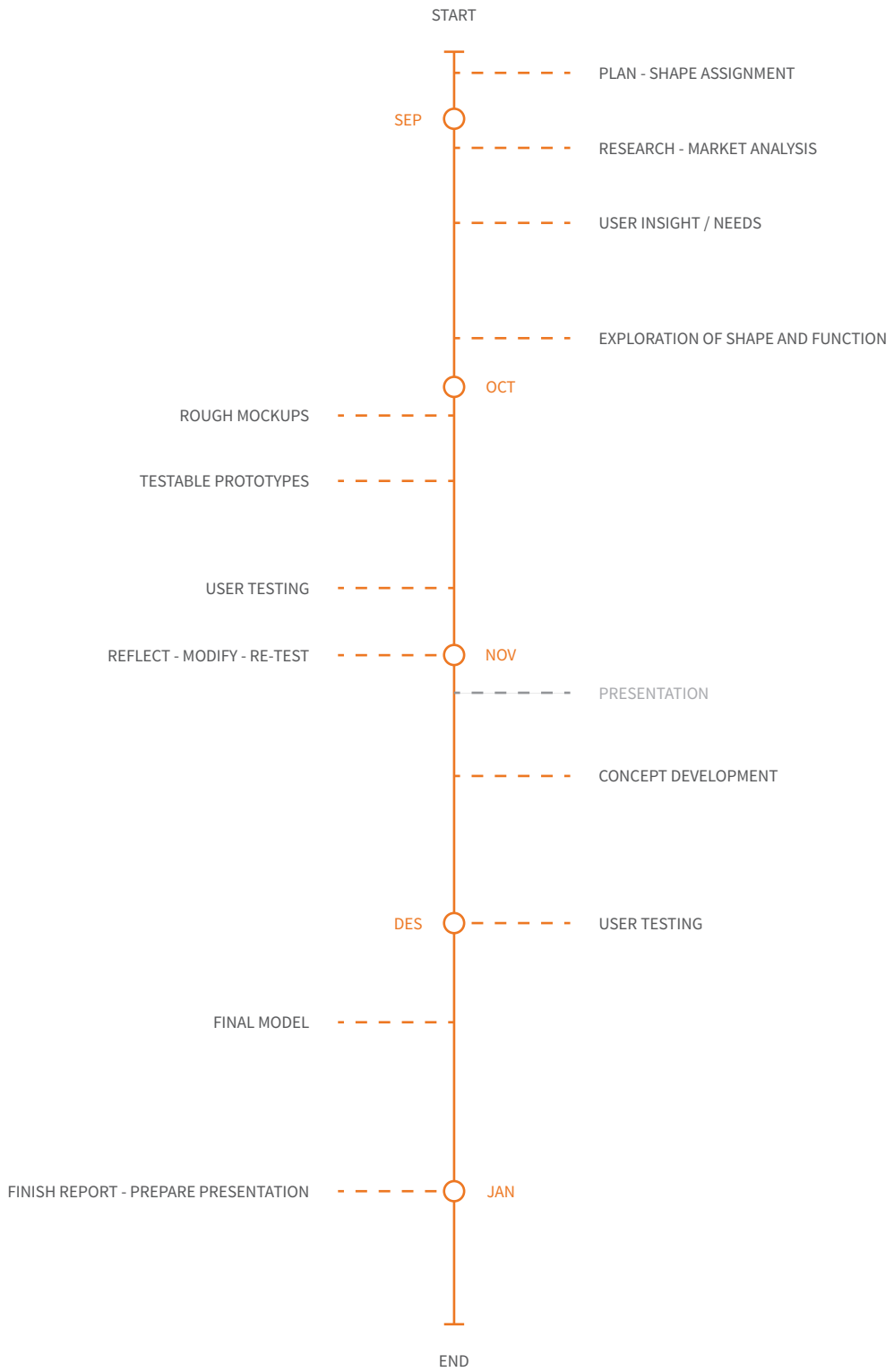
FAMILY OF
PRODUCTS



GROWS WITH THE CHILD

TIMELINE

Before starting the assignment, a suggested way of working was created based on previous projects. This was meant to be a rough overview to get a grasp of how the timeframe could be utilized effectively.



CONTENT

- 1 WHAT IS A BOUNCER?**
- 2 WHERE TO ATTACK**
- 3 IDEAS AND HOW THEY APPEARED**
- 4 CONCEPT DEVELOPMENT**
- 5 RETHINKING, REDOING**
- 6 USER TESTING**
- 7 FURTHER DEVELOPMENT**
- 8 FINAL MODEL**
- 9 REFLECTION**



1

WHAT IS A BOUNCER?

Existing solutions and the problems they solve

BOUNCERS, SWINGS AND ROCKERS

A baby bouncer is made to calm the child with soothing, continuous motions. Some can also be used for keeping the child busy and stimulated through creating motion by the child's own movements. From a more practical perspective, a bouncer is also a safe place to put your child while performing tasks that require your full attention.

Bouncers can be put into the same category as rocking chairs and swings, which are also commonly used products achieving similar results. The advantage of baby bouncers are that they often require less space. Some can even be folded for transportation or storage. In addition, most bouncers are not dependent on even surfaces to work properly as rocking chairs will be.



FUNCTIONALITY

Bouncers can be categorized according to their functionality. Today, most bouncers can be placed in the following categories:

- Electric
- Semi electric
- Height adjustable
- Basic

Electric bouncers offer fully automatic movements which keeps the motion going until it stops by a timer function or you stop it manually. These bouncers are usually large and lack the ability to be folded flat. They also lack the ability to react to the child's movement.

Semi electric bouncers usually offer the same functionality as basic models, with battery driven extra features. Common extra features are vibration and speakers for playing music or soothing sounds.

Height adjustable bouncers have the ability to be raised to higher levels for feeding and easier interaction. These models are usually large and bulky, contain a high number of parts and require stricter safety measures.

Basic bouncers are typically the most portable models with the least amount of features. While some can fold flat and have adjustable seats, others only have the ability to create a bouncing movement.

BASIC



HEIGHT ADJUSTABLE



SEMI ELECTRIC



ELECTRIC



DESIGNING FOR CHILDREN

When making products for children, different aspects must be considered compared to designing for adults. The most apparent difference is the strict safety standards the products must meet to reach the consumer. To prevent dangerous situations for the child derived from unintended use of the product, these requirements are important for both the well being of the end user and the producer. The standards and requirements that follow are often limiting the scope of actions and experimentation. This can in turn make it hard to innovate or introduce alternative solutions without modifying the standards or meeting them in unconventional ways. Children are curious and fragile, leaving no room for coincidences when creating products for them to interact with.





2

WHERE TO ATTACK

Placement in product category

ASKING THOSE WHO KNOW

A visit to Barnas Hus in Trondheim gave some unbiased input on the popularity of their range of bouncers. Talking about the different options and models, the saleswoman would not recommend going with an electrical bouncer, as she meant they could be overstimulating the child. She went straight to recommending either the BabyBjorn Bliss or the Stokke Steps Bouncer. These were also the best selling products. The Steps would be best if you had already bought into the Stokke range of products and own a Steps highchair. Otherwise, she would not hesitate going with the BabyBjorn because of its lightness, functionality and looks.



SCOPE

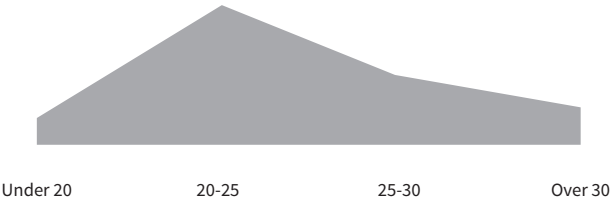
To limit the scope of this assignment, some general observations were made before starting the ideation phase:

1. The new model should accompany, not compete with the Steps bouncer.
2. The BabyBjorn bouncers are market leaders. What makes them good?
3. The product should offer something new and different in its category.
4. The question of excessive use and overstimulation argues against the use of electrical features.

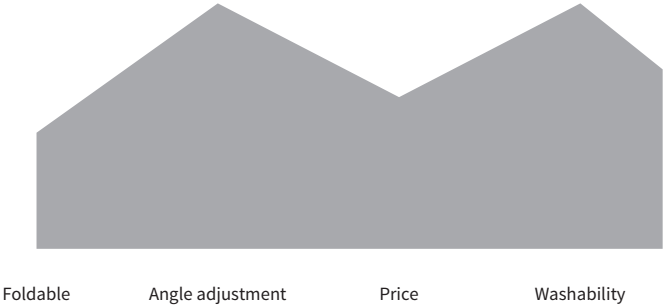
ONLINE SURVEY

To get a grasp of what parents either using or previously using baby bouncers see as important, an online survey was made. The survey was sent to different maternity groups on Facebook as well as friends and friends of friends. 47 participants completed the survey, which gave good insight to such things as how baby bouncers are used, along with the frequency of these actions. Getting this insight early in the research phase is key and can be used as guidance when trying to find directions and make decisions.

Your age when buying bouncer



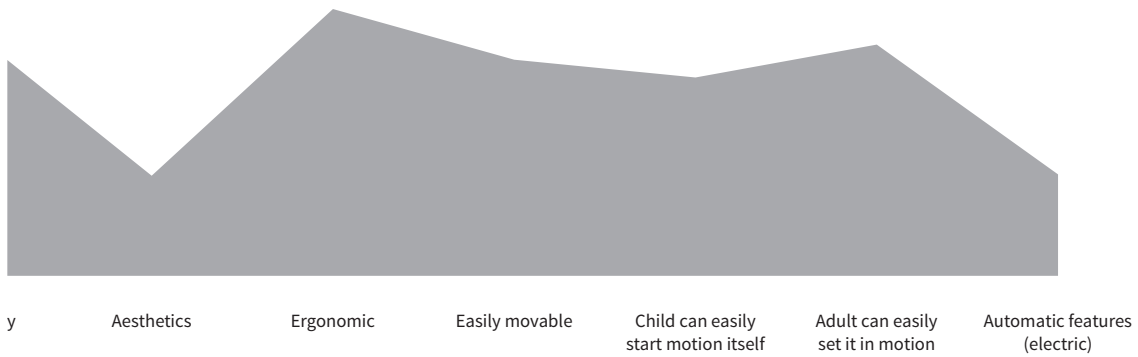
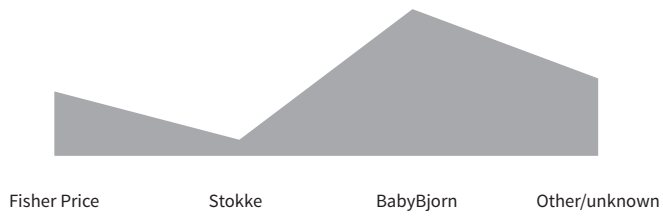
Rate the importance of these features



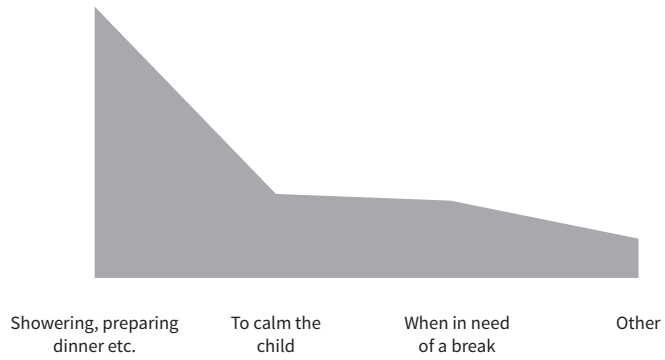
When did you get it?



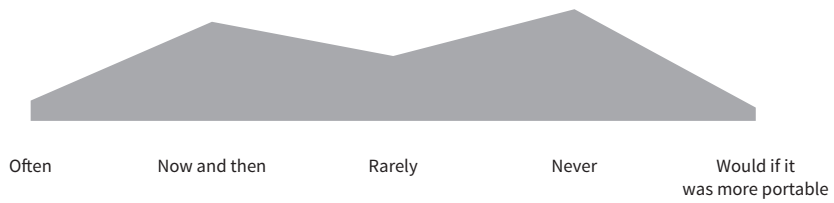
Which model/brand?



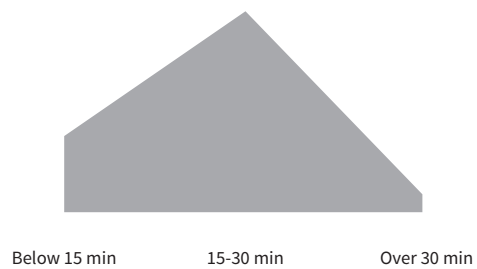
User settings



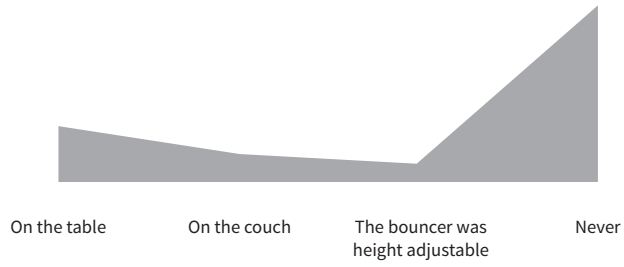
How often was it brought with you? (visits, weekend trips etc.)



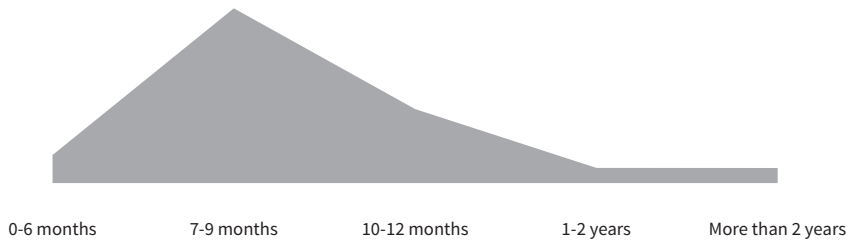
Intervals of continuous use



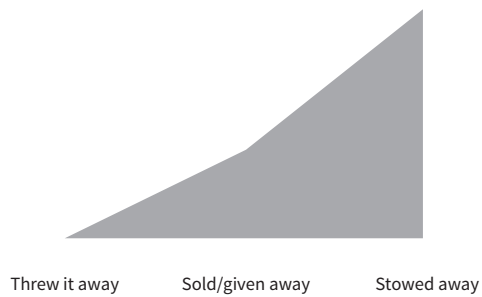
Was the bouncer often placed above ground level?



When did the child stop using it? (Age)



What happened to the bouncer after it was no longer in use?



MOSCOW

Based on the online survey, a MoSCoW diagram could be created. This is a prioritization method used to help reach a common understanding of the scope of a project. MoSCoW is an acronym derived from the first letters of each prioritization category; Must, Should, Could and Won't. The requirements in each category should be seen as important, but are rated to achieve the greatest business impact in the timeframe of the current project. The categories can be rated as follows:

Must - Minimum requirements for the product to be successful. If these are not met, the product can be regarded a failure.

Should - Important requirements that are not critical to achieve in the first iteration of the product.

Could - Desirable requirements that are not necessary. Can be added if opportunities are there and development time is short.

Won't - Least important requirements with lowest payback. These can be seen as future additions if allowed or needed.

Baby bouncers are products meant to fulfill specific tasks for two very different user groups; 0-9 months old babies on one hand, grown ups on the other. For this reason, the requirements of such a product can get complex.

MUST

- Be ergonomic
- Be fool proof (safe)
- Have intuitive functionality
- Be easily washable
- Be easily set in motion by an adult
- Be foldable
- Be adjustable

SHOULD

- Have appealing aesthetics
- Be distinct
- Have a toybar
- Be easily set in motion by the child

COULD

- Be ultra portable
- Be multi functional

WON'T

- Be electrical
- Be height adjustable

DIFFERENTIATION

To successfully introduce a new product on the market, it must appeal to consumers in a way superior to its competition. There might be several ways to achieve such an effect, and picking the right area to strike may be the most crucial part of the early development of a product. After having some guidelines to follow in terms of functionality and use, such an area could be identified.

Connecting dots between the online survey, popularity of certain products and the MoSCoW diagram some assumptions could be made. When also looking at the range of products available today, there is something missing. Most bouncers are either made to be as cheap as possible to produce and sell (Fisher Price), or presented as premium products with double the pricetag (BabyBjorn, Stokke). The problem with the premium products are that they do not really look very premium. Although these bouncers perform very well and offer good functionality, the gap between the two groups is mostly prominent because the cheaper products look very cheap.

Baby bouncers are indoor products. They have relatively basic functionality and do not require a lot of space. They should be easy to move around, but will rarely be brought out of the house. As a bouncer is also a place for children to sit, it should be classified as furniture. So why do no bouncers look like furniture?

To offer something new does not necessarily mean introducing new functionality

or technology. It often means offering something *else*. This could be minor details in mechanisms or incremental changes to improve usability. It could also be different solutions based on previously known principles. Because the survey did not show strong needs of more functionality, the path ahead should lead to something basic. The question then is how basic such a product can be without losing interest from consumers.

Simple products are the hardest to make, but if done right it often leads to success. To make a bouncer that incorporates elements from the world of furniture requires clever solutions and the right use of materials. If the number of parts are kept to a minimum, the price per part could increase while still keeping the product within the range of a sensible budget.

CHALLENGES

Since most parents seem to get hold of a bouncer before the child is born, input from users that are using such a product or have previous experience using it must be considered as relevant but not absolute. First time parents might not be aware of how such a product should really perform. To rate the importance of certain features and choose which ones to ignore can of this reason be problematic. This means that “gimmicks” and extra features could be presented as relevant and essential to the customer, and work as an advantage compared to other products with more basic functionality. The importance of reputation, advice and recommendations can limit this effect if the product is given a chance. Aesthetic values can contribute to such chances being given.

DIGGING DEEPER

To get a deeper understanding of how products came to be and why they perform as they do is critical when starting a new project. To do so, the focus was put on two bouncers relevant for the direction this project was heading in. These bouncers were the BabyBjorn Bliss and Stokke Steps Bouncer. These were chosen based on a few different insights:

- Good sales numbers
- Priced as premium products
- Known for good quality
- Different solutions for bouncing
- Different perceptions of comfort
- Different materials
- Simple vs more complex

A thorough inspection was made of the two bouncers to acquire knowledge on how they work and why certain decisions have been made.

STOKKE STEPS BOUNCER

The Stokke Steps Bouncer was made as a part of the system based around the Steps high chair. The bouncer attaches to the chair allowing the child to take part of family activities around the table from day one. In addition the bouncer can be used on its own, which makes it height adjustable (if you buy into the system). This is what mainly differentiates it from other bouncers as it would fall into the basic category if used alone.

Another highlighted feature of the Steps Bouncer is its cradling motion. Instead of rotating around a pivot in the bottom front of the bouncer, it acts more like a swing. This is engineered to simulate the motion of a parent soothing the baby in its arms.

Other features are foldability and an angle adjustable seat.



FIRST IMPRESSION AND VISUAL INSPECTION





CONCLUSION

The Steps bouncer is a solid product in terms of functionality, especially if combined with the Steps highchair. The fact that it serves as both a stand alone product and as part of a package might also be its biggest flaw. While combining well with the highchair, adding another dimension in terms of height and closeness it has also made sacrifices. The level of complexity of this bouncer can be seen as high compared to others, as extra handles and buttons are added.

The bouncer's most prominent feature is the way it bounces. As a simulation of the movement a parent would use to soothe a child in its arms, the movement leans towards that of a rocking chair. To achieve this motion, another set of parts are introduced, further complicating the product. This construction also limits the ability for a small child to set the bouncer in motion. The motion itself is nice, and the way it bounces differentiates it from other actors. The question is if the child really notices and cares about it.

BABYBJORN BOUNCER

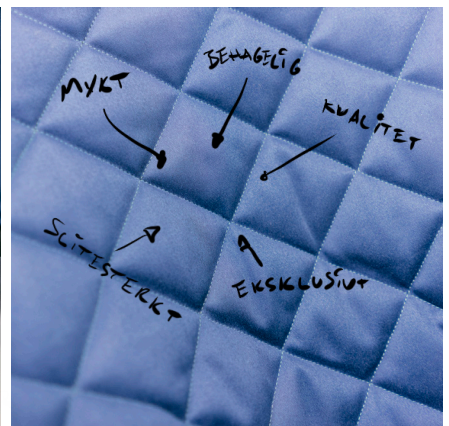
The BabyBjorn bouncer is probably the most recognizable and well known bouncer on the market. BabyBjorn released its first bouncer in 1961, and considering the years going by little has changed. Today's model has gotten new features and improved usability, but the key functionality with a banded spring steel frame remains the same.

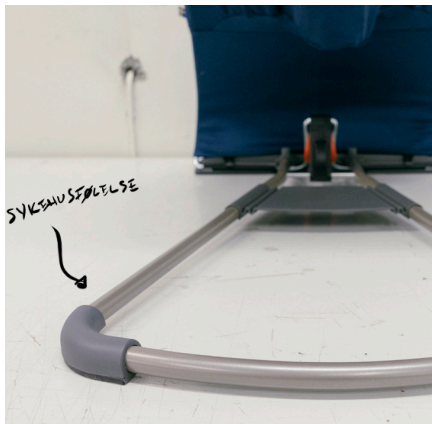
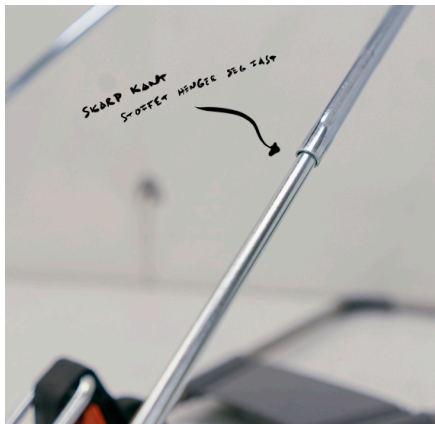
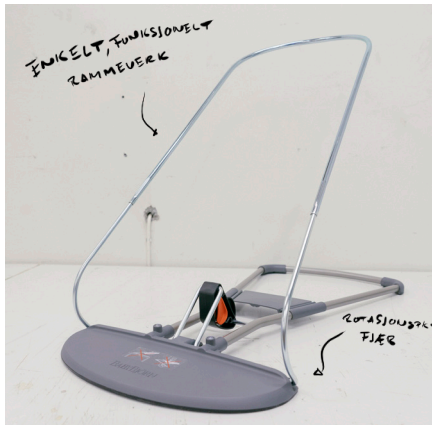
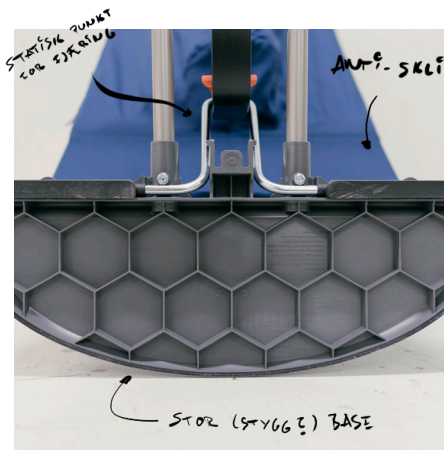
Key words to describe BabyBjorn's bouncer are simple and effective. The seat consists of a fabric pulled over an open frame made from spring steel. This makes for a hammock seat embracing the child while giving support. The steel frame acts as a giant spring, flexing when the child kicks or an adult sets it in motion.

The bouncer can be folded flat and the seat angle is adjustable.



FIRST IMPRESSION AND VISUAL INSPECTION





CONCLUSION

The BabyBjorn bouncer is one of the simplest on the market, yet it has all the functionality needed to serve as a very convenient and practical product. The beauty in this bouncer lies in its clever use of the seat frame as a natural spring while also creating an ergonomic hammock from the easily removable textile. While this construction is the main component of the bouncer, the rest seems to be hidden away on purpose. While the textile is in place, it covers the whole front concealing the base construction and functionality of the bouncer. This might be a successful move in terms of perceived aesthetics, but at the same time it feels like a cheap trick. Covering the functionality makes the product less intuitive, and also makes it harder for the user to get a grasp of how the parts affect each other to work as a whole.

The center of functionality lies behind the seat, and is made up from a closed plastic part. This part includes a handle for angular adjustments and a trigger for folding. Even though the functionality of this part can be understood to some degree because of the hooks gripping the seat frame, it is not visible while in use. The folding trigger is not very intuitive as the seat frame must be pulled upwards for the trigger to fully release.

SUMMARY

While the BabyBjorn has built its success on taking advantage of a spring steel seat frame, Stokke has tried offering an improved solution based on the same principles. The problem with Stokke's bouncer is the added complexity of this solution. Several parts are added to achieve a nicer cradling motion, which in the end compromises its ease of use.

The visual impression of the two bouncers are very different. Where BabyBjorn aims for a simple hammock construction with an exclusive fabric, Stokke aims in the direction of the perceived comfort of a thick, fluffy mattress. Both hammocks and mattresses are by most people considered comfortable, which calls for subjective opinions or looking at other functionality. A closer look reveals that the Stokke bouncer is also based on a hammock seat, with a large plastic frame (not fluffy) supporting the head and feet of the child.

The BabyBjorn bouncer is much lighter and has more air in its construction, making it both feel and perform as a more portable product. Since the Stokke Steps Bouncer is made to fit the Steps highchair, this comparison might be unfair as extra mechanisms are implemented. The fact that the BabyBjorn is a stand alone product also gives it a lot more freedom in terms of visual expression. The Steps Bouncer must look natural both on top of another product and by itself, which limits its possibilities of shape and structure.



3

IDEAS AND HOW THEY APPEARED

Looking for directions

WHERE TO START?

After looking into user needs and analyzing existing products finding their possible weaknesses and strengths, an image of how this project would evolve had already started to form. It became apparent after analyzing the current market that aesthetics is not in focus among most producers of baby bouncers. Since what is important for parents is the safety and well being of their child, one can say that this creates room for downprioritizing. However, the ones succeeding in the business are not the cheapest, the prettiest or the most functional products but the ones combining these factors best. Combining these factors well in any product category can mean great success, and will most likely result in a quality product. As easy as it might seem, this combination, or lack of it, is also what separates the good products from the bad.

A factor limiting the shaping of a new baby product is the strict safety requirements it must fulfill. All products made for children must be certified by the standards relevant in the country it will be sold. To comply with these standards the product must sustain several tests measuring dangers related to such things as material use, contrapment, sharp edges and endurance. As these standards leave little room for improvisation, creating something that really stands out from the rest can be challenging.

A baby bouncer can be categorized as furniture. It will most likely be something occupying space in ones living room for the majority of its lifetime. A piece of furniture

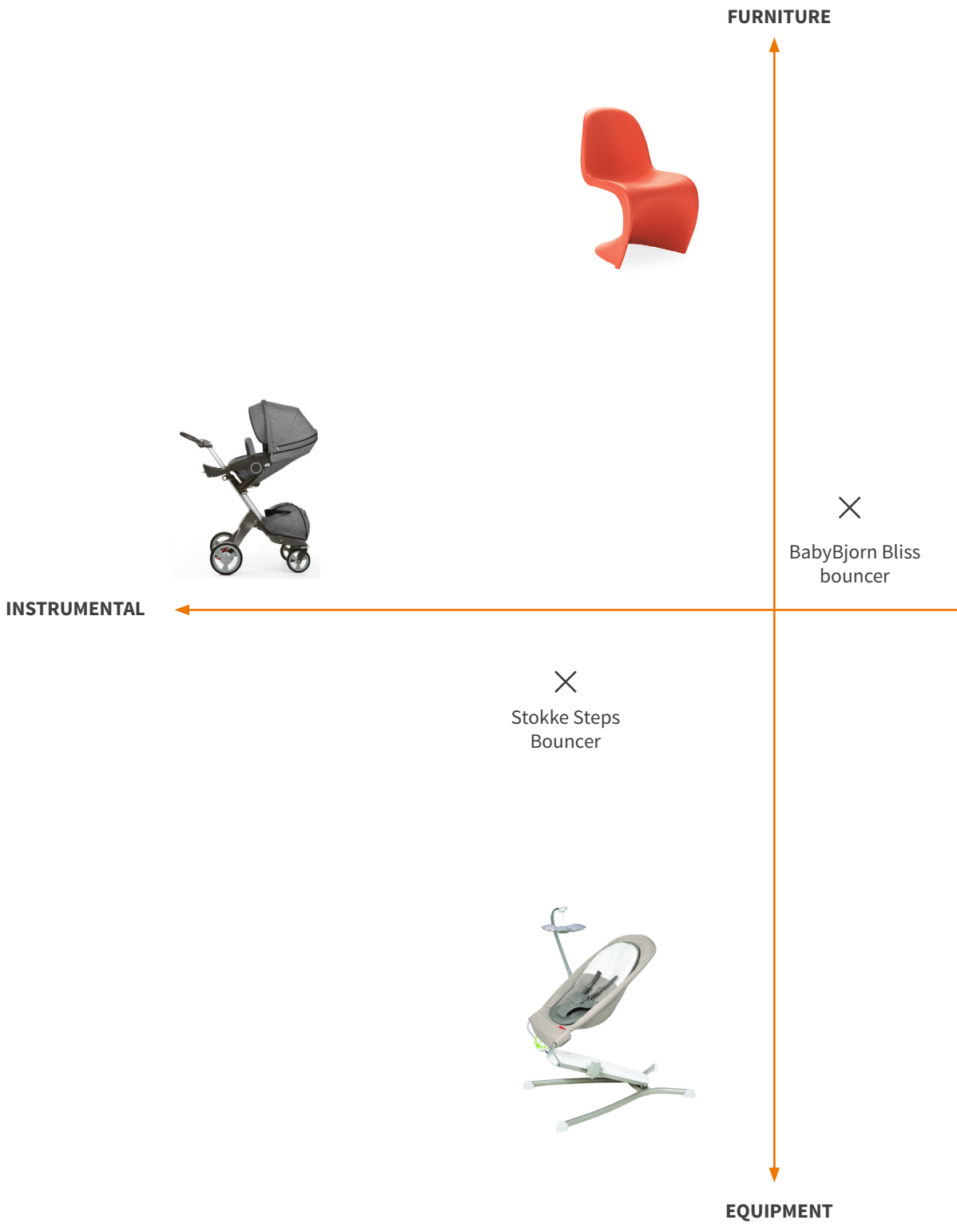
should be a natural part of any home, a humane object encouraging contact and emitting the sense of comfort. At some point it can be argued that few baby bouncers available today possesses these qualities. Most options appear to be technical constructions concealed by rounded surfaces and accentuated fabrics.

Based on this “hole” in the market, the ideation phase was kicked off by searching for clever solutions and material use in the world of furniture.

In the beginning, the emphasis was put on finding the right feel. This was done by “painting with images” as a way of creating a strong sense of how the final product should be perceived. This process was carried out over the span of a few weeks with a deep focus on materiality and how materials communicate emotions and provoke feelings. Using materials as tools to achieve functionality without adding additional parts and mechanisms was also emphasized.

For this process to give unbiased results, sketching was more or less prohibited. Once silhouettes start appearing and catch interest, it is easy to pursue certain ideas and make decisions based on the wrong terms.







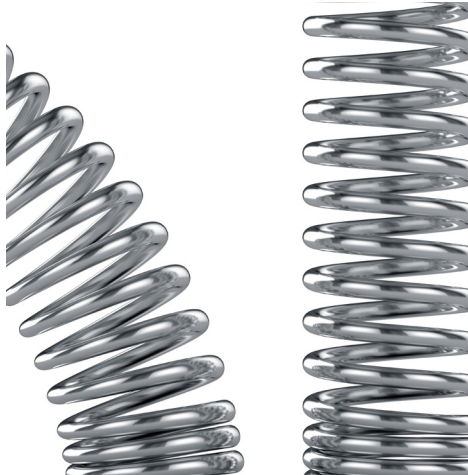
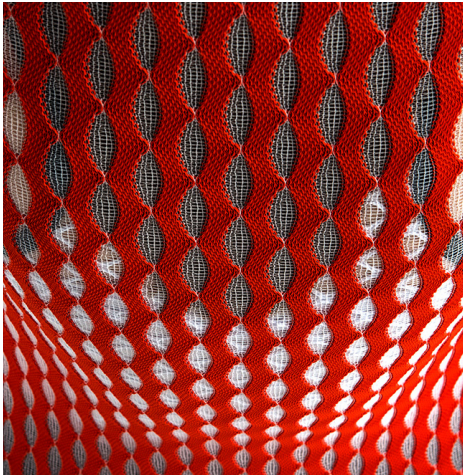
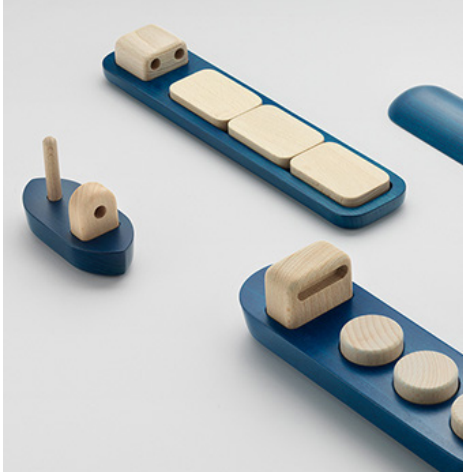
Chosen placement



STRUCTURAL

MATERIALS







COMMUNICATION

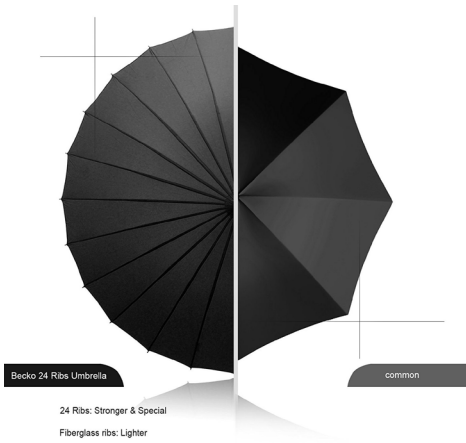




STRUCTURAL



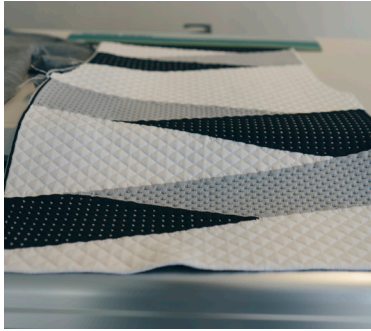




TENSILE







3D KNITTING AND ITS POSSIBILITIES

When diving deep into the bucket of inspirational content on the internet, 3D knitting was a thing that demanded attention. While this technology has recently made a big impact in the world of sneakers and athletic footwear through giants like Nike and Adidas, it is still not integrated in such a scale in other product categories. The furniture world is currently catching up and experimenting with its possibilities, and when IKEA recently launched its first chair with a 3D knitted textile you know it is worth looking into. Highly visible firms like Layer Design, Moooi and Vitra have also showcased exciting ways of using this technology to their advantage.

To get a closer look on what this is all about, a meeting was set up with Arnt Idar Dalen from Møbelkraft. Møbelkraft act as a platform introducing new technology to surrounding manufacturers of furniture in Sykkylven. In collaboration with Amatec, they have acquired two 3D knitting machines on loan from Shima Seiki, a Japanese developer of such equipment. Arnt Idar gave an extensive tour of these machines showing how they worked, and explained the possibilities. He also showed samples created on the machines making use of its many advantages, such as seamless shaping of materials, knitted conductive wiring and techniques for inlays and padding.

The machines are controlled from a computer using a specialized software made from the same producer. From this software, one could apply textiles directly on top of CAD models. The software would

then, depending on the material, calculate the how loose the knitted masks should be on every point of the surface. This means that the textile coming out from the machine would have the shape of the surface it was applied on. The software also allowed for detailed previews a range of materials and calculation of material use and total cost. This enables easy customization from the customer, as the price of another material can be given on the spot. The fact that the textiles produced by these machines only require minor afterwork, such as cutting a few threads make these calculations pretty accurate as additional manpower can be ignored.

The most exciting feature of 3D knitting is the ability to knit complex shapes of different materials together seamlessly. As an example, Arnt Idar presented a sweater with stretch zones designed to perfectly adapt to the person wearing it. This was knitted and ready for use in 45 minutes.

Using this technology as a basis for my assignment seemed like an interesting approach, as the seat of bouncers require shaping of some sort. Combining this seamlessly while adding stretch, ventilation and padding in certain areas could be very suitable.

ADVANTAGES

- Seamless blend of materials
- Customizable
- “No” waste
- Enables playing with materiality, taking advantage of different qualities just where they are needed
- Can be used both for prototyping and mass production
- Automated process - one operator per 10-15 machines



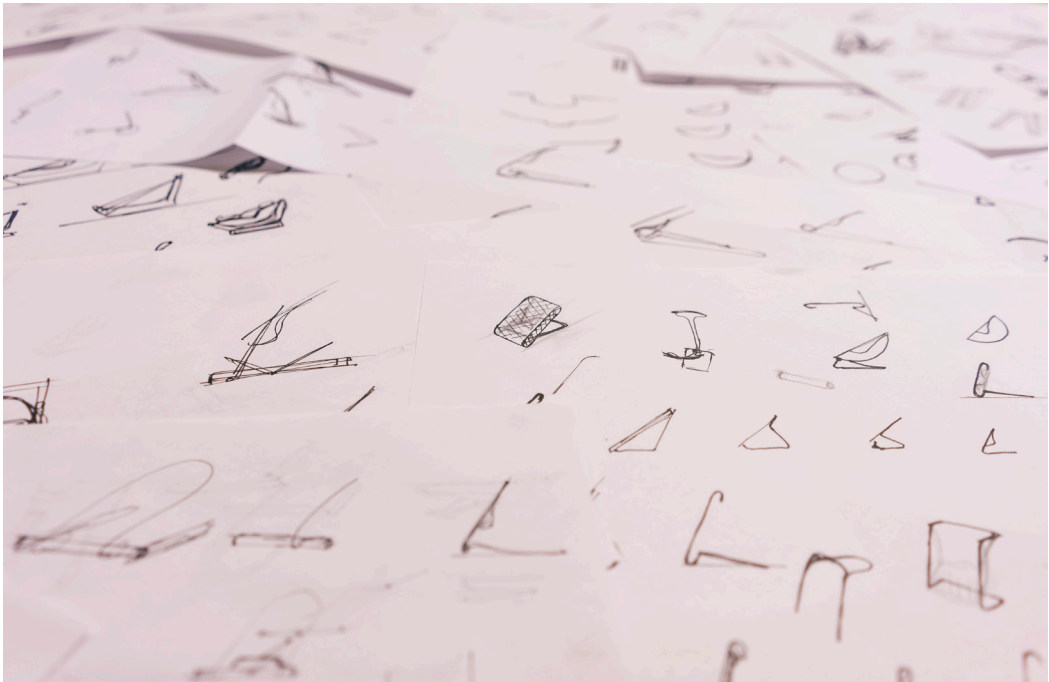


APPROACH

With the 3D knitting technology in mind, creating a bouncer based around a hammock seat seemed like a natural choice of direction. This would allow for a simple supporting construction, and taking advantage of the technology could result in an effective and well functioning textile.

The decision to go with a hammock seat also makes sense as a new addition to the Stokke portfolio. As the Steps Bouncer is a quite space demanding bouncer with a massive expression, a lighter and more manageable product would be a natural addition. As previously mentioned, the new product should not compete directly with existing ones.

With lightness in mind, emphasis could be put into getting the pen in motion.



SOURCES OF INSPIRATION

LAYER

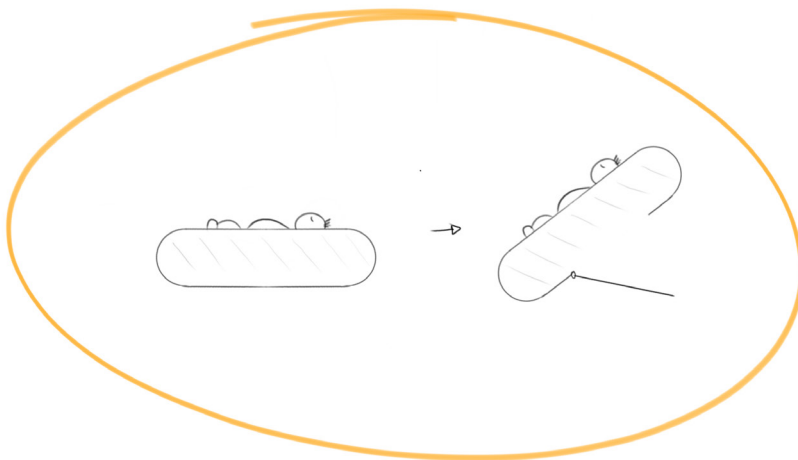
A heavy source of inspiration when starting the sketching, both in terms of looks and material use was the Cradle collection from Layer Design. The collection contains a high and low back chair and a room divider. The chairs attempt to blend two conventional types of seating - the classic upholstered lounge chair and a net structured hammock. The use of modern technology in the backrest combined with a more traditional stool creates two distinct elements joined together by a bold colored steel frame. The use of these three strong elements serving their purpose as puffy seat, immersive backrest and defining structure works well together as a minimal yet interesting piece of furniture.

NENDO

Another source of inspiration was the Japanese design studio Nendo. What Nendo does well is taking everyday objects and reshaping them to something surprising that makes sense. These objects are usually presented by simple signature sketches of small “stories”. These stories tell the tale of how the product came to be in a way that often gives the product itself added value as it creates a deeper understanding for the spectator.

Looking at these sketches inspired what came to be the first concept of this project that deserved further efforts. To create an object that inhibits a literary quality that is apparent to the spectator will lift it to a new dimension if performed in an understandable way. This led to a path pursuing not only a functional and aesthetically pleasing product, but a product that effectively tells a story.







4

CONCEPT DEVELOPMENT

Getting physical

FIRST CONCEPT

The first idea worth pursuing was based on the perception of comfort. While Stokke can be accused of creating something massive that tricks you into believing it is soft and fluffy, I wanted to make something that look and feel comfortable without being massive. To achieve this, the idea was to start out with the outlines of a mattress. These outlines could then be covered with a light textile on the two sides and front, giving it a sense of massiveness. Instead of being solid, the shape would be hollow, meaning the fabric would need to work as a hammock. This would create a merge between the two common approaches for seating, giving it the look of a mattress with the feel of a hammock.

As the idea builds on a classic mattress, a thought was to create something that worked both as a bed and a bouncer. While lying flat, the child could then sleep in a natural position. Several people, both friends and from the survey, said that if the child fell asleep in the bouncer they would adjust to the lowest position and let it sleep for a while. This is why it could be interesting to build on that user situation, widening the field of use compared to classic bouncers.

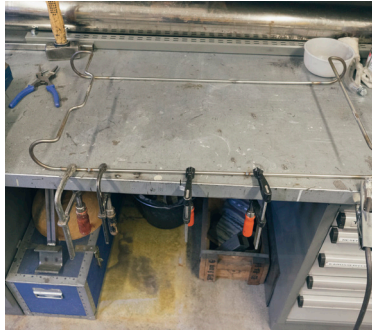
To get a good idea of the three dimensional shape of the concept, soldering wire was a helpful tool for making quick sketch models. This made it easy to experiment with sizes and ratios as well as assembling parts together to get an idea of how they would interact. In terms of functionality, the idea was to make use of a spring steel frame to create the bouncing motion while

also being the support frame for the seat textile. This part would then be connected to a base frame through some mechanism for adjusting the seat angle. This base frame could be made in wood or steel, depending on the mechanism.

PREPARING A PROTOTYPE

An effective way of moving forward with a concept is to quickly start building prototypes. For this specific idea it could also be useful to start working with materials resembling the ones used on the final product. Cardboard and foam are usually the first step when making such models, but these materials are more effective on solid shapes and surfaces. This is why it would be both more realistic and less time consuming to build a prototype from steel and wood. This would also give a better impression of how the materials would work together.







EVALUATION

After finishing the model it was easier to talk about solutions and problems. This was more an exploration of shapes and composition than a functional prototype, but an evaluation of functionality could still be made.

The model was discussed in detail with different people in Stokke and Ole Petter, resulting in a list of problem areas needing resolution.

- As the steel frame touches the ground directly, movements from the child would likely result in moving the bouncer forward
- Will the steel frame give sufficient flex to make it bounce?
- The adjustment mechanism needs resolving
- The steel frame looks oversized compared to the base frame

Positive points were noted as well for further development.

- Lifting the base frame from the ground and making it rest on the steel frame creates a light and harmonious composition
- When folding up, the base frame is lifted continuously in a smooth motion
- The bouncer looks good and consistent when folded
- Being able to use the bouncer as a bed when folded is interesting

The effort of creating a model this early in the process was rewarded with very specific

feedback that could instantly be taken into account. After a few days of thinking and further discussions, the decision was made to keep working on an alternative idea. Even though the prototype had some interesting aspects, it became clear that the disadvantages outweighed the advantages.

MOVING ON

The idea of using a wooden frame as a base combined with a functional steel seat frame was probably the most valuable aspect of the first prototype. The challenge with such a configuration would be solving the connection between the two materials.

This could be done by introducing a new part, creating three different elements as a whole. This would require the right measures of submissiveness and dominance in accordance to each other, without moving too close to the BabyBjorn mechanism.

The other alternative would be finding a natural way of connecting the two parts without adding new elements. This would require integration of both folding and angle adjustment which could prove to be a challenge.

Moving on with new knowledge, the decision was made to continue the use of a wooden base and spring steel seat frame. Even though it would be an obvious challenge, reducing the parts and making full use of the materials used seemed like a tempting approach.

MATERIALS AND THEIR NATURAL PROPERTIES

The first prototype made use of a mechanism similar to BabyBjorns bouncers for keeping the seat in position. This required two new parts in addition to the two essentials, the base and spring. Before starting a new round of sketching, some alternative methods of locking and adjusting the seat was explored. Based on the decision to pursue a solution without adding extra components, a quick mockup was made of a pinch lock adjustment system. Playing with the dimensioning the bottom end of the steel frame allowed the loose ends to be pinched together with low effort. These ends could then be slid up or down in a groove on the inside of the wooden base and locked in three different holes by letting go of the pressure. The seat frame could also be folded flat if slid all the way down past the edge of the wood.

A solution like this would be very readable for the user, as the groove and holes indicate what actions are possible and how to perform them. Using the natural flexibility of steel and the easy processing of wood, such a mechanism could be both elegant and efficient.

While the solution itself might have seemed like a good idea, it became apparent that several problems would follow with it. The long distance needed to get a good grip on the steel combined with the short distance needed to grip over both bars would result in an unstable construction. This would be apparent when weight is put in the seat. The long arm (seat section) would put a lot of pressure on the short arm (grip section). Without stabilizing the length where the steel enter the wood, this would create problems. Since the steel frame would rely on its own ability to bounce, the solution was therefore quickly discarded.





5

RETHINKING, REDOING

Building on previous attempts

THE CLOTHES PEG

It was time to start over with empty sheets of paper and new ideas. This time around a clearer direction and approach was decided, meaning a more detailed ideation phase could commence. While discussing these choices of direction with Ole Petter, a very appropriate source of inspiration was revealed.

The clothes peg is one of the everyday classics that understandably passes under the radar in our busy lives. This product is made with the sole purpose of connecting a piece of clothing to a wire, which might seem like a basic assignment. However, the solution to this task is very elegant.

The classic clothes peg consist of three parts; a spring and two levers. The levers are two identical parts that can be read as one when assembled. The spring acts as the connection between these two, being the subdominant part of the construction. Compositionally, the way the two distinctly different parts meet creates a natural tension that makes the product as a whole appear harmonious and interesting.

The beauty in this assembly is apparent when looking at the way these parts interact. The two levers are pressed against each other with the spring coil acting as a pivot point. This action pushes the spring arms apart in a circular motion with the spring coil as the point of rotation. This opens the large and smaller hole in the levers, making space for clothes and a wire. Letting go of the pressure creates a pinch on the clothes and a locked circle around the wire. Gravity

will then make sure the clothes hang straight down without falling off.

The functionality of the clothes peg is based purely on the interaction between these two elements. The shape of the wooden levers enables this interaction while the spring itself hold the parts together.

Achieving such a harmonious yet functional composition using only two different parts is an accomplishment. The way the spring and wood works together served as great inspiration for the further progression of this project.



SHIFTING THE FOCUS

Inspired by making more from less, the concept of taking full advantage of the shapes and materials used in a product became the ultimate goal to strive for.

While the focus early on in the project had been on the textile part of the bouncer, this was now pushed down the list. While working with the first prototype, it became apparent that the value of such a project would not lie in the use of new technologies for creating the textile. The technology is there, and the hammock seat solution is old news, which means it is fully feasible to create such a seat if the framework is in place. When looking at existing bouncers, downprioritizing the textile might be a radical move. Taking the BabyBjorn bouncer as an example, it is apparent that the textile is what demands attention. Since it is accentuated in such a way, what lies beneath it fades into the background and goes unnoticed. As mentioned in my analysis of this bouncer, the base itself belongs more to the world of technical products than the furniture world. This observation inspired the thought of shifting the focus from textile to framework, accentuating the construction rather than the cover.

THE BEAUTY OF FUNCTIONALITY

To make the framework interesting, effective and worth noticing, some key elements

should be in place.

- The base should be part of the functionality, not just a support
- The mechanics of the products should be apparent
- The base should be dominant and communicate stability without being heavy

In other words, the shape of the construction should be a result of the tasks it will perform. By separating the different functions and focusing on the simplest way to solve them, combining ideas could lead to an answer.

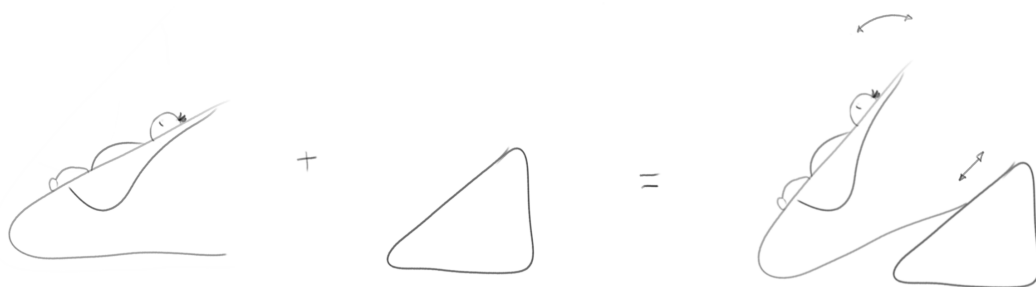
BACK IN THE DAYS

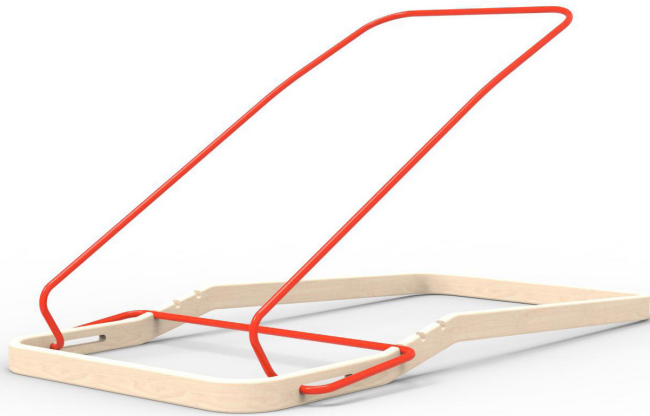
Looking back in time for inspiration often leads to finding products in their purest form. As time moves forward so does the list of requirements to make our lives easier. Questioning these “requirements” can often be a good exercise, as they tend to complicate products only to allow for more functionality that is not always needed.

Early versions of the bouncers we know today were mostly effective constructions performing the one key task: bouncing. BabyBjorn's first bouncer was unveiled in 1961 and consisted of a continuous frame made from spring steel and a seat fabric. The steel frame served both as a base and a seat frame utilizing its potential perfectly. The frame has now been split in two to allow for folding and angular adjustments.

Could this have been done differently?

Questioning this decision led to a few fun experiments on how to preserve the essence of perceivable functionality while adding another dimension. Looking into the most obvious solutions without thinking of form and relationships created some interesting thoughts worth pursuing.





CONCEPT 2.0

The second concept worth pursuing was mainly an exercise in making something functional with the minimum possible number of parts. This was an effective way of generating alternative solutions to challenge existing ones. The point was not to revolutionize, but to challenge current norms and explore options that might create new ways of composing a bouncer. The idea was driven by a desire to make something understandable where every action is visible. To do so, the base frame would benefit from being wide where the steel meets the wood. This frees up the middle, shifting the interaction points from underneath the seat to a place where users can see what is happening. In addition to emphasizing the mechanics of the steel frame, such a base frame will also create a refined area on the ground plane encompassing the child in the center. This can increase the perceived safety of the product as it will appear more steady and persistent to outside stresses.

STORYTELLING

A great challenge with this concept was making the base frame and the spring work together in a natural way. Instead of creating a merging intersection between the two components, a more desirable option was to present them as what they are; two different components with specific tasks to perform. This conclusion made it easier to connect the two in a sensible way. Looking back at the clothes peg, a natural way to

present a spring is to show how it works. Wrapping the steel around the wood in a way that accentuates the direction of forces and clarifies the pressure points would achieve this expression. This would also create a natural tension between the two different elements, creating a harmonious composition. These measures add up to give the product a sense of literacy, creating a story of how the components fit together in a way that makes sense. This is a quality both the BabyBjorn bouncer and the Steps bouncer do not possess.

SLOTS AND GROOVES

As concluded earlier, wood could be a good option for use as a base of the product. Wood is traditionally known as a remarkably strong material in relation to its weight, and has the advantage of being highly ideal for subtractive processing. Utilizing these qualities, a light base frame shaped to purpose seemed like the way to go. Using an angled surface with grooves combined with a closed slot would make a static steel frame movable, allowing the seat angle to be adjusted.

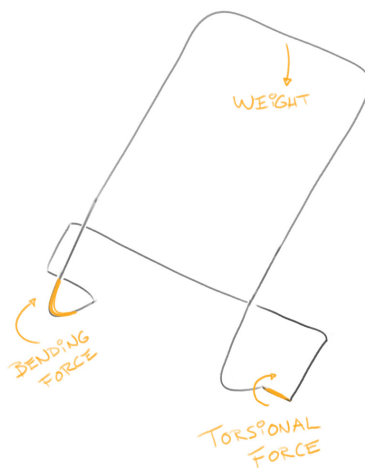
WILL IT WORK?

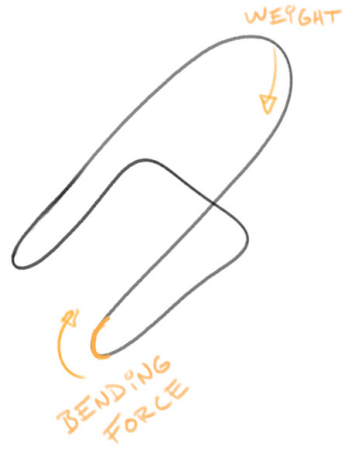
An element of uncertainty with this design is the shape of the spring. Instead of making use of torsional forces, like both Stokke and the current BabyBjorn bouncer does, this spring will mainly be dependent on bending forces in the longitudinal direction of the steel. It has a short length of possible torsion, but if it is too short to be neglected is unknown. As mentioned, BabyBjorn's first bouncers were shaped to only make use of bending forces, and whether this was changed only due to the added folding mechanism or to get a smoother motion is hard to say.

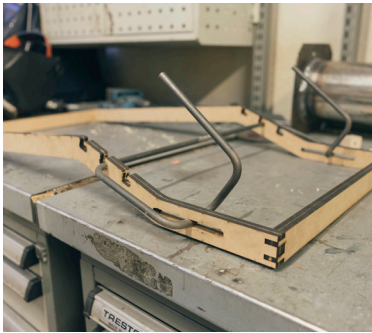
A dialogue with engineers and designers at Stokke were set up to clarify if this was a feasible solution. Their first reaction was that a torsional spring would definitely be the way to go, but after further discussions

it was concluded that it was hard to decide without actually testing it. A conversation was also started with the danish firm Hagens Fjedre which has connections with Stokke. Hagens Fjedre specializes in making custom springs for different applications, and helped prototyping the torsional spring for the Stokke Steps Bouncer. Also here the employees were uncertain, and argued that the softness of the metal would have a bigger impact on the bouncing motion than whether the spring acted in a torsional or bending direction.

The decision was made to continue development of the current concept and see where it might lead. The next step was therefore to build new prototypes. Two were made before user testing could commence.















6

USER TESTING

—
Make or break

SET UP

After having made a functional model, user input could be gathered by arranging a user test. This was done in Stokke's Oslo office, with good help from Eva Tøftum and Peder Kjærnli.

The test was set up as part interview, part practical comparison of functionality and user friendliness. Each subject was presented with three different bouncers, the current prototype, BabyBjorn Bliss and Stokke Steps Bouncer. Following an interview guide (appendix), each participant was asked to perform a certain line of actions and compare these actions between the three bouncers. They were all encouraged to give honest feedback and speak their mind during every interaction.

The whole sequence averaged around one hour, and was divided in five main segments:

- Previous experiences, if any
- Foldability
- Angle adjustments
- General use
- Visual impression

HYPOTHESES

Based on previously gathered insight, a few hypotheses could be set up for validation. These were mainly based on the early online user study and conversations with product developers from Stokke sharing their experiences. Talks with random relevant users also helped back these assumptions. These were the main points of interest:

- These are the most important features:
 - Easily washable
 - Ergonomics (visual impression)
 - Movability (around the house)
 - Easily set in motion
- The way the prototype folds is perceived safer than the conventional method
- The minimalist design combined with the use of wood increases desirability
- Readable functionality is key to a good first impression
- Easy folding and adjustments are rather bonuses, not main priorities
- The mother is most likely the customer

PARTICIPANTS

The participants were gathered via friends of the facilitators and through Stokke's employees. All were either mothers or pregnant, making them relevant users.

In total, seven users were interviewed and asked to interact with the products presented.



**1
HOUR**



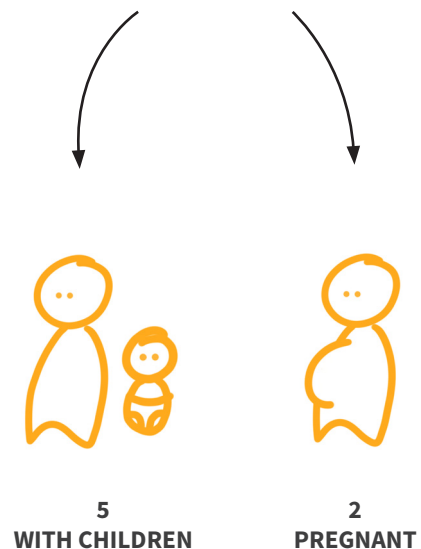
**7
PARTICIPANTS**

SOURCES OF ERROR

All participants did either already own or have previous experience using the BabyBjorn bouncer. This could cause biased feedback and give the BabyBjorn bouncer an obvious advantage during the comparison of products.

Since the prototype was a rough functional model with mechanisms not fully optimized, it would naturally perform worse than the other commercial products. This was communicated to the participants before the testing started.

All participants in this test were women. Adding male participants could give different results. This choice was based both on convenience and the perception that women often decide which ones of these products to buy. This effectively makes them the target group of my assignment.







FOLD UP

PROTOTYPE

When given no instructions, almost all participants started by placing the wooden base on the floor before bending down and sliding the seat forward. Some found it harder than others, but everyone managed to set it up in the right position.

The most important finding during this exercise was that some thought the bouncer was fully set up when the seat frame was positioned at the very rear of the wooden frame. Even though they eventually slid it forward this could cause a potentially harmful situation. If someone places a baby in the seat while in this position, the bouncer could tip over backwards.

STEPS

A common comment when folding up the Steps bouncer was that the sound was not right. To lock the bouncer in an unfolded state, a plastic part must snap into place. This mechanism requires a certain force, and produces a quite loud *click* when done right. Some participants were concerned that they had broken something.

Because of the force required to trigger the mechanism, some participants gave up and needed explanation.

BABYBJORN

The majority of participants found this operation to be very easy. Some commented that the click on this one was satisfying and assured them that the locking mechanism was engaged.

FOLD DOWN

PROTOTYPE

As folding down on this model is the reverse action of folding up, most participants immediately understood how to do it. Getting the steel frame out of the front locking mechanism was not understood without demonstration, even though all were able to detach it in alternative ways.

STEPS

To fold down the Steps Bouncer, a lever must be pushed and held while lifting the top part of the seat upwards. As this lever is hidden underneath the seat, most participants struggled to find it. When found and pushed, most people also did not understand that the seat had to be lifted for the button to give in. This was another element of frustration, and some participants were unable to fold it down.

BABYBJORN

Most participants located the locking mechanism of the BabyBjorn bouncer quickly. The unlocking requires pushing the lever while sliding the housing backwards, which most struggled to perform at once. After some wiggling all participants managed to fold it.

ANALYSIS

To get unbiased results from the user testing, a proper analysis of the results was carried out. Information was divided in key categories based on the interview guide. By reviewing notes and videos, the users interactions and comments were written on post it notes. The post its were then grouped in sub categories and stacked upon each other if they contained insight within the same area. By grouping all insight in this system it was easy to visualise what mattered most to the user. The largest stacks of post its and most valuable insight could now be rewritten as recommendations of how a baby bouncer should perform and feel.

KEY INSIGHT

The most valuable insight was gathered from the main categories the user test was based on. The test was mainly an early review of basic functionality and perceived easy of use, so the results were split into separate user sequences.

FOLD DOWN

- Easy if you know how - acceptable?
- 'Reversed' folding gives a more secure impression
- Give me some instructions
- Folding = bringing it with you = why bend down?
- The bouncer usually stays put - folding is rare
- Visible functionality makes for quick understanding

FOLD UP

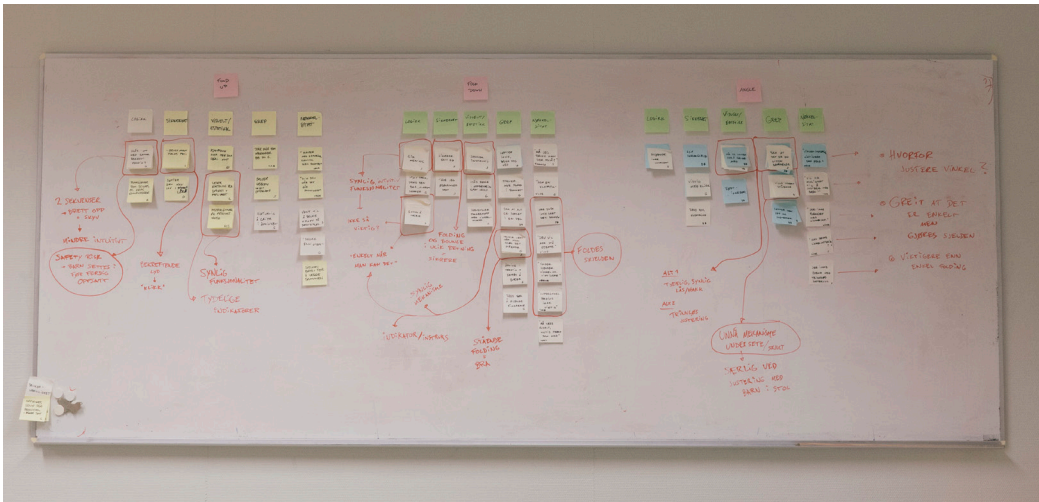
- A good click confirms safe state of use
- Unfolded state suggests opening like a newspaper
- Visible functionality makes for quick understanding
- Grips and buttons need indicators

ANGLE ADJUSTMENT

- Continuous adjustment only needed if mechanism is hidden
- Visible grooves for adjustment is easily understood but requires visual confirmation
- Angle adjustment is a more important feature than folding
- Seat angle is mainly adjusted to compensate for growing child

DESIRABILITY

- Wood is perceived as safe, steady and natural
- Plastic is considered a cheap and short term
- Simplicity is soothing among childrens products
- Less parts and mechanisms = longer lifespan
- Natural materials are a natural choice for children



SYNLIK, INTUITIV
FUNKSJONALITET

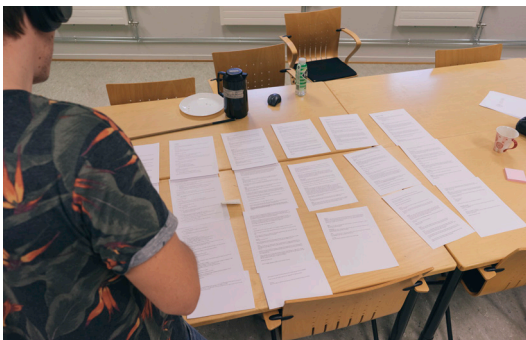
GREP

NØKKELSITAT

* MÅ JEG BRUKE MÅTT DER OGSÅ? RACHILD S

HAR ENDA IKKE LAGT DEN SAMMEN PB

* DU VIL NOK STÅ FLEMMER HILDE







7

FURTHER DEVELOPMENT

Listening to the users

SAFETY

The most surprising finding during the user testing was how the users approached the bouncer when setting it up. Since most users started by placing the base flat on the floor, the set up sequence naturally changed from what was intended. In retrospect this makes very much sense, and the sequence intended would require instructions to perform when setting up the product for the first time.

The new way of setting up the bouncer also introduced some unexpected confusion on when the bouncer was ready for use. As mentioned, some users opened the bouncer and placed the steel frame at the very rear of the base. This could become an obvious danger, as this would create an unbalanced construction which could easily tip over if a child was put in it. Solving this problem was given top priority when moving forward.

LOCKING THE ANGLE

In addition to safety issues, a function missing while conducting the user test was the ability to lock the seat angle. All users were asked to envision how this could be done in a way that felt natural. The feedback was varied, but a common approach was placing one hand at the front end or side of the base while sliding the seat from the “handle” on top of the frame. This was done to hold the base in place while pulling the seat backwards to a steeper position. Another input was that visible grooves or points of fixation would be beneficial both for visually confirming that the seat was in a safe position, but also to make sure they placed the seat in the same position as the last time it was used.

These inputs were good indicators to how such a locking mechanism could be added. As most participants did see the need for a smooth, stepless solution as long as the grooves or steps were visible, using steps could be justified. Since the users also placed one hand on the frame while adjusting, a one hand solution was neither of priority to pursue. Adding an interaction point on the base could of this reason be an obvious solution.

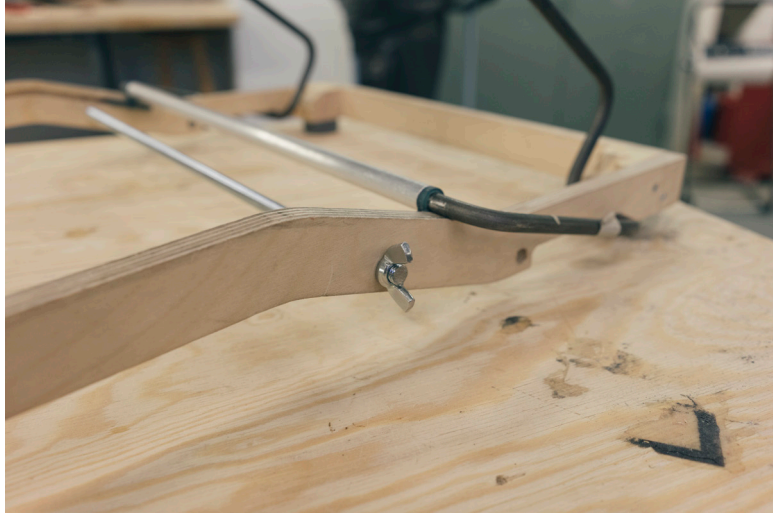
ADDING ONE PART - SOLVING SEVERAL ISSUES?

A current problem with the base frame was the flexibility of the wood due its length. Adding a steel rod across the base would help stiffening the frame, but was up until this point considered a backup solution. Still with the flexibility in mind, such a rod could maybe also serve other purposes.

Looking at the danger of using the bouncer in the wrong set up, an easy solution would be to block the movement allowing it. To not mess with the folding mechanism, such a block would need to be placed where it did not interfere with the grooves or sliders. This is where the idea of adding the steel rod came to mind. By placing it close to the front end of the base frame, this would force the seat frame to be lifted up in the right area, while also guiding the movement.

After deciding to add the steel rod, thoughts on how to further utilize this new addition came to mind. By looking at the TrippTrapp chair for inspiration, such a part could maybe also utilize the flexibility of the wood in a positive way. The seat surface and leg support on the TrippTrapp are locked in place by tightening screws on steel rods placed across the frame of the chair. By doing this, it squeezes these surfaces between the two main wooden profiles, hence locking them in position. A similar approach could now be used on the bouncer.





FEEDBACK

After presumably solving all apparent issues, a new meeting with the engineers and designers at Stokke was scheduled. The new prototype was examined and discussed thoroughly, resulting in a new list of issues needing resolution. This list was quite comprehensive, presenting problems of nearly every functional part of the bouncer. These were the main issues:

- Sliding the whole seat frame back and forth using the grooves in the base frame is not realistic. It will be hard to get proper steering and achieve a smooth motion.
- Making such a narrow and long groove in the wood will not be very cost efficient, since the processing speed will be slow.
- Locking the seat angle merely using frictional forces will not be sufficient. In addition, squeezing the wood together using a screw will create problems if the moisture content in the air changes. This can cause the screw to either loosen or be very hard to release.
- The plastic locks in front will sooner or later snap. Making these long, thin parts strong enough will be a problem.

Based on the feedback from experienced employees, the current solutions needed reconsiderations. This led to a new round of ideation.





8

FINAL MODEL



Can it be made?

COMPROMISES

Further improvement on the bouncer concept called for radical changes. A lot of time had been spent trying to solve every function with the least possible amount of added parts. As this now seemed unlikely to solve by only making small additions to the base and seat frame, the search started for alternative solutions. Especially the sliding functionality for folding and opening the bouncer seemed to require some supporting parts to work as planned. This functionality had been troublesome from the start as the distance across the base would require long guides pressing against the wood at each end to achieve sufficient steering. The base profile combined with the flexibility of the wood made this a big challenge.

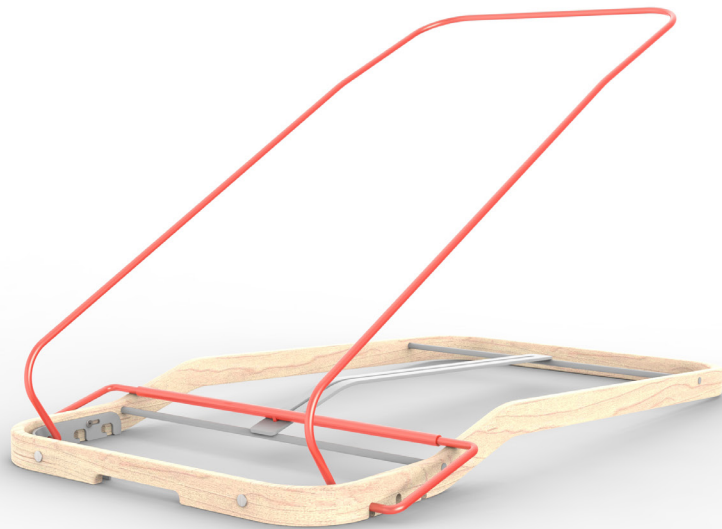
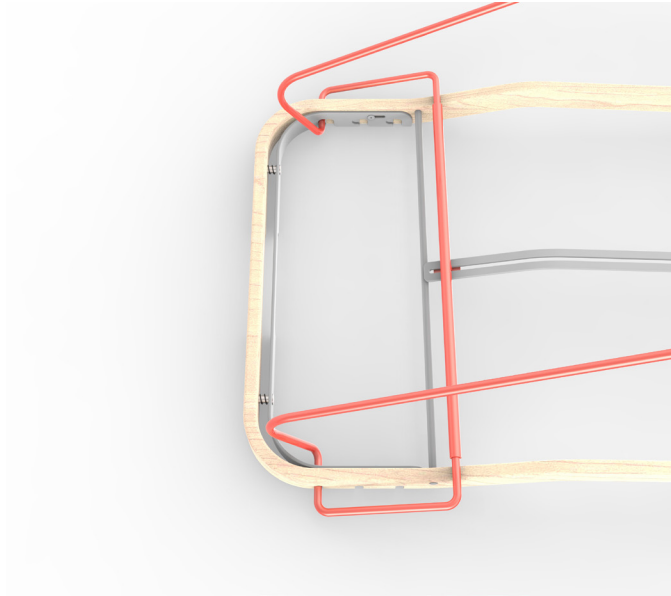
As the steel rod blocking unintended use of the bouncer still seemed like a good idea, looking into adding functionality here was a good place to start. As this rod would act as a structural and subdued component in the composition, adding another in the opposite end for further stiffening could be allowed. These two rods would then enable the supporting of another part connecting them and working as a centered guide for the seat frame to slide on.

After coming up with a new solution for the sliding mechanism, focus could be shifted towards the front end of the bouncer. A problem with the previous solution was that the components locking the seat frame in place did not provide functionality to lock the seat angle. Merging these two essentialities in the same part, or at least the same area of interaction would be beneficial

to both the user and the construction. With that priority, a new solution came to mind. By dividing the long slot in front into three defined positions for the seat frame, a mechanism for locking the seat angle would be excessive. Doing so would sacrifice a stepless adjustment, but it would also create a clearer way to place the seat in the desired position.

The remaining problem was now to prevent the seat frame from rotating forwards by locking it to the base. To fold the bouncer, the best approach would be to grab the base by the front end and the seat frame from the top. Placing a button where the hand should be placed would both indicate the correct way of folding and allow for a smooth way of doing so.

A total of three parts (+ fasteners and springs) were now added. At first this seemed like a loss to the ambitions of keeping everything as minimal and effective as possible. Either way, the parts added would generate a more realistic product in terms of functionality. In the process of doing so, the plastic snap locks and frictional seat angle lock were removed. Even though the parts removed were presented as more subtle additions, they would not serve their purpose if not working properly. The result of doing these changes were after all necessary, and toning them down by using a strategic color would still present the base and seat frame as the center of attention.



TEXTILE DEVELOPMENT - TRIAL AND ERROR

After shifting the focus from textile to framework, up until this point the textile was not given much attention. Thoughts on choice of materials and style of harness (3 point buckle vs 5 points) were gathered during the user test, but shape and visual expression had not been explored properly. Since the essence of this product would be the framework, it would be essential to create a textile that played its part as a natural piece of the composition rather than being the centerpiece. To accomplish the right balance, the textile would of this reason benefit from being simple and toned down.

The effectiveness of working with physical models earlier in the project made it natural to continue this process when developing the textile part. The only idea when starting out was to accentuate the steel frame in some way to prevent it from being hidden. This led to some experimentation on how to attach the textile to the frame. Initially, a thought was to solve this in a way that allowed the seat to be single layered. This would in comparison to the BabyBjorn textile use less materials and open new ways to utilize the fabric. For instance, a mesh fabric would traditionally look better single layered.

An important feature of the textile that was highlighted during user research is the washability and ease of attachment/detachment. Washability is a key feature of most products for children and an important consideration for parents buying them. Of this reason, the textile should not require much work to detach and in turn becoming

a source of frustration. With this in mind, a solution simpler than the BabyBjorn would be hard to come by. Regardless, some attempts were made and evaluated.

A light and visually pleasing suggestion was based on a dual layered bottom part combined with a single layered top wrapping around the steel frame. This would form a firm area for the legs of the child and a free hanging hammock top part. However interesting this solution might be, it was quickly scrapped due to some clear concerns:

- It can be perceived as unsafe due to the gaps.
- The top part would not properly wrap around the body of the child to provide proper support and the feeling of being protected.
- The exposed steel frame communicates hardness, which should be avoided on this area of the product.

A decision was made to move on looking at alternative solutions. Because solutions including a single layered fabric would most likely complicate the attachment too much to defend, an approach similar to the BabyBjorn bouncers seemed appealing after all.



SPICING UP THE BASIC

After experimenting on the physical model and deciding to go with a dual layered “bag” solution the details were set using digital sketching. Sticking to the plan of keeping it low key and basic, a new idea formed quickly. While conducting the user test, a modified BabyBjorn fabric was used. To generate a perceived affordance of where to interact with the bouncer, a cut was made at the top of the fabric. This created a handle indicating where the user should place its hands. This proved to be an effective way of communicating functionality, as all users naturally placed their hand on the handle. It was of this reason only natural to implement such a cutout in the final version.

The cutout also serves a purpose visually. Instead of showing off the steel frame through a mesh fabric or by exposing it in larger sections, the cutout would act as an indicator of how the frame creates the outline of the seat. This effect creates an understanding of how the parts fit together, and makes the product more readable.

The most prominent feature of the textile part is the harness securing the child. While trying to make it blend in with the rest of the seat, it should also look comfortable and safe. In addition, it would be positive being able to open and adjust the harness with as little effort as possible. As with most products made for small children, one handed operations can be very handy if the child occupies the other. To address this, a harness was sketched up where the adjustments would be done on one side instead of both. By making folded and

unlockable vertical strap, a horizontal strap could be placed freely under the fold. This would allow lifting the child in and out of the seat by only releasing the horizontal strap on one side. The strap would then slide freely under the fold and the other end could be sufficiently loosened to let the child's foot through. If not, the vertical strap could be released to fully unfold the harness.



ERGONOMICS

In a baby bouncer there are three main concerns to consider while giving form to the seat:

- Arced shape of the back
- Sideways support
- Even pressure

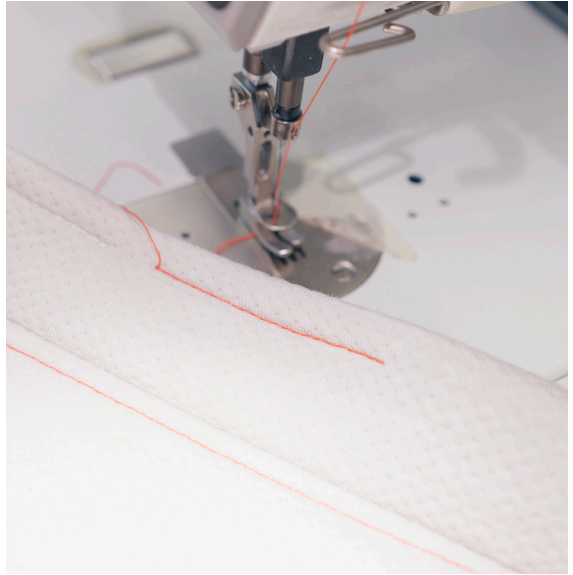
As a baby, the spine has not started to settle properly before reaching the age of 6-9 months and the child is able to sit upright by itself. At this age the bouncer should no longer be used. The reason behind this is that the seat of a bouncer is arced to evenly distribute pressure and prevent interference with the underdeveloped spine. When the child starts sitting up straight, the back should now rest on a straighter surface supporting the lumbar.

A spine under development should also be supported sideways when seated. This is to keep it as straight as possible to prevent injuries.

To keep an even pressure on the whole body of the child, it is important that the seat is not too deep as this would place pressure on the child's feet. This should also be reflected in the choice of materials in terms of stretch and flexibility as these properties vary with the shape of the seat.

MATERIAL SELECTION

The seat fabric should have a few basic qualities to create the right impression. Most importantly it should express rigidity and safety, secondly it should look inviting and comfortable. These basics are covered if combining shape and choice of materials in a sensible way. By widening the harness to create an extra sense of security while also choosing a padded fabric, the seat would be assuring the right appeal.



FINAL PROTOTYPE - PRODUCTION MEASURES

The creation of the final prototype acted as a way of understanding how the product could be approached in a production setting. Even though most of the processes would be automatized, it is important to understand where and why problems will occur. This understanding can partly be a product of simply trying to solve the problems the most effective way on your own.

WOODEN BASE

The trickiest part of the design would naturally be the wooden base. Producing this would require a process split into separate stages:

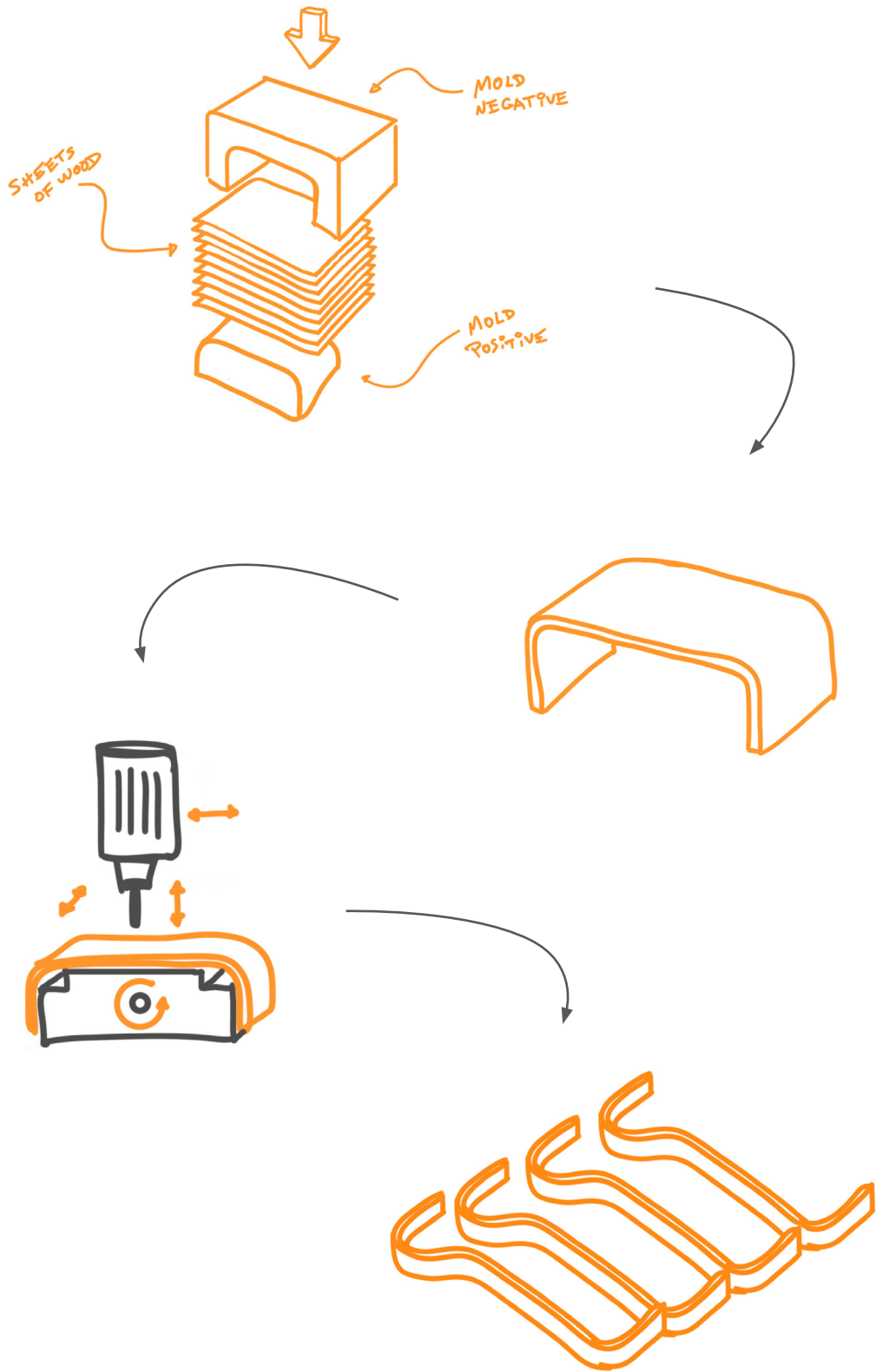
- Lamination
- Machining
- Joining

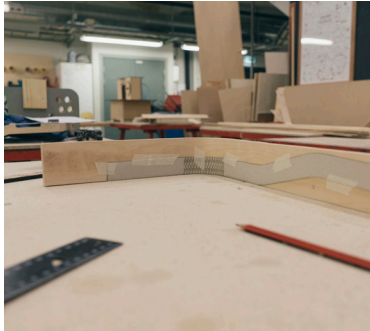
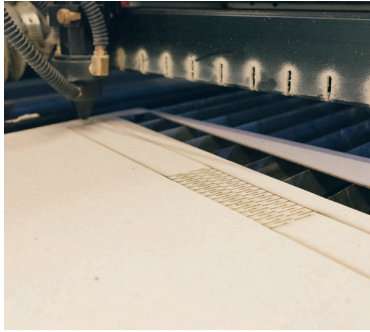
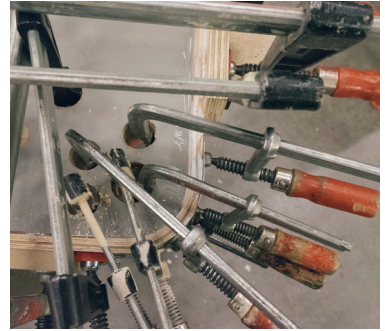
The shape of the base would require laminating sheets of wood and pressing them together in a mold. This could be done in several ways, with a minimum of one joint. Because of the complexity and cost of processing the base with only one joint, the best option would however be to split the base in two parts or more. The two most prominent solutions would then be splitting it on the short sides or creating four joints by separating the short sides with the radiuses. Both of these solutions would require only one mold, as the bent pieces would be symmetric before cutting out the profiles. By laminating wide sheets of wood, several profiles can be cut out from one laminated piece.

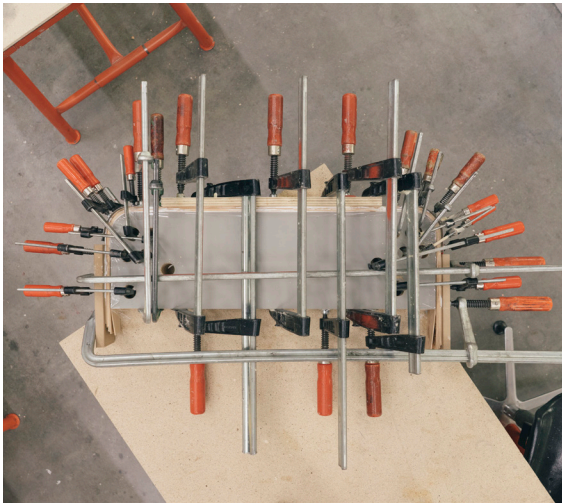
To create the illusion of a fully enclosed base, the best choice visually would be minimizing the number of joints. Because of this, splitting the frame on the short sides was the most desirable option. Choosing this solution would complicate the machining operation, requiring four axes of movement to cut the profiles. This operation should however be fully possible.

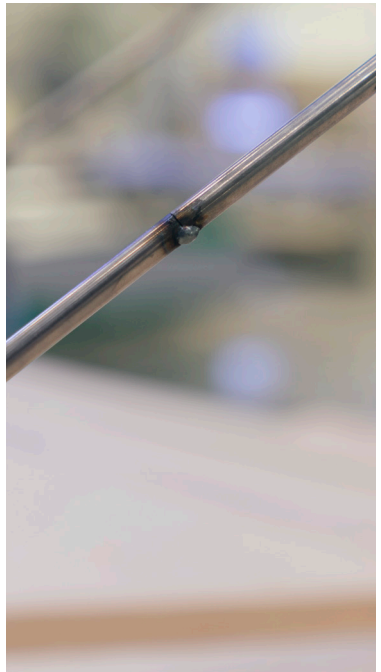
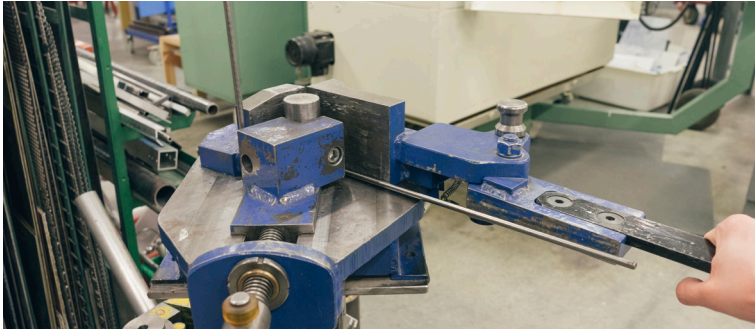
Choosing to connect the frame by four joints would require a less complicated machining process since the long sides could then be cut from a flat piece of wood. The downside to this solution is doubling the amount of joints and losing the sense of continuity around the base.

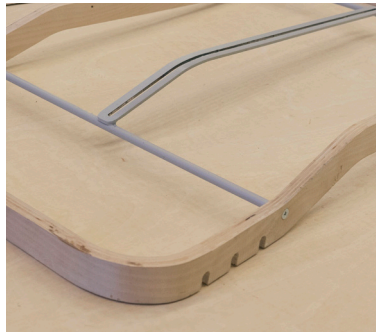
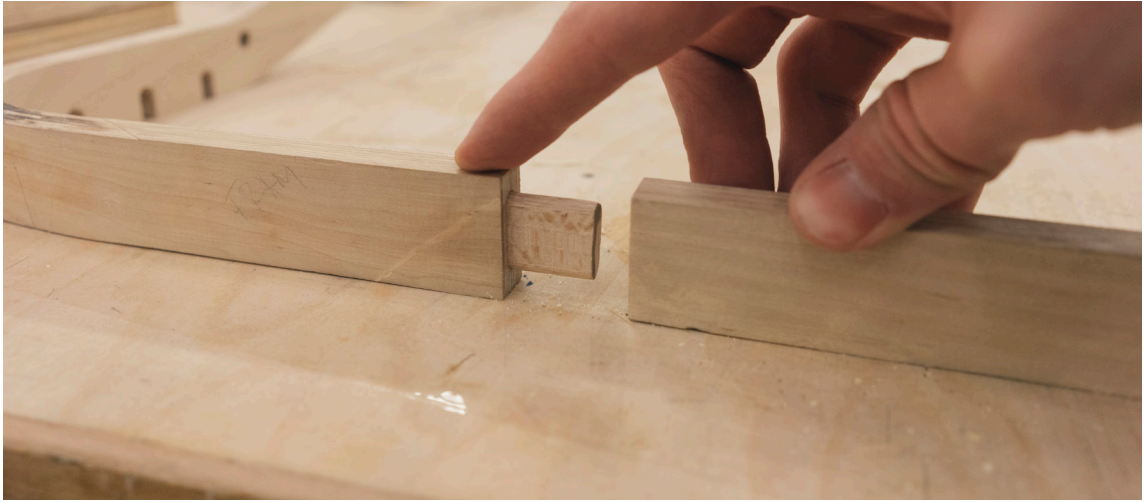


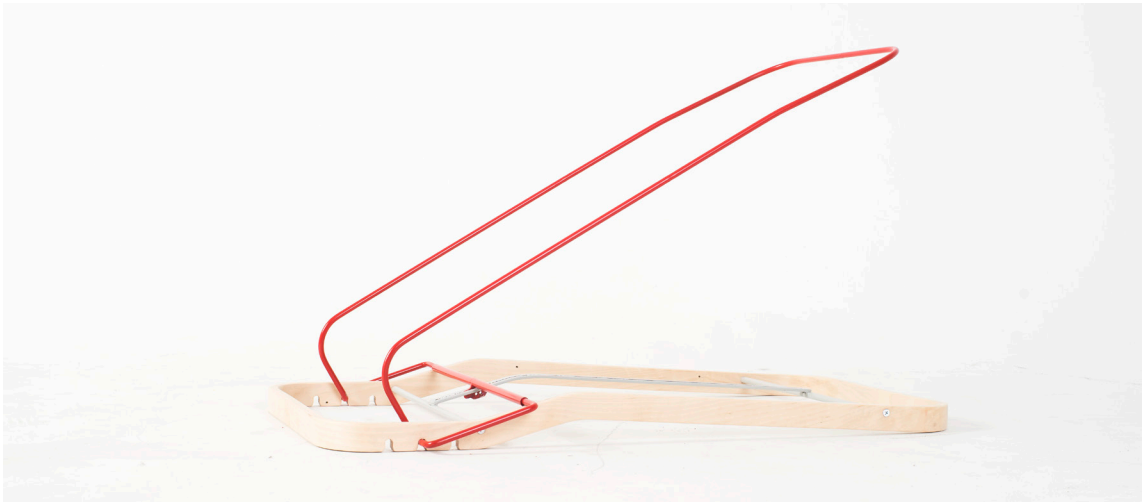
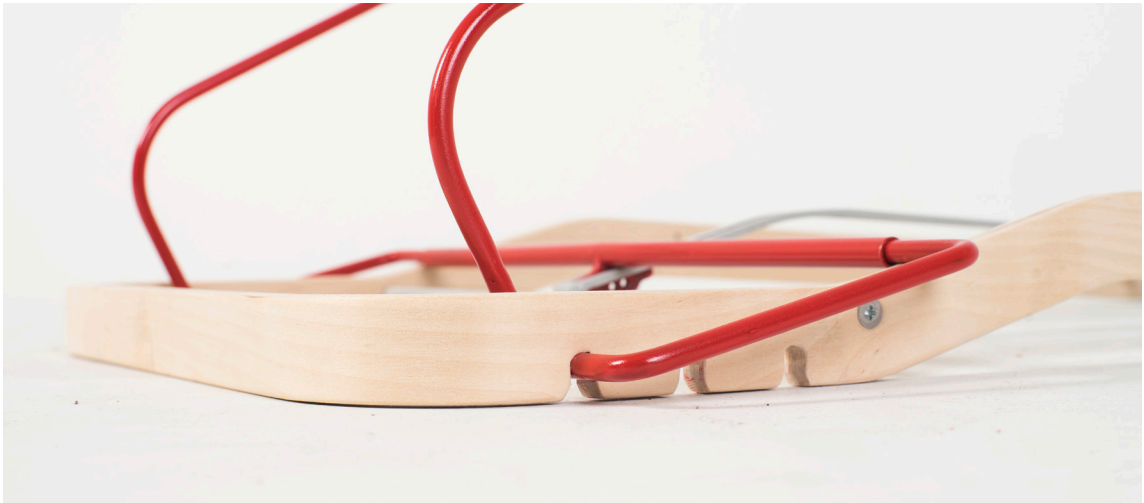
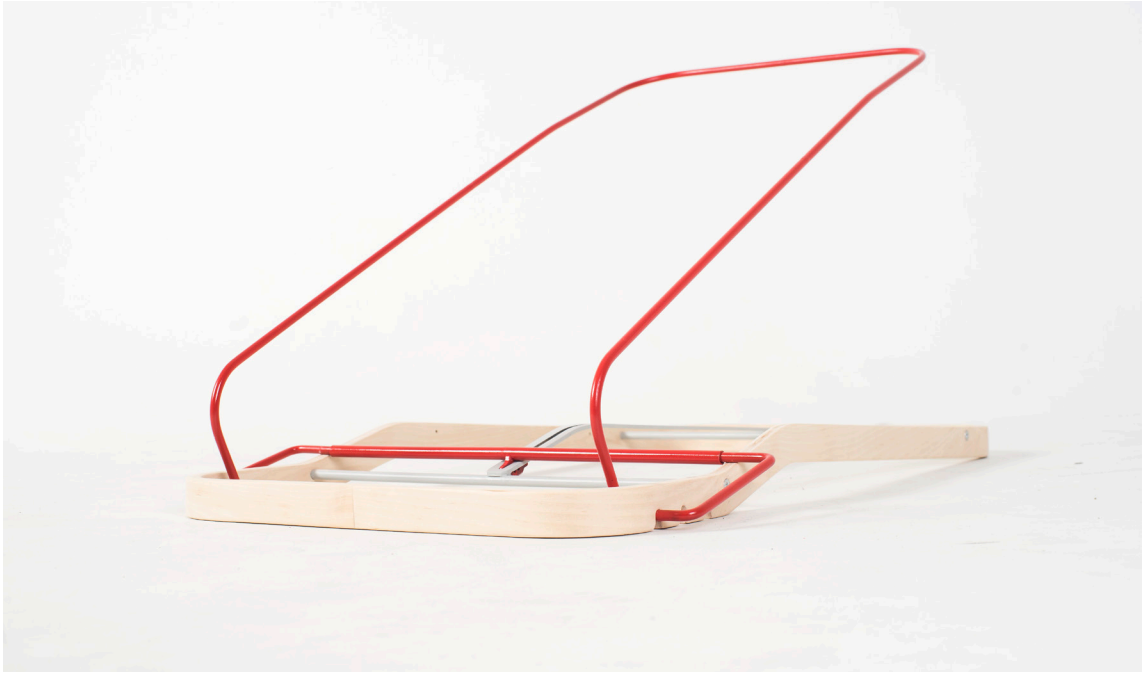


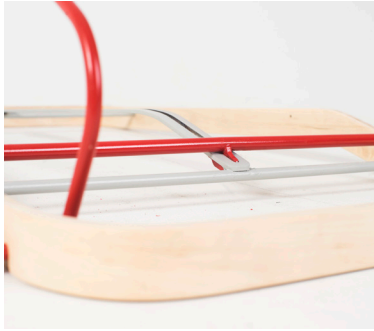
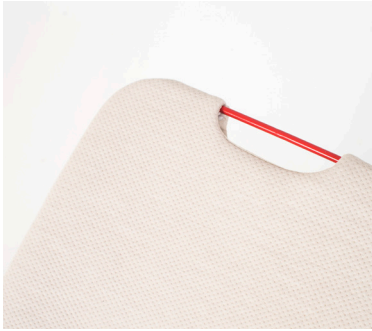














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REFLECTION

Is this the end?

EXPECTATIONS VS RESULT

When commencing this project, I had no previous experience with baby bouncers and what they were used for. As this is a product I cannot relate to myself, user insight became an important part of the progress. This forced me to make contact with users to understand which issues needed fulfillment. Throughout the span of the project I spent time talking to parents I already knew and parents I randomly met. In addition, user tests and a quantitative survey was conducted giving insight would not acquire otherwise. This was a positive experience, much because I discovered that parents naturally have a lot of opinions on what is best for their children.

I did not have any preconception of what I might end up with when starting out, but a course was gradually laid out after examining the market. In the beginning, I had problems arguing for a product that would only last for a maximum of 9 months. This is the case of several children's products, and a common approach seems to be making cheap products that sooner or later break and are thrown away. The other way to go would be creating quality products that last. Even if the child grows out of it fairly quickly, the product can then be stowed away and kept for future children or even the next generation of children. The trend of shopping second hand also argues for this approach. The TrippTrapp is a great example of such a product, as its biggest competitor (in Norway at least) is used versions of itself. This might be bad for business, but good for the environment.

I look at what I ended up with as a product challenging what seems to be the evolution of similar products - implementing technology. In times where big data are being put to use in a rapidly increasing scenarios and products, one must not forget the basics.

I also see this product raising questions of which qualities children's products should possess. The effort in these products are generally put into practicality and functionality. Optionally, there are premium products often sacrificing the practical part for expensive materials and good looks. Can there not be something in between?

WHAT'S NEXT?

The natural way to move forward with this project would be to immediately start running extensive evaluations on functionality and safety measures. If these evaluations have positive outcomes or at least plausible fixes, the engineering work would commence. Even though the probability of producing every part has been considered while developing the product, efforts on how to solve this the most efficient and economic way possible must be made.

I have during the project been in contact with Hagens Fjædre to assure the probability of manufacturing the steel frame (spring). I was promised delivery of a test sample in spring steel before the deadline of this assignment, but this was postponed due to some technical issues. The spring is however fully possible to produce, and a sample will be sent as soon as possible.