The Rotary Floor Stand
Development of shop fitting for H&M

JANA WENNBERG-JANSSON

Master of Science Thesis
Stockholm, Sweden 2015
Det roterbara golvstället
Utveckling av butiksinredning för H&M

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Examensarbete
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KTH Industrial Engineering and Management
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SE-100 44 STOCKHOLM
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av

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Abstract

H&M are making their own store interior in-house. They are continuously updating their interior products in order to achieve better quality, design and function in the stores. One of H&M’s key interior products is the Roundrail, which is seen in all H&M stores all around the world. Quality controls showed that current Roundrail could not meet the requirements of quality and function and that an improvement was needed in these areas. A new design was also requested since the current one does not correspond to the desired store expression.

The goal of the thesis project was to develop an interior product for H&M that should replace the Roundrail. The overall objective of the development was to secure the quality, improve the features and to create a design that matches desired store expression. This has been conducted by using methods of design and product development.

A theoretical study was done within stakeholders and how to involve them in the process, in order to develop a product that fulfills its purpose. This study served as a basis for a comprehensive data collection, which was conducted to find out the stakeholders and their opinion about the current product and requests for the new one. The findings were the foundation for the entire development work. The stakeholders were also involved in the concept generation process, which resulted in a large number of ideas. The concept that was considered to have the greatest potential and credibility was further developed and the product’s design, functions, detailed construction, manufacturing methods and material were defined.

The development work focused on creating a durable product that gives a sense of quality and that enables a great presentation of the clothes. The product should also be contemporary, inviting and synchronized with the other interior. This has been achieved by improving selected functions and by creating a new design.

This degree project has resulted in complete material for producing a prototype of the Rotary Floor Stand, with two different suggestions of top shapes. H&M had the definitive decision in which of the two tops they will proceed with. A prototype of this product will be produced to be able to evaluate it. The Rotary Floor Stand will possibly be further improved to achieve the final goal: launching the product in H&M’s stores in 2017.
Sammanfattning

H&M gör sin egen butiksinredning internt. De uppdaterar ständig sina inredningsprodukter i syfte att uppnå bättre kvalitet, design och funktion i butikerna. En av H&M:s viktigaste inredningsprodukter är Rundringen, som används i alla H&M-butiker världen över. Kvalitetskontroller visade att nuvarande Rundring inte uppfyller kraven för kvalitet och funktion och att en förbättring i dessa områden behövs. Även en ny design efterfrågades då den nuvarande inte överensstämmer med det önskade butiksuttrycket.

Målet med examensarbetet var att utveckla en inredningsprodukt för H&M som ska ersätta Rundringen. Det övergripande målet för utvecklingen var för att säkerställa kvalitén, förbättra funktionerna samt att skapa en design som matchar önskat butiksuttryck. Detta har gjorts med hjälp av metoder för design och produktutveckling.

En teoretisk studie gjordes inom berörda parter och hur man involverar dem i processen. Detta för att utveckla en produkt som uppfyller sitt syfte. Denna studie låg till grund för en omfattande insamling av data, som genomfördes för att definiera de berörda parterna och deras uppfattning om den nuvarande produkten samt önskemål för den nya. Resultatet låg till grunden för hela utvecklingsarbetet. Intressenterna var också inblandade i konceptgenereringsprocessen, vilket resulterade i ett stort antal idéer. Konceptet som ansågs ha störst potential och trovärdighet har vidareutvecklats och produktens design, funktioner, detaljerade konstruktion, tillverknings metoder och material definierades.

Utvecklingsarbetet fokuserade på att skapa en hållbar produkt som ger den upplevda känslan av kvalité och som möjliggör en bra presentation av kläderna. Produkten ska kännas nutida, inbjudande och vara synkroniserad med övrig inredning. Detta har åstadkommits genom att förbättra de önskade funktionerna samt genom att skapa en ny design.

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1. Introduction

This introductory chapter describes the base of the thesis and introduces the underlying facts and problem. The chapter also describes the goal and purpose as well as the limitations in the development work.

1.1 Background

The product development work described in this report is a master thesis done at the degree program Design and Product Development, with the specialization Industrial Design, at the Royal Institute of Technology in Stockholm, Sweden. The work corresponds to 30 credits and was conducted in spring 2015 along with the company H&M, at their department Store Development, in their premises in Stockholm.

H&M are making their own store interior in-house. The development of shop fittings for all their stores worldwide is made in Stockholm, on the department Store Development. They are developing future store concepts with new ideas and solutions and are continuously updating their interior products in order to achieve better quality, design and function in the stores.

H&M makes continuous quality controls in their stores worldwide, to investigate if the interior fulfills the requirements. The result determines whether a product needs to be updated or removed completely.

1.2 Problem description

One of H&M’s key interior products is the Roundrail. The current Roundrail is a high quantity product that is seen in all H&M stores all around the world. It is heavily loaded, especially when used during campaigns and sales. Features such as height adjustment, rotation and that the product is movable put high demands on the product and its production. The product should have a contemporary yet simple design, as it is placed in all areas in the stores.

During quality controls, it was found that current Roundrail could not meet the requirements of quality and function and that an improvement was needed in these areas. A new design was also requested since the current design does not correspond to the desired store expression. This led to the creation of a product development task at H&M, which has been conducted in this thesis project.

1.3 Goal and purpose

The goal was to develop an interior product that should replace one of H&M’s key products, the Roundrail. This concept would have similar properties in terms of being able to provide a lot of
garments on a small area and preserve necessary functions. This product would be a part of the development project Floor Stands that will be launched in the beginning of 2016. H&M’s goal with this project is to launch the products included in this project in H&M stores in 2017.

The overall objective of the development of the Roundrail was summarized in three points:

- Secure the quality
- Improve the features
- Create a design that matches desired store expression

The purpose of the thesis has been to develop a new interior product for H&M by using well-known methods of design and product development. The development work has resulted in a detailed product description and design proposal for a new interior product, with two different variants of the top, for all H&M stores.

1.4 Method
Since the thesis project was a part of another project at H&M, the overall methodology used to conduct the thesis work followed the structure of the product development process used at Store Development, which is described in chapter 2.3 Product development process.

This method was adapted to the demands of the thesis by a theoretical study within methods and tools. This study resulted in useful tools and methodologies that were used in the work process, which are explained in chapter 4. Theory: Methods and Tools.

1.4.1 Software used
The program that was mainly used during the development work was NX CAD, for product modeling and to create technical drawings. (Siemens, 2015)

To create 3D renderings, the software KeyShot was used. (Luxion, 2015)

1.5 Limitations
In the development work, some limitations were necessary because of the limited amount of time.

The result of this project was complete basis for ordering a prototype. Due to the time constraints, this prototype will be validated after the project ends. This will be done by H&M, to see if any further development is necessary to produce the final product.
Since the product that was developed is to be used at all H&M stores, material choice, dimensions, production methods and design was limited to H&M’s possibilities and requirements. Many decisions have therefore been discussed with several different departments at H&M and have been dependent on their opinion. However, the creator of the product valued its own opinions and relied on its own knowledge.

The exact cost of the product has not been calculated but the price has been discussed with suppliers, whether the developed product will be less or more expensive than the current one.
2. Company description H&M

This chapter provides information about H&M that was useful in the development work. This includes a brief description of the company background as well as an explanation of the department Store Development and how the product development process is conducted within this department. Lastly, information about the core costumer and the store categories is presented.

2.1 History and today

In 1947 Hennes women’s clothing store opened in Västerås, Sweden, selling women’s clothing. In 1968, sales of men’s and children’s clothing began and the name was changed to Hennes & Mauritz, H&M. Today the H&M Group offers fashion under the brands of H&M, COS, Monki, Weekday, Cheap Monday and & Other Stories, as well as fashion for the home at H&M Home.

H&M has about 3 000 stores in 53 countries. The growth target is to increase the number of stores by 10–15 percent per year, and at the same time increase sales in comparable units. The strong pace of expansion continued in 2015 with a planned 400 new stores.

2.2 Store Development

The project work has been done in close collaboration with the department Store development. The department is a part of H&M’s global expansion organization. Store Development’s goal is to create an outstanding store experience for all H&M stores, that maximizes selling, enables expansion and strengthens the brand in a sustainable and qualitative way. To reach the overall business goals the focus are to:

- Continuously improve the existing store concept within design and functionality
- Develop the future store concept with new ideas and solutions
- Support development of existing stores
- Support development of Flagship stores, to strengthen the brand

Store Development consists of a mix of competences that works in tight teamwork and collaboration in different development projects connected to the overall goals and priorities. The people included are store planners, designers, architects, engineers, graphic artists as well as project support and administration.

The work is done in tight collaboration with the departments Sales, Visual, Marketing and Buying Office.
2.3 Product development process

The product development process used at Store Development is shown in Appendix 1. The final product is presented in an internal event called handover, HO. During this internal event, all products developed during the year are presented. These products are launched in the H&M stores the following year. The process is in progress for one year but due to the time constraints, the goal in the project presented in this report is an ordered prototype and then H&M will continue with the remaining work.

A big part of this degree project was the Sketch and idea phase, which is a creative work process during the concept development. Sketches that leads to design and functions ideas and solutions is done in several phases, shown in Figure 1. Each creative phase is finalized in a presentation-and decision meeting with concerned responsible to decide what ideas to continue with. These ideas are further developed in the next phase by using the same method again. This continues until the final concepts has been found and chosen.

![Figure 1. The sketch and idea phase in the product development process at H&M](image_url)

2.4 Store categories

The stores at H&M are divided into three different store categories: Blue, Red and Flagship stores. The reason for this is to meet up with the different needs of the stores based on location, investment levels, staff hours and garment allocations.

The different store categories also have different interior. When developing new interior it is adapted to which category, or categories, it belongs to. This could be in terms of choice of material or the expression of the product. Figure 2 shows the distribution of the different categories.
The blue stores are the smallest ones, which are furnished only with basic interior. The red stores are covering the large mass and is the category that sells the most garments. The interior in the red stores can vary, from simple to more lavish interior. The flagship stores are more unique and are the most luxurious ones when it comes to the interior.

2.5 The core customer
H&M caters to a large target group; children, youths, men and women. The quote illustrates how the company describes its costumer:

"We see no line between H&M and our customers. They are just like us. Or you. They love fashion or just to dress the way they want. All ages young at heart."

Due to this large target group, H&M has a core customer that is women between 20 and 40 years.
3. Current Product

The product to be developed is called the Roundrail and it is shown in Figure 3. The Roundrail is one of H&M’s key products and it is used in all store categories. The upper part of the product can spin so that the customer can reach all the garments from one spot. It is height adjustable with the possibility of two different positions, to suit different kinds of garments. The product is movable to ease the work for the shop assistants. The top ring exists in two different sizes, to match the different garment allocations in the stores. The product has different names depending on what top that is used: the Normal Roundrail and the High Selling Roundrail.

Figure 3. The current Roundrail
4. Theory: Methods and Tools

This chapter presents the theory that formed the basis for the development work on H&M. Stakeholders and how to involve them in the process were studied, in order to develop a product that fulfills its purpose. A study was also made within data collection, to structure it and present it in an suitable manner.

4.1 Stakeholders
To build the right product, you have to understand the extent of the work; the people who do it, influence it, or know about it; and the outcome that those people are trying to achieve. Stakeholders include anyone with an interest in, or an effect on, the outcome of the product. The owner is the most obvious stakeholder, but there are others. For example, the intended users of the product are stakeholders. They have an interest in having a product that does their work correctly. Because so many classes of stakeholders exist, it is helpful to discuss some of the more important ones. (Robertson, J. and S., 2013)

The product should aim for to establish the optimal value for the owner, and that probably means talking to many of these people, all of them are potentially sources of requirements. (Robertson, J. and S., 2013)

4.2 Data collection
This chapter describes the methods and tools used to collect data and how to compile it in an appropriate manner.

4.2.1 Qualitative Interviews
Qualitative research explores attitudes, behavior and experiences through such methods as interviews or focus groups. It attempts to get an in-depth opinion from participants. As it is attitudes, behavior and experiences that are important, fewer people take part in the research, but the contact with these people tends to last a lot longer. (Dawson, 2007)

In social research there are many types of interview. The most common of these are unstructured, semi-structured and structured interviews. In unstructured interviews, the researcher attempts to achieve a holistic understanding of the interviewees’ point of view or situation. (Dawson, 2007)

Unstructured interviewing is designed to elicit an authentic account of the interviewee’s subjective experience. Unstructured interviews aim to delve deep beneath the surface of superficial responses to obtain true meanings. Unstructured interviews rely on the social interactions between the interviewer and interviewee to elicit the information. Unstructured interviews are intended to increase the appearance and relevance of the question. (Klenke, 2008)
In the book *Qualitative Research in the study of leadership*, the author Karin Klenke explains the advantages of unstructured interviews. Some of them are presented in the info box below.

### ADVANTAGES WITH UNSTRUCTURED INTERVIEWS

- Complex issues can be explored
- The answers can be clarified
- May contribute to the elicitation of more in-depth as well as sensitive information
- Important issues are uncovered that eventually can guide future inquiries
- General understanding of the problem is provided when very little is known about the problem

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**Analyze data**

In the book *Qualitative Interviewing: The Art of Hearing Data* by the authors Herbert J. Rubin and Irene S. Rubin describes how to analyze the data collected from qualitative interviews.

Concepts, themes, and topical markers are systematically examined to sort them into appropriate groups, comparing them, and looking for patterns and connections. You combine what different interviewees have said about for example the same topic, to refine your understanding of what each topic means. (J. Rubin; S. Rubin, 2005)

The content is sorted by bringing together all of the data related to the same topic into one computer file and then summarize the content of each file. A summary can be useful, because not everyone knows what other people think about the topic. To summarize the content of the file, main points in the text are listed associated with different categories. (J. Rubin; S. Rubin, 2005)

To help generate additional ideas, the material in each summarized file can be sort and ranked. The data is now organized into different categories and each category is ranked. One example of this could be that different complaints about parking were found. The fact that some complaints were considered minor and some major, suggests that you rank-order the complaints from the most to the least serious. This ordered information can be used in a variety of ways. (J. Rubin; S. Rubin, 2005)

4.2.2 **Functional analysis**

A functional analysis is a document of functions that summarizes the information gathered from the previous analysis phases. In the functional analysis, all the possible requirements and demands for the product within different categories are listed. This intends to facilitate the creative work by systematically and methodically analyze all the demands and requirements set for the product. (Landqvist, 2001)

The functional analysis is constantly supplemented. It is a document that works as a checklist to make sure that nothing has been overlooked in the continued development. (Landqvist, 2001)
The functional analysis is often divided into different categories, in order to create a comprehensible document. In the functional analysis every function is selected to be a main function, a necessary function or a desired function. (Landqvist, 2001)

### 4.2.3 Benchmarking

Benchmarking is the continuous process of measuring products, services and processes against the toughest competitors or companies recognized as industry leaders. It is the process of identifying, understanding and adapting outstanding practices from organizations anywhere in the world to help the organization improve its performance. Benchmarking is a development model, but it also uses common sense to define the critical path for success, to look for examples of higher performance that can be applied to one’s own process. Why reinvent things you can learn from others more quickly and with lower cost? (Niva, Tuominen, 2005)

### 4.3 Requirement specification

A requirement is something the product must do to support its owner’s business or a quality it must have to make it acceptable and attractive to the owner. A requirement exists either because the type of the product demands certain functions and qualities, or because the client justifiably asks for that requirement to be a part of the delivered product. The analyst write the requirements so as to ensure that parties at either end of the development spectrum are able to have an identical understanding of what is needed. (Robertson, J. and S., 2013)

In the book *Mastering the Requirements Process: Getting Requirements right* the authors James Robertson and Suzanne Robertson describes the difference between functional and non-functional requirements. A functional requirement is the functionality if the product, what the product shall or should fulfill. The functional requirements are requirements that cause the product to do the work while the non-functional requirements are those that give character to the work - how usable, convenient and inviting the product is.

### 4.4 Concept generation methods

*The methods presented in this chapter have been used mainly in order to involve the stakeholders in the concept generation.*

#### 4.4.1 Brainstorming

Brainstorming is methods for actively seek to generate many ideas and proposals for solutions on an issue or a problem. The method is one of the most common concept generation tools used today and can be used in most parts of product development process. (Ullman, 2003)

In the book *The Art of Innovation* the author Tom Kelley explains the secrets for better brainstorming. Some of them follow below.
Good brainstormers start with a well-honed statement of the problem. This can be as simple as a question. A brainstormer without a clear problem statement is like a company without a clear strategy: You’ll wander aimlessly and need a lot of extra luck or talent to succeed. If you find yourself leading a session, spend a few minutes developing a good problem statement.

Don’t start to critique or debate ideas. It can snap the energy of the session pretty quickly. The brainstorming rules should be told or printed, for example “Encourage wild idea” or “Be visual”.

In brainstorming, don’t be an “expert” snob. Bring someone from manufacturing, who knows how to build things. Invite a customer service rep with lots of field experience. They might not have the “right” degrees, but they just might have the insights you need. (Kelley, 2001)

### 4.4.2 Team Based Innovation

Team-Based Innovation is a concept in which experts can gather to work together on a specific topic, focusing on product development. **Mattias Bergström**, researcher in the Division of Functional Product Development at Luleå University, explains that it is a more intense form of workshop that is called **FUNfunctional Charrette**. In the subject of functional products, the method has been developed which has created content in the Charrette. The **FUN functional Charrette** consists of different phases where the participants’ creativity and insights are mixed and utilized. (“Luleå Tekniska Universitet”, 2010)

The company Volvo Construction Equipment, VCE, has hired researchers Luleå University of Technology to train their own iCoaches. **Åsa Norrby**, working with process and organizational development within VCE Innovation, says that for most people, it is a whole new way of thinking. She thinks this gives great benefit and that it is useful in the early phases of the project in order to generate ideas. (“Luleå Tekniska Universitet”, 2010)

The three different phases in the **FUNfunctional Charrette** is called now-wow-how. It allows a workshop to be planned, designed and conducted in order to analyze an existing situation (now), a preferred alternative future (wow) and elaborate on how these two can be bridged (how). This three-step framework is a collaborative process in which the participants’ diverse competences and skills are seen as the source of creativity. (Ericson, Å; Törlind, P, 2013)

### 4.4.3 Workshop with focus group

A focus group is where a number of people are asked to come together in order to discuss a certain issue for the purpose of research. The focus group is facilitated by a moderator who asks questions, probes for more detail, makes sure the discussion does not digress and tries to ensure that everyone has an input and that not one person dominates the discussion. The goal is to achieve a free-flowing, useful and interesting discussion. (Dawson 2007)
In the book *A Practical Guide to Research Methods* the author Dr Catherine Dawson explains the advantages with the focus group method:

- Can receive a wide range of responses during one meeting
- Participants can ask questions of each other, lessening impact of researcher bias
- Helps people to remember issues they might otherwise have forgotten
- Helps participants to overcome inhibitions, especially if they know other people in the group
- The group effect is a useful resource in data analysis
- Participants interaction is useful to analyze
5. Implementation

The work to develop the new product for H&M followed the product development process that is explained in chapter 2.3 Product development process. This process was performed using the methods and tools explained in chapter 4 Theory: Method and Tools. This chapter describes the implementation of the project in its entirety and the included phases are presented in an order that makes it easy for the reader to follow the work process. It intended to reflect and justify the choices that have resulted in the product description found in chapter 6. Results.

5.1 Data collection

A comprehensive data collection was conducted in order to find out the stakeholders and their opinion about the current product and requests for the new one. The findings were the foundation for the entire development work.

5.1.1 Stakeholders

To create an understanding about which persons that should be included in the data collection, the most important stakeholders were defined and are presented in the info box below.

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<th>STAKEHOLDERS</th>
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<tr>
<td>▷ The costumer</td>
</tr>
<tr>
<td>▷ Shop assistants at H&amp;M stores</td>
</tr>
<tr>
<td>▷ Departments at H&amp;M head office</td>
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<tr>
<td>▷ Suppliers</td>
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</table>

The most important stakeholder is the costumer, which visits H&M stores. The costumers will in this case not buy the developed product but they will be affected of it since the product, together with the other interior in an H&M shop, creates the shopping experience for the costumers. Another important stakeholder is the shop assistance that daily works closely with the product.

Other stakeholders are the departments at H&M head office that are involved in the product development. In this project, the most involved departments have been Buying Office, Visual, Design, Store Operation and Interior Store Engineers, also called constructors. The suppliers are also an important stakeholder since it is involved in the creation of the product and have a great effect on the outcome of the product.

To get an understanding of how the different stakeholders relate to the product, they will all be involved in the development process.
5.1.2 Store practice
To experience how the interior is used in the store, a store practice was made during four days at an H&M store in Stockholm. Since the shop assistants are important stakeholders for the developed product, feedback on the Round Rail were collected. The shop assistants pointed out the importance of this product. It sells large quantities of garments but it needs improvement. The most important insights that were collected are presented in the info box below. For further description about the store practice, see Appendix 2.

<table>
<thead>
<tr>
<th>INSIGHTS FROM STORE PRACTICE</th>
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<td>➢ The product is rarely height adjusted</td>
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<td>➢ The wheels often loosen which makes the product skewed</td>
</tr>
<tr>
<td>➢ The whole product moves when customers spin the top with garments</td>
</tr>
<tr>
<td>➢ It requires a lot of space when stored</td>
</tr>
</tbody>
</table>

5.1.3 Store visits
To investigate how the product is used and function in the stores, store visits at H&M stores were made. During these visits many problems with the current product were discovered. The problems that were found are connected to the wheels, the height adjustment and the rotational parts, which are illustrated in Figure 4. A more detailed description of these problems is given in Appendix 3.

Figure 4. Some of the problems that the current Roundrail has
5.1.4 Handover
To obtain an understanding of the product’s final phase, H&M’s annual handover were visited at Plaza Sergel the 17th of February 2015. This event gave an insight into what criteria the product to be developed in this project should have.

The development focus areas were presented, that is used in order to achieve better quality and function in the stores, which are shown in the info box below.

<table>
<thead>
<tr>
<th>DEVELOPMENT FOCUS AREAS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>QUALITY</strong></td>
</tr>
<tr>
<td>» Durability</td>
</tr>
<tr>
<td>» Sense of quality</td>
</tr>
<tr>
<td>» Clarity</td>
</tr>
<tr>
<td><strong>FUNCTION</strong></td>
</tr>
<tr>
<td>» Enable presentation</td>
</tr>
<tr>
<td>» Efficiency</td>
</tr>
<tr>
<td>» Synchronizing interior between departments</td>
</tr>
</tbody>
</table>

Two other important topics that were highlighted during the handover where shopping experience and expression. H&M aims for creating a clear and qualitative shopping experience, by having a great presentation of the clothes and by adding inspiring features. The importance of the expression in the stores was also mentioned. Questions like “What do H&M express and what do we want to express?” were raised.

5.1.5 Qualitative Interviews with departments at H&M head office
Qualitative interviews where made with people from different departments at H&M that are involved in development of the interior: Buying Office, Visual, Design, Store Operation, Design and Construction.

Based on the literature studies on qualitative interviews, explained in chapter 4.2.1 Qualitative Interviews, the information from the interviews was summarized. What different people have said about the same topic was combined. To refine the understanding of what each topic means, main points in the text were listed associated with different categories: Wheels, Top, Top Tray, Height adjustment and Expression. This was also done to help generate a requirement specification and concept ideas. An extract of this compilation, that shows most mentioned the problems, is shown in Appendix 4.

Functional analysis
After data from the interviews had been summarized and sorted, a functional analysis where made. This was done to scale down the information into functions and to obtain a basis for the further developing process. Since the functions were classified and ranked, the functional
analysis showed what features that were important to focus on and served as a basis for many decisions. The document was updated during the process, when new important information was collected. The final functional analysis is found in Appendix 5.

5.1.7 Dialogue with shop assistants
Interviews, store practice and store visits confirmed that the problems with the product is, or is affected of, its functions. To find out what one of the user groups, the shop assistants, require for the upcoming product, a dialogue with four visual merchandisers from different H&M stores in Stockholm were held. They got to answer the same questions and a summary of what showed to be the most rewarding questions and answers appear in Appendix 6.

All four agreed on that the height adjustment is unnecessary since it is rarely used, thus the same result as the earlier store practice and store visits showed. During the store visits, explained in 5.1.3 Store visits, one shop assistant at the H&M store on Smålandsgatan 16 said:

“I have worked here for six years
and I have never seen anyone adjust the height”

All the visual merchandisers also agreed on that the rotation and the ability to move the product around the store are important features. The importance of a movable round rail was also confirmed by the question “How often is the product moved?” which proved to be quite often. However, the dialogue with these shop assistants also showed that the wheels and the rotational function needs improvement.

5.1.8 Benchmarking
In the developing process a benchmarking research was made to find out which similar products that are available on the market. This was done partly in order not developing a product that already exists and some ideas were actually removed because of this. This was also done to get inspiration, both for the design and the construction.

This research was made partly on the Internet, where different kind of pages that offers shop fittings where visited. Among many are some examples Aliexpress, Vizona, Alibaba and E-shopfittings.

To see what kind of shop fitting the competitors are using, their stores in Stockholm were visited together with a designer and two engineers from H&M. Some examples of the visited stores are Zara, KappAhl, Weekday, Intersport, Stadium, Salt, Dressman and the mall NK. This was conducted together with designers and constructors from H&M. All agreed on that the stores that have succeeded best in creating a clean expression and a sense of quality had interior with pure constructions and an edged design language. Some examples of interior that corresponds to the sought expression is shown in Figure 5.
5.2 Requirement specification

A requirement specification was done to ensure that all included parties in the development work should be able to have an shared understanding of what is needed. During the work process, the concepts were continuously compared with the specification to ensure that they comply with the requirements.

To provide measurable requirements, an information gathering and calculations were made. This is recognized in Appendix 7 and includes required height, number of garments, hanging units and what load the product must manage.

In contrast to the functional analysis, the requirements in this specification where generalized. This was made to create a more creative development process that was not affected by the existing product, for example its’ parts and forms. The Requirement specification is presented in Appendix 8.
5.3 Concept generation

Ideas appeared early in the process and concepts were created in parallel with the other phases. This chapter describes the largest concept generation moments, which partly was carried out in two workshops with different focus groups that are two important stakeholders: the core costumer and the Interior Store Engineers at H&M. These workshops gave a good view of what H&M and the customer think about the current product and what they want to the new one to deliver.

The concept generation work was influenced of the methods explained in chapter 4.4 Concept generation methods. The concept generation phase focused mainly on finding solutions based on the product’s problems and needs, which resulted in many new ideas and concepts.

5.3.1 Workshop with H&M

A workshop was performed together with Interior Store Engineers at H&M the 4th of March 2015. The purpose of this workshop was to involve people with a lot of experience in the subject by making them share their opinion about the product and also create new ideas and solutions. The workshop was held at H&M’s head office in Stockholm during a three hours session. Information material, work templates and sketch material was available during the workshop.

The participants began to work individually, giving all participants the chance to get their opinions told. Each participant wrote done his or her perceived needs of and problems with the product. This worked as a basis for the following brainstorming and concept development. Some pictures from the workshop are shown in Figure 6.

![Workshop together with Interior Store Engineers at H&M](image)

**Figure 6. Workshop together with Interior Store Engineers at H&M**
The workshop resulted in several innovative concepts that gave rise to new ideas and solutions that were used in the development process. For more detailed information about how the workshop was performed, see Appendix 9.

5.3.2 Workshop with the core customer
As explained in earlier, H&M’s core customer is women between 20 and 40 years old. To make a product that suits this target group, which is the most important stakeholder, a workshop was performed the 11th of March 2015. Seven women within the age range were participating in this four hours session. Pictures from the workshop are shown in Figure 7.

![Figure 7. Workshop with women that belongs to H&M’s defined core customer group](image)

As mentioned in chapter 5.1.4 Handover, the shopping experience and the expression in the stores are two important topics that influence the product development at H&M. Therefore, these topics were discussed during the workshop.

The current product, the Roundrail, was discussed and opinions that all participants shared are presented in the box below.

<table>
<thead>
<tr>
<th>THE CORE COSTUMERS’ OPINION ABOUT THE CURRENT ROUNDRAIL</th>
</tr>
</thead>
<tbody>
<tr>
<td>» The product express low quality</td>
</tr>
<tr>
<td>» It gives a messy look</td>
</tr>
<tr>
<td>» The costumer experience chaos</td>
</tr>
<tr>
<td>» It is exhausting to look for clothes on the round rail</td>
</tr>
<tr>
<td>» The product is often packed with too many garments</td>
</tr>
<tr>
<td>» It is hard to see the garments that are hanging on the round rail</td>
</tr>
<tr>
<td>» It is hard to spin</td>
</tr>
<tr>
<td>» Expect to find cheap and odd garments on it</td>
</tr>
<tr>
<td>» The garments are hanging to low</td>
</tr>
</tbody>
</table>

The core customer’s perception of the product is not consistent with H&M’s design preferences: A qualitative product that enables great presentation of the garments and that is perceived as high quality.
The participants wished for a better presentation of the garments, preferably that the product displays which garments that hangs on it. They also wanted the product to be clearer and not so messy.

The workshop also consisted of a brainstorming session in two groups. This resulted in new ideas of presenting clothes, which inspired further development. To get more details of how the workshop was performed, see Appendix 10.

5.3.3 Idea generation around problems and needs
To solve the existing problems and satisfy the needs of the product, a brainstorming around the products identified problems and needs were made. A lot of ideas were posted under every need and problem as shown in Figure 8.

![Figure 8. Brainstorming around solving problems and satisfy needs](image)

Together with the supervisor at H&M, the best ideas were chosen and put together which created three different areas. A further concept generation was done within each area, which is presented below.

**Synchronize design**
H&M’s interior follows, or will be developed to follow, an edged design language. To match this, ideas for a new shape of the current round top were sketched. The idea of creating a new shape of the top was also to meet the demand from the core customer, to create a product that shows the garments in a better and more sorted way. Some of the ideas are shown in Figure 9.
Modular based product
The idea of creating a modular based product was to make a product that can be adapted to different types of garments and display the garment in different ways or be placed in various ways in the store. The idea of making a modular solution was also to ease the current problem with storing the product. Some ideas are shown in Figure 10.
Optimizing functions
Solutions to solve current problems with the Roundrail, which were found in the background study, were made. This included for instance to solve issues with storing the current product, by fold it or make the top separable, and the difficulty to rotate it, as shown in Figure 11. These solutions were considered usable for several concepts in the other areas.

Figure 11. Sketches of solutions to improve the functions

5.4 Concept evaluation
The concept generation phase resulted in a large number of concepts. This section describes how a selection among these was done to finally find the concept that was considered to have the greatest potential and credibility. The earlier data collection, the functional analysis and discussion with H&M formed the basis for the final selection.

The main focus with this evaluation was to choose between improving the current product by creating a new shape or change the whole product into a modular concept. The selection of which ideas of those created within optimization of functions that should be further developed were dependent on this choice. The decisions concerning which functions to focus on where therefore made in the next phase: the concept development.
5.4.1 Evaluation with H&M
This was done in several steps; the ideas were sorted out through discussing them with different departments at H&M head office. The most involved peoples were the supervisor at H&M, the store engineers and the designers. Their opinion was important since they possess an experience of developing products for H&M and have a feeling of what ideas that will work and not.

When presenting the concepts, there were different opinions among different departments and people. The overall conclusion was that H&M was positive about trying out a new shape. The modular concept was questioned mainly by the designers, which did not believed in it.

5.4.2 Earlier data collection
In the evaluation, all the information from the earlier data collection was taken into consideration. Since the most important stakeholder, the core customer, thought that the current Roundrail gave a messy and non-qualitative feeling, a new shape that hopefully would enhance this expression was an interesting choice.

One conclusion from the benchmarking was that shop fitting that are changeable in different ways usually not express high quality and cleanliness. Therefore the modular concepts were questioned.

5.4.3 Evaluation using the functional analysis
The different concepts and ideas were compared to the functional analysis and its ranking. It was considered that a new shape could fulfill more highly rated features that the current product has proven not to fulfill, in contrary to the modular concepts that could not deliver enough functions with high rankings.

5.4.4 Concept choice
After taking all the opinions and conclusions from the evaluation phase into consideration, a final concept where chosen.

The different evaluations showed that a modular concept has too much drawbacks to be worth developing further.

As mentioned before, H&M requires products that express quality and gives the garment a great presentation. Due to the most important stakeholder, the core costumer, the current Roundrail is perceived contrary. This was the main reason for taking the decision to create a new shape of the current round top, to try enable a better presentation of the clothes, give a perceived sense of quality and to create a design that matches desired store expression. This concept would include a new design of the whole product and improved functions.
H&M were positive about changing the round shape but since the Roundrail are one of their key products, which has always been round, there was a risk that they would not replace the current round version. Therefore, the decision was made to also create a round top for the final product.

So, the chosen concept should be based on creating a new shape of the top, where the clothes are hanging, that would influence how the rest of the product would look like. Another product would also be delivered, with a round top, as a result of the risk that H&M in the end would decide to not replace the round variant. To facilitate for the reader, the further focus in this report will be on the product with the square top. How the product looks with the round top instead will be presented only as a finished product in chapter 6.2 The second top.

5.5 Concept development
The continued development of the concept had the focus on selecting the shape of the top, create a framework for the design and select the functions. This resulted in a complete concept proposal that is summarized in a concept description.

5.5.1 Development of the new shape
The new shape was to be developed. An important requirement was to provide the same Hanging Units, HU, as current product. To be able to change the round shape, the HU for straight hanging surface was calculated. These calculations are shown in Appendix 11. As explained in chapter 3. The current product, the current Roundrail has two tops in two different sizes that is adapted to the different garment allocations in the stores. The product was delivered to H&M with both tops, round and square, in two different sizes that correspond to these different amounts of HU. However, the product will in this report be presented with only the smallest size of the tops.

Different shapes were sketched and some of them are shown in Figure 12. These sketches served partly as a tool to find out the size of the product in different shapes when it accommodates the number of required garments. This was a crucial factor since the main function of the product was to provide space for a lot of garments on a small area.

![Figure 12. Sketches of different shapes of the top were made, partly to ascertain how big the top will be to accommodate required amount of garments](image)
One finding was that a hexagon would have to much untapped hanging space and that shape was therefore dropped. After testing various forms, the conclusion was that a square shape would give the most hanging space.

Different square shapes were made and analyzed based on the required size, if the construction is believed to be stable, how the garments will be presented and what shape that was believed to give the most clean and good presentation.

5.5.2 Design expression and Mood board
To create a design that fits into H&M’s product range, their way of working with design expression was studied.

H&M works with design expression by using a tool called House of Fashion, showed in Figure 13. When creating a new design it is dependent on what kind of profile in the House of Fashion it belongs to. This is used to constantly evolve the interior products, creating a more qualitative, clear and consistency H&M store expression.

Figure 13. The interior at H&M is divided into different profiles with various expressions

The product to be developed, the round rail, belongs to the profile The Foundation and is a product that is used in all kind of areas in the store. The products included in this profile exist in large volumes and should be of high quality and have simple design in neutral shades that fits well with all the profiles.

The words that describe what the products in this profile should express are: contemporary, inviting, clear and qualitative. These words were translated with a mood board shown in
Figure 14, where inspiration from modern museums was taken. This mood board worked as an inspiration in the creation of the design.

![Figure 14. A mood board was made to illustrate the words contemporary, inviting, clear and qualitative](image)

### 5.5.3 Synchronize design

To create a unified expression in the store the concept were synchronized with H&M’s other interior. This was important since synchronizing the interior is one of their development focus areas, as explained in chapter 5.1.4 Handover.

Areas like tube profiles, colors, and design were discussed together with the design and engineering team. This was made to agree on decisions that suit not only the products to be developed in this project but also the other interior products that are developed at H&M.

### 5.5.4 Choice of functions

When the background study was performed, it was clear that the height adjustment is a function that is rarely used and that causes problem. It contributes to that the current product is skewed, which is one of the main problems. By removing this function, the product would therefore probably be more stable and durable. An H&M store normally has several Roundrails and the shop visits showed that they are set at different heights. Since H&M aims for a synchronized
store expression, one height that is synchronized with other interior would contribute to a more synchronized and clean impressions. With these arguments, H&M agreed on to remove the height adjustment.

In the selection of which features to focus on in the further development, the functional analysis and the functional requirements in the requirement specification served as an aid, which are shown in Appendix 5 and Appendix 8. Due to the functional analysis, two of the most important features were that the product should be able to move around and the product should be rotatable. Since the functions have been proven to cause problems, the decision was taken to make a new rotational function, replacing the wheels and improve their attachment.

5.5.5 Concept description
As a result of the concept generation, selection and development, a complete proposal of the final concept was obtained. The concept is a development of H&M’s current product, the Roundrail, which have been updated following the wishes and requests from the different stakeholders. This have resulted in new design and improved functions.

The new product will be mentioned as the Rotary Floor Stand. The product has a square shape of the top that is developed to meet H&M's requirements that the product should be clear, inviting and qualitative, which also will satisfy the wishes from the core costumer.

As explained in chapter 5.4.4 Concept choice, this product will be delivered to H&M also with a round top.

5.6 Construction
This chapter describes how the choice of components, functions and construction has been made. All the decisions have been taken after thorough research on each area, dialogue with experts and suppliers and in agreement with H&M. The focus has been on developing production documentation.

5.6.1 Dialogue with suppliers
H&M’s suppliers are located in Asia, Europe and America and they play an important role in the development of the new product. The construction was affected by that the product is to be produced by suppliers in different parts of the world. In order to develop a realizable product, several suppliers were contacted early in development. The main cooperation was together with the suppliers ROL (Pablishnis, Kipras; technician at ROL) and TENTE. (Jansson, Thomas; seller at TENTE AB)
5.6.2 Function improvements and component selection
Since the functions on the current Roundrail caused a lot of problems, a large and important part of the work was the improvement of functions.

Since the choice had been made to remove the height adjustment, the functions that were improved were the rotational function and the movability of the product, where the wheels and their attachment cause problems.

A further investigation within the areas wheels and bearings were made. H&M’s warehouses and sample stores were visited to in detail explore the current Roundrail and its parts, to find the causes of current problems. Other interior products at H&M were analyzed and used for inspiration. Also a study on the Internet was done, within the areas wheels and bearings, which gave useful information for the development.

The ideas and findings that were created and founded during this investigation were discussed with constructors and designers at H&M and also with different suppliers, which led to the final selections.

The choice of wheels and the benefits that made them the final choice are explained in Appendix 12. The wheels used for this product is the model Linea from TENTE, with a diameter of 65mm. The wheel can be made in any color and the color selection will be made based on the product's other parts. The original versions from TENTE are shown in Figure 15. A new attachment of the wheel was also necessary and the solution is explained in the chapter 5.6.5 Manufacturing and attachment.

![Figure 15. The wheels that were chosen for the product](image)

A detailed explanation of the selected rotational function is presented in 5.6.4 Detailed design.
5.6.3 Functional prototype: Testing and evaluation of rotation

In cooperation with the supplier ROL, a functional prototype of the rotational solution was created, which is shown in Figure 16. The prototype was a simplified and smaller version of the product but the bearing was made in the actual size. The purpose of the model was to test how the rotational solution works, both without and with a load, and its durability.

![Prototype Image]

**Figure 16. A functional prototype were made to try the new rotational solution**

The new solution for the rotation worked much better than the present. The top pins easily, both with and without load. To get an idea of how it will be litigated a wear test was conducted, which is shown in Figure 17. The prototype was attached to a rotating plate, which rotated three turns per minute. The upper part was fastened and only the lower part rotated. The prototype was loaded with a weight of approximately 25kg. The test was ongoing for a few days and the result showed no attrition on the bearing or the steel.

![Wear Test Image]

**Figure 17. A test environment were built to test how the bearing will be litigated**
5.6.4 Detailed design
The development of function and the design was accompanied since they were dependent on each other. The product will be exposed to wear since H&M stores have a large turnover of clothes and customers. Since the product should retain good quality for ten years, a durable design was important. Furthermore it should provide a qualitative and clean impression and should be neutral as it is placed in all store areas.

Based on these desires, the product’s design and construction have been developed. The different parts are further called as Figure 18 shows, where the bottom includes the wheels.

Figure 18. Further in the report, the parts will be mentioned as the picture shows
Top
Based on the requests from the core customer that the clothes should be displayed in a better way, the products hanging surface is divided into four sections that creates a space between every section. This space is utilized to display the front of the garments. The whole top is shown separately in Figure 19.

![Figure 19. The clothes are hanging in four sections which creates a space that enables good presentation of the garments](image)

The dimension of the rails for the hangers has been synchronized with the other interior’s rails. They are made of stainless steel to manage the wear from the hangers.

As Figure 20 shows, the top has a stable construction with a middle cross that is hidden by a top tray. The top tray is made of carbon steel that is powder coated in a light grey color, which is a color that is found in H&M’s other interior.

![Figure 20. The square top includes a top frame and a top tray that covers the construction](image)
Plain bearing
The top is rotatable 360° because of the plain bearing that is placed between the top and the bottom tubes, shown in Figure 21. To enable a stable construction and avoid a skewed top, the two steel tubes are overlapping each other. Both steel tubes are hollow and only sealed in their upper part. The bearing consists of two parts: A hollow nylon tube that is closed at one end and a nylon washer. The nylon tube is fitted tight to the upper steel tube and will be sliding against the nylon washer that is placed upon the bottom tube. The bearing prevents the two steel tubes to slide against each other and the rotation will appear mainly between the two nylon parts.

Figure 21. The plain bearing consists of two parts: A hollow nylon tube and a nylon washer

Bottom
The metal rod is a round tube to ease the rotation. Standard tube dimension for the base, and also for the tube part in the top, where chosen from ISO 1127:1992 Stainless steel tubes - Dimensions, tolerances and conventional masses per unit length, The bottom is made of stainless steel to resist the wear from kicks and such.

The product has five legs, to make it stable so it does not wobble. Since the legs are the most visible part when the clothes are hanging on the product, their dimensions and profile were synchronized with other floor stands. They have a thin square shape and are parallel to the ground to create as much space as possible for the garments.

Each wheel is composed of two wheels that will stabilize each other, making the wheel not spin around as easily. Three of the five wheels have a brake, a total lock, to secure that the product stands still. The bottom with a detailed picture of a wheel is shown in Figure 22.
5.6.5 Manufacturing and attachment
Selection of how to manufacture the product has been made in consultation with H&M's constructors and suppliers. In the evaluation has consideration been taken of which manufacturing methods that is most suitable for the desired shape and functions. The following is a description of how the product is manufactured and attached to each other.

**Top**
The top consists of a frame and a top tray. The top frame consists of three different hollow profiles: rectangular profile for the rails, square profile for the cross section and a tube for attaching the top on the base. The steel profiles are cut to required size by using laser cutting, which gives a smooth an even cut. The rectangular steel profiles are joined together by welding.

To make the top tray stable, it is made out of a sheet metal that is bended, as the detailed picture in Figure 23 shows. The top tray is made out of sheet metal. To give more rigidity and to avoid it to flex, strengthening bends is added around perimeter of square tray. Since welding could cause that the thin sheet gets deformed and dented, it is attached with four pins that are placed in the four holes in the frame.
IMPLEMENTATION

Figure 23. The top tray is attached to the top frame by four pins and it is bended to avoid that it will start to flex,

Plain Bearing
A turning machine is used to manufacture the plain bearing from solid block of nylon. No specific surface treatment is used. The larger of the two parts, the tube, is produced by making one hollow nylon tube and one end cap which are glued together.

Bottom
The bottom consists of a metal rod and five legs that are made of hollow rectangular profiles. The legs are cut by laser and welded onto the metal rod.

The wheels are attached with a center bolt. The current product has the problem that the wheels are getting unscrewed, which makes the whole product skewed. The actual wheels are never replaced, therefore the wheels were chosen to be attached by welding to be sure that they do not release. After the wheels have been welded inside the tube, end plates are attached on to the legs, which is illustrated in Figure 24.
5.6.6 Material choice
In order to develop a functional, sustainable, environmentally friendly and aesthetically pleasing product, the choice of materials was of importance. In the evaluation of the materials, consideration has been given to production, form, function and the materials that H&M uses for their existing products.

Before making the final decision for the prototype, experts from KTH and material suppliers were involved. Due to their opinion, the materials chosen are suitable for their areas of application.

Steel
The main material for this product is steel. H&M set the requirement that the steel used for the product, except the top tray, should be stainless steel. A study within various types of stainless steel was done, in order to choose the most suitable material.

There are a number of grades to choose from, but all stainless steels can be divided into five basic categories; austenitic, ferritic, duplex, martensitic and precipitation hardening. Ferritic and martensitic stainless steels were excluded, partly since the weldability is poor. Precipitation hardening is used to increase the strength, which is unnecessary for this product so this type of material was also excluded. (“ASSDA”, 2013)

The choice stood therefore between austenitic and duplex stainless steel. Since austenitic and ferritic grades account for approximately 95% of stainless steel applications, austenitic steel is probably easier to get hold of worldwide.

The steel that was chosen for the product was *AISI Type 304 Stainless Steel*. Type 304 Stainless Steel is the most versatile and widely used of the austenitic stainless steels and it is to be found in all the countries where H&M has their production. In Sweden, this type of stainless steel corresponds to the material *SS 2332*. The steel will have a brushed finish.
Since the top tray is powder coated, which prevents it from corrosion, the material does not need to be stainless. A discussion with the constructors at H&M and with the supplier ROL led to the decision of using the carbon steel DC01 steel, which does not need other surface finish than powder coating.

The internal name at H&M for these materials is SS01 for the brushed stainless steel and ST122 for the powder coated carbon steel, which is the designation used in the detailed drawings in Appendix 13.

**Polymer bearing**

By sifting different bearing materials, the two most suitable were found: nylon and polyethylene. A further investigation was done to make the final decision.

The two materials have similar coefficient of friction. Nylon has a higher stiffness, abrasion resistance and elastic modulus than polyethylene, which make it more resistance to being deformed elastically when a force is applied to it. (Johnson and Ashby, 2010)

Because of this, the polymer used for the bearing is nylon.

**5.6.7 Price**

The price of this product compared to the current one was discussed with one of H&M’s main suppliers, ROL. Due to them, this product will be 15% cheaper than the current Roundrail.
6. Results

This chapter presents the results of the different phases in the development of the H&M's new interior product. It describes the product as a whole, while the construction and design choices are summarized. A description of how the product is to be used is also presented.

As explained in chapter 5.4.4 Concept choice, the focus in this report has been on the product with the square top, which also is the case in this chapter. The second round top, which fits to the same bottom, is briefly presented in chapter 6.2 The second top.

6.1 The Rotary Floor Stand

The result of this master thesis is the Rotary Floor Stand, a new product that will replace H&M’s current Roundrail. The product is to be used in all H&M stores worldwide. The development work focused on creating a durable product that gives a sense of quality, that enable a great presentation of the clothes and that is contemporary, inviting and clear. This has been achieved by improving the functions of the current Roundrail and by creating a new design. The Rotary Floor Stand without garments hung on is shown in Figure 25.

![Figure 25. The Rotary Floor Stand](image_url)
To create a unified expression in the store, the product has been synchronized with H&M’s other interior within areas like dimensions, colors, and design. The different stakeholders have been an important source for the development and their opinion have been decisive in many decisions throughout the entire process. Therefore, the Rotary Floor Stand fulfills the requirements from the wishes, which creates good conditions for a launch of the product.

6.1.1 Design
H&M aims for interior that feels contemporary, inviting and clear and that enable a great presentation of the clothes. According to H&M’s main customer, the current Roundrail gives the corresponding impression. Therefore, the objective of the design work was to develop a product that corresponds to these goals. The design has also been adapted to fit into any store category and that the product is placed in any area in the stores.

The Rotary Floor Stand has been given a square shape that matches the edged design language H&M pursues. This design gives the product a clean and qualitative look while it results in functionality. Since a similar product has not been found on the market, it contributes a novelty value and innovation.

Since the garments are hanging in four sections, the space between them enables a presentation of a whole garment that is visible in all directions, which are illustrated in Figure 26. This gives an inviting look and a clean impression. The legs are thin and parallel to the floor, leaving more space for the clothes and let them get the attention.

Since the product should look good for ten years, the main material stainless steel is a suitable material. The material will look good even if the product is exposed to wear. Brushed stainless steel is also a classic material that will seem contemporary for several years. The top tray covers the construction and gives the product a more clean impression. The grey color of the top tray is widely used for H&M’s interior which will make the product fit in to the range of H&M’s interior.
6.1.2 Use and performance
This product is one of H&M’s key products and is used in all store categories. It is a part of what H&M call The Foundation, which means that the product will exist in large volumes and be used in all areas in the stores.

The Rotary Floor Stand provides 4HU, which is similar with approximately 200 tops. The clothes are mainly meant to be hung on the four sections, like Figure 26 shows, but this shape offers a variation in how the clothes can be hung on and displayed. As shown in Figure 27, the garments can also be hung on side by side on the hanging sections. This enables presentation of an outfit, for example displaying pants and top together. This is also a good way of adapting the product to the different garment allocation in the store. Since fewer clothes can be hung on if they are hung side by side, this is suitable for smaller stores to avoid a perceived empty product where the clothes are hanging too sparsely.

Figure 26. The picture illustrate how the product looks when clothes are hung on
Figure 27. The picture shows the two different ways in which clothes can be hung on

The product stands on wheels, which makes it easy for the staff in the stores to move it when they change the appearance in stores. Three of the five wheels have a total lock that is easy to lock and unlock by just a kick.

The upper part of the product spins so that the costumer can reach all the clothes from one spot. This also increases the possibilities of where in the store the product can be placed.
6.1.3 Exploded perspective
The different parts and how the product is composed is shown in Figure 28, complemented with Table 1.

![Exploded perspective of the Rotary Floor Stand](image)

**Figure 28. An exploded perspective of the Rotary Floor Stand that shows its included parts**

<table>
<thead>
<tr>
<th>Nr</th>
<th>Part</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Top tray</td>
<td>Covers the construction in the top frame</td>
</tr>
<tr>
<td>2</td>
<td>Top frame</td>
<td>The garments are hung on the four sections</td>
</tr>
<tr>
<td>3</td>
<td>Plain Bearing</td>
<td>Own solution and design, tested and evaluated by functional prototype</td>
</tr>
<tr>
<td>4</td>
<td>Bottom</td>
<td>Consisting of a middle rod and five legs</td>
</tr>
<tr>
<td>5</td>
<td>Wheels</td>
<td>Model Linea from TENTE, d65mm</td>
</tr>
</tbody>
</table>
6.1.4 Dimensions

The Rotary Floor Stand offers the same amount hanging units, *HU*, as the current Normal Roundrail, which determined the size of the product. The hanging height, that also is the height of the product, has been synchronized with H&M’s other interior products. The height is also adapted to the longest garment that is hung on the product. The outer dimensions in millimeter for the whole product and the bottom are shown in Figure 29.

![Figure 29. Outer dimensions in millimeter for whole product and bottom](image)

The top will exists in two different sizes, to match the different garment allocations in the stores. The one presented in this report is the smallest one, which provides 4 *HU*. The dimensions for this top and top tray are shown in Figure 30. The other size provides 4,7 *HU*, which also was delivered to H&M.

![Figure 30. Outer dimensions in millimeter for top and top tray](image)

For a total detailed drawing, see Appendix 13.
6.1.5 Material and surface finish
H&M set the requirement that the steel used for the product, except for the top tray, should be stainless steel. A study within various types of stainless steels and bearing materials resulted in the materials presented in Table 2. The table also presents the surface finish and H&M’s internal code that is used in the drawings in Appendix 13.

<table>
<thead>
<tr>
<th>Part</th>
<th>Material</th>
<th>Surface Finish</th>
<th>H&amp;M Internal code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top tray</td>
<td>Carbon steel: DC01 steel</td>
<td>Powder coated</td>
<td>ST122</td>
</tr>
<tr>
<td>Top frame</td>
<td>Stainless Steel: AISI Type 304</td>
<td>Brushed</td>
<td>SS01</td>
</tr>
<tr>
<td>Plain Bearing</td>
<td>Nylon</td>
<td>-</td>
<td>NYLON PL08</td>
</tr>
<tr>
<td>Bottom</td>
<td>Stainless Steel: AISI Type 304</td>
<td>Brushed</td>
<td>SS01</td>
</tr>
</tbody>
</table>

6.1.6 Manufacturing
H&M’s different suppliers in Asia, Europe and America will manufacture the product. The manufacturing methods for the different parts are specified in Table 3.

<table>
<thead>
<tr>
<th>Part</th>
<th>Manufacturing process</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top tray</td>
<td>Laser cutting, bending</td>
</tr>
<tr>
<td>Top frame</td>
<td>Laser cutting, bending, welding</td>
</tr>
<tr>
<td>Plain Bearing</td>
<td>Turning, gluing</td>
</tr>
<tr>
<td>Bottom</td>
<td>Laser cutting, welding</td>
</tr>
</tbody>
</table>

6.1.7 Summary of improvements
Since the task in this project was to develop H&M’s current Roundrail, a major focus has been to solve the problems with the current product to achieve good quality and design. A summary of the most important improvements that have been done, in both design and function, to solve discovered problems and to meet H&M’s goals are presented in Table 4. Note that all these solutions not have been tested or evaluated with a finished product but are considered to solve the problem based on analyzing images and CAD-models, opinions by experts and by testing the functions separately.
### Table 4. A summary of the most important improvements and why they have been made

<table>
<thead>
<tr>
<th>The Rotary Floor Stand</th>
<th>Solves or improves problems detected with the current Roundrail</th>
<th>Meets H&amp;M’s goals</th>
</tr>
</thead>
</table>
| The product has a square shape making the garments hanging in four section | • The Roundrail gives a messy look  
• Experience chaos  
• It is exhausting to look for clothes on the round rail | • Synchronize the product with H&M’s edged design language  
• Present the clothes in a clear way |
| Garments are fronted in each direction | • The garments are not presented in a good way  
• It is hard to see the garments | • Enable good presentation of the garments  
• The interior products should be inviting |
| Improved functions:  
• A new rotational function  
• New wheels and improved attachment | • The problems with the product is, or is affected of, its functions  
• The Roundrail is hard to spin  
• The product is skewed  
• The whole product moves when the customers spin the ring  
• Wheels are unscrewed  
• The product express low quality | • Have interior products with high quality  
• The products should be perceived as high quality  
• Making durable products |
| Height adjustment has been removed and one height that is synchronized with the other interior has been chosen | • The garments are hanging to low  
• Height adjustment cause problems and is rarely used  
• The Roundtrails are set on different heights in the store | • Have interior products with high quality  
• Synchronize the interior  
• Making durable products |

### 6.2 The second top

Since the current Roundrail that has been developed in this project is one of H&M’s key products, the risk was that they would not replace the current round shape. The result of this risk was a second top for the Rotary Floor Stand. The product, with same bottom, wheels and rotational function, with this second round top is illustrated in Figure 31. This solution has also been delivered to H&M and the decision of which of the two tops to use for the product is left with them.
6.3 Prototype
This degree project has resulted in complete material for a prototype order of the Rotary Floor Stand with two different suggestions of top shapes. H&M has the definitive decision in which of the two tops they will proceed with. A prototype of this product will be produced to be able to evaluate it in their sample store. After this evaluation, the product will possibly be further improved to achieve the final goal; launching the product for H&M’s stores in 2017.
7. Discussion

This chapter consists of personal reflections about the process and the findings with focus on the method, the product and recommendations on how to proceed with the work. H&M’s decision of what product to proceed with is also discussed.

7.1 Method

The thesis has largely followed H&M’s own product development process. Since this project was time limited, the whole process that results in a finished product was not performed. The method has also been adapted to the context of a satisfactory graduation project. This has resulted in a work process that has progressed from the initial problem description through a defined concept proposal to design and production documentation.

The thorough data collection has been very useful to develop a product that fulfills its purpose. It has also served as a basis to justify my decisions for H&M. Interviews with various departments at H&M head office created an understanding of the desired outcome. The benchmarking together with designers and constructors from the company also gave good insight into what expression they wanted to achieve.

The data collection was summarized in a functional analysis that has been a very useful tool, used through the whole development work. It has worked as a basis for the concept evaluation and guidance on what functions to focus on and improve. This is a tool that was found during the theoretical research, which I will continue to work with in future product development projects.

In the theory part of this report, James and Suzanne Robertson were recited:

“To build the right product, you have to understand the extent of the work; the people who do it, influence it, or know about it; and the outcome that those people are trying to achieve.”

This has influenced the whole process in this project where the work has been done in close collaboration with all the stakeholders. During the way I realized that H&M takes a lot of decisions based on the opinions from different departments at H&M head office. This was when I decided to make a product that mainly pleases the customer and the shop assistants, which are the most important stakeholders. This also refers to the questions that was raised at the visited handover:

“What do H&M express, and what do we want to express?”

The investigation of these stakeholders’ experience and opinion about H&M’s current Roundrail showed that the product gives the opposite expression to what H&M wish for. These results
shocked the people involved at H&M head office, which shows that they have not done this kind of investigation with this product before. Therefore, this documentation will be useful in the future development of the product and hopefully inspire and influence their way of working.

The stakeholders were also involved in the concept generation process, which was very useful for the continued development since information of what they desire from a similar product was collected. It also gave inspiration to new ideas and solutions.

The project's timeframe have been followed relatively well. However, the work has been affected by that this project has been a part of another bigger project at H&M. The scheduling has therefore continuously been adapted to the upcoming changes and deadlines in the other project.

The theory study within methods and tools were shown to be very useful and worked as a basis for the development work. A theory study within store expression and shop fitting were also initiated but were showed to be unusable because of H&M’s clear framework for design and construction.

The chosen method has been suitable for a conducted project at H&M. All decisions in H&M’s development process are made very quickly and usually through discussions between involved departments. One example of how the method has been influenced by this is the evaluation of the concepts, which could have been done by using well-known evaluation methods. The concepts were instead mainly evaluated by discussions with people with great influence and experience, were the results from the thorough background study served as a basis.

The collaboration with H&M has been very successful. The company and its personnel have shown great trust, interest and involvement in the project. The possibility of daily work close to the company's development team has been an invaluable experience. Supervision and feedback has been continually. This has resulted in a requested and comprehensive product material.

### 7.2 The product

The overall objective of the development of the circular ring was in chapter 1.3 Goal and purpose summarized in three points:

- Secure the quality
- Improve the features
- Create a design that matches desired store expression

The Rotary Floor Stand fulfills the requirements of a more qualitative and functional working product with a synchronized design that matches H&M’s desired store impression.
DISCUSSION

Since many different people and departments at H&M have been involved, many different opinions existed in every decision. These opinions has of course been taken into consideration but the focus has always been on making a product that meets H&M's development goals and the wishes from the customer and the shop assistants. This has created a product that pleases the costumer and the shop assistants in H&M stores.

The product fulfills all the requirements in the requirement specification except that it should be accommodated in a maximum area of \(1m^2\). A desired goal was to come up with a better storage solution but it was eliminated during the process because of the time constraints. Another limitation that was done during the development work was to create a price sign, since H&M was developing a new solution for all floor stands that will be implemented to this product when it is done.

The Rotary Floor Stand is an innovation and novelty on the market in the sense that a similar product has not been found. It has been developed with the core costumer in focus, while it has been designed for production with a probably lower price than the current round ring. This gives H&M a product that is appreciated by customers and has good potential to provide good sales.

7.3 Further development

The result of this thesis is a foundation for prototyping and production. However, certain elements of the dossier must be complete and some areas must be explored or developed.

The first step in the continued development process should be to evaluate the prototype by examining how the clothes look on it in reality and how it fits into the store environment. How the product works when it is maximally loaded should also be examined.

In the evaluation of the square top, it will be necessary to investigate if the hangers will slide over the corners of the rails. If that is the case, it will be necessary to add a stop knob to prevent this. It is also important to investigate if the top tray is straight and stable and if its attachment is suitable.

To fulfill its purpose, it should also be evaluated together with the customer and the store personnel. It would be interesting to compare the square shape with the current round shape in reality, to see which one that sells the most clothes and also include which one that gives the greatest added value to the store expression.

Before the final product is ready, a total cost indication needs to be done. A decision of how it should be packed and shipped is also necessary.

In a further development of the product, it would be interesting to look for a better solution of how to store the product to minimize the storage space.
7.4 Knowledge exchange

By conducting this master thesis at H&M, I have received new knowledge within product development that will be useful in my future projects. It was instructive to follow the product, from idea to prototype, in such a large and successful company. This thesis was a good summary of my education, where I got to apply my knowledge in both design and engineering.

This cooperation has resulted in an exchange of knowledge. I have not only learned a lot from H&M, by adopting the task with an open mind I have been able to supply new knowledge and new ideas to them.

The many ideas that were created during the work process indicated new opportunities and new way of thinking. Since I had no obligation to the company, I dared to change their key product and created a new shape, which has never been done before. The fact that H&M gave me a great responsibility and trust also gave me the confidence to dare creating something new. The feedback from H&M has been good all through the process and my new thinking has been appreciated.

I conducted a thorough background study, which resulted in new knowledge for H&M. They have developed products that suit the needs and look in the stores. How the customer would perceive the product had not been considered. This was an important part of my background study, which resulted in new knowledge for H&M.

My main suggestion for H&M is to involve the costumer and the shop assistants in the product development process, to create products that fulfill its purpose. This will also give them a new perspective on the products and provide a more open-minded approach with the results of creative ideas and solutions.

7.5 The result

The result of this project led to that H&M ordered a prototype of the product with the round top, shown in Figure 31. The people within the different departments that I worked closed with were more positive about trying out the square top but the final decision maker chose the round version. This was not entirely unexpected as the Roundrail sells clothes in such extent. This is probably the reason why H&M did not dare to take the step toward changing the product too much.

Even though the design and functions has been updated on the new product, some of the proven disadvantages with hanging clothes on a round product will not disappear. As explained in the 5.1.4 Handover H&M pointed out the importance of having products that gives a qualitative impression and that enable a good presentation of the clothes. By choosing this safe way and holding on to current round version, they have disregarded the customer experience that showed the other way around.
After the prototype had been ordered I held my final presentation at H&M. After this presentation, they were convinced about that the square version also should be tested and ordered as a prototype. Regardless the final choice of shape of the top, the result, that my developed product became a prototype and most likely ending up as a product in H&M stores worldwide, is seen as a success.
8. Sources

**Literary sources**


**Articles**

Luleå Tekniska Universitet. *LTU utbildar Volvos produktutvecklare* [Press release] 2010-12-06
Internet sources
(Retrieved 2015-04-02)

Software
Luxion. 2015. Software called *KeyShot 5.0 Pro Floating*. Version 5.0
Siemens. 2015. Software called *NX CAD*. Version 9.0

Personal communications
Pabilionis, Kipras; technician at ROL, Lithuania, 2015, continuous contact by e-mail
Jansson, Thomas; seller at TENTE AB, Stockholm, 2015, continuous contact by e-mail and meeting
9. List of appendices

A1  Product development process
A2  Store practice
A3  Store visits
A4  Problem analysis
A5  Functional analysis
A6  Dialogue with shop assistants
A7  Calculations and Measurements
A8  Requirement specification
A9  Workshop with H&M
A10 Workshop with core costumer
A11 Hanging length for straight surfaces
A12 Choice of wheels
A13 Detailed drawings
A1  Product development process

This appendix shows the product development process used at Store Development. Due to the time constraints, the project proceeded until the green line and then H&M will continue with the work.
This appendix gives a more detailed description of the conducted store practice.

To get an insight into how the work is done in an H&M shop a store practice were made at H&M in Skärholmen, the 3rd to the 6th of February 2015. During these days, the tasks as the shop assistants do on a daily basis were performed. Since the shop assistants are important stakeholders for the product to be developed, feedback on the Roundrail was collected during these days.

There were always costumers in the shop and the work was performed in a fast pace, which provided no time to accomplish things in addition to work tasks. This may be the reason for the feedback that the Roundrail rarely is height adjusted and they questioned whether height adjustment is necessary.

One observation that was made was that the store's warehouse is cramped and full of shop fittings and garments. The employees pointed out the problem that the shop fittings provide a lot of space when they are not used in the store and stored in the warehouse.

Feedback and observation stated that customers put clothes on the top tray, which they did not bother to hang back. This creates a messy impression and the application area for this top tray was questioned by the shop assistance.

Other important feedback that was collected was that the wheels often break, the product becomes warped and that the whole product moves when the customer tries to spin the ring with the garments.

Although, they pointed out the importance of this product. It sells large quantities of garments and if the store has an ambition to sell certain garments they use the Round Rail.
This appendix gives a more detailed description of the most common problems that were found during the store visits.

To get an insight into how the product works in the store, many different H&M stores in Stockholm were visited during March 2015. During these visits, problems with the current product were discovered.

The round rail is often skewed, which gives an impression of poor quality. The reason for this was found to be different causes, connected to the wheels, the rotational function and the height adjustment.

The first cause is that the wheels become unscrewed which makes the whole product skewed. The second cause is the big gap between the pipes in the height adjustment. The height adjustment also causes the problem that the garments often get stuck in the locking as they spin around. The pin that is used to lock the height often disappears and even here the employees uses tape to avoid these problems. The rotational function is too unstable for the heavy load, which also contributes to that the product is skewed. The rotational function was also proved to work poorly and in some cases not at all. Some examples of these problems are illustrated in Figure 32.

Figure 32. Some of the problems that were found during the store visits
A4 Problem analysis

This appendix presents the problem analysis, which is a summary of the most mentioned problems during the qualitative interviews with departments at H&M head.

<table>
<thead>
<tr>
<th>Topic</th>
<th>Problem</th>
</tr>
</thead>
</table>
| Wheels        | Breaks  
Releases from product  
Becomes skewed  
Dirt gets stuck in some wheels which makes them hard to roll  
Current breaks does not work good enough |
| Top           | Gets skewed when loaded with garments  
Is the reason that the product takes a lot of space when stored  
Current ring do not rotate good enough, causing that the entire product spins  
Loaded with too many garments |
| Top Tray      | Customers put garments on the top tray, gives a messy look  
Is already skewed when delivered |
| Height adjustment | It requires 2-3 persons to adjust the height  
Hard to adjust so it is rarely done  
The Round Rails in the stores has different heights, which looks bad  
Clothes gets stuck in the bolt  
The bolt disappears |
| Expression    | Looks messy  
Hangers gets stuck and clothes end up on the ground which looks bad |
A5  Functional analysis

The current Roundrail’s functions were classified and ranked, in order to see what functions to focus on. This functional analysis is presented in this appendix and served as a basis for many decisions in the development work.

<table>
<thead>
<tr>
<th>Function</th>
<th>Classification*</th>
<th>Ranking*</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functionality</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Provide space for a lot of garments on a small area</td>
<td>MF</td>
<td>10</td>
</tr>
<tr>
<td>Be able to move around</td>
<td>NF</td>
<td>8</td>
</tr>
<tr>
<td>The ring should be able to rotate</td>
<td>NF</td>
<td>8</td>
</tr>
<tr>
<td>Display price</td>
<td>NF</td>
<td>10</td>
</tr>
<tr>
<td>Hangers can be moved around on the entire ring</td>
<td>NF</td>
<td>4</td>
</tr>
<tr>
<td>Product should be able to stand still</td>
<td>NF</td>
<td>9</td>
</tr>
<tr>
<td>Product should be dismountable</td>
<td>DF</td>
<td>3</td>
</tr>
<tr>
<td>Offer height adjustment</td>
<td>DF</td>
<td>4</td>
</tr>
<tr>
<td><strong>Construction</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wheels should withstand wear</td>
<td>NF</td>
<td>10</td>
</tr>
<tr>
<td>Withstand weight of maximum number of garments</td>
<td>NF</td>
<td>10</td>
</tr>
<tr>
<td>Adapted to all H&amp;M’s hangers</td>
<td>NF</td>
<td>10</td>
</tr>
<tr>
<td>Suitable height</td>
<td>NF</td>
<td>8</td>
</tr>
<tr>
<td>The product should not be much bigger than today</td>
<td>DF</td>
<td>6</td>
</tr>
<tr>
<td>Last for 10 years</td>
<td>DF</td>
<td>8</td>
</tr>
<tr>
<td>Production cost should be around 170 euro</td>
<td>DF</td>
<td>5</td>
</tr>
<tr>
<td>Materials should withstand the wear</td>
<td>DF</td>
<td>7</td>
</tr>
<tr>
<td>Easy for the supplier to manufacture</td>
<td>DF</td>
<td>5</td>
</tr>
<tr>
<td>Shipped assembled</td>
<td>DF</td>
<td>4</td>
</tr>
<tr>
<td><strong>Design</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Express quality</td>
<td>NF</td>
<td>9</td>
</tr>
<tr>
<td>Fit into H&amp;M’s product range</td>
<td>NF</td>
<td>9</td>
</tr>
<tr>
<td>Suit all types of stores</td>
<td>NF</td>
<td>8</td>
</tr>
<tr>
<td>Should not take attention away from the garments</td>
<td>DF</td>
<td>9</td>
</tr>
<tr>
<td>Contain roof</td>
<td>DF</td>
<td>4</td>
</tr>
<tr>
<td>Present the garments in a clear and nice way</td>
<td>DF</td>
<td>9</td>
</tr>
</tbody>
</table>

* Classification
MF = Main Function
NF = Necessary Function
DF = Desired Function

* Ranking
10 = Most important function
1 = Least important function
A6   Dialogue with shop assistants

This is a summary of the most important questions and answers from four visual merchandisers. The responses are presented below the respective question. The visual merchandisers will be anonymous and be presented from what H&M store they are working in:

Person number 1:  Drottninggatan 56
Person number 2: Drottninggatan 53
Person number 3: Sergelgatan 22
Person number 4: Hamngatan 22

<table>
<thead>
<tr>
<th>How often is the product moved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: We move the product every time we are rearranging the</td>
</tr>
<tr>
<td>interior in the shop, which is a couple of times per</td>
</tr>
<tr>
<td>season.</td>
</tr>
<tr>
<td>2: Not so often, mostly we just change the clothes on it.</td>
</tr>
<tr>
<td>It is only moved when we are rearranging the store.</td>
</tr>
<tr>
<td>3: We often change the appearance of the store which</td>
</tr>
<tr>
<td>includes moving the round rail.</td>
</tr>
<tr>
<td>4: We move the product every week.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Which parts usually break?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: I don’t know, I don’t think it usually breaks.</td>
</tr>
<tr>
<td>2: The height adjustment breaks causing that the ring is</td>
</tr>
<tr>
<td>very slow and skewed.</td>
</tr>
<tr>
<td>3: The wheel lock breaks after a couple of years causing</td>
</tr>
<tr>
<td>that the whole product moves when the customers tries</td>
</tr>
<tr>
<td>to spin the ring.</td>
</tr>
<tr>
<td>4: The wheels break or detaches. The height adjustment</td>
</tr>
<tr>
<td>breaks as well.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>How often do you adjust the height of the product?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: Hardly never, we usually use the same height for all</td>
</tr>
<tr>
<td>clothes.</td>
</tr>
<tr>
<td>2: Almost never, we use the same height for all the</td>
</tr>
<tr>
<td>garments.</td>
</tr>
<tr>
<td>3: I think it would be enough with just one height since</td>
</tr>
<tr>
<td>we rarely adjust the height.</td>
</tr>
<tr>
<td>4: Since we almost never adjust the height it would be</td>
</tr>
<tr>
<td>enough with just one position.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>What function do you think is more or less important?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1: The height adjustment might be unnecessary but it is</td>
</tr>
<tr>
<td>important that the product can rotate and be movable.</td>
</tr>
<tr>
<td>2: It is important that the round rail can spin and be</td>
</tr>
<tr>
<td>moved around the store. If it is necessary with height</td>
</tr>
<tr>
<td>adjustment it must be easier to adjust.</td>
</tr>
<tr>
<td>3: The height adjustment is unnecessary but the other</td>
</tr>
<tr>
<td>two functions, rotation and movable, are important.</td>
</tr>
<tr>
<td>4: The rotation and the movement of the product are two</td>
</tr>
<tr>
<td>important functions, but not the height adjustment.</td>
</tr>
</tbody>
</table>
A7 Calculations and Measurements

To provide measurable requirements for the requirement specification measurements and calculations were made, which is presented in this appendix.

**Height**

To be able to set criteria for the height of the product, the height of the longest garment that is hanged on the product is defined. Due to H&M’s Measurement Guideline 2015, the men’s jeans are the longest item and are based on size 36. Due to the Measurement Guidelines the height with hanger for this product is $1330\text{mm}$. The developed product should therefore have this height or be adjustable to this height.

**Number of garments**

The current Roundrail were used to find out what the new product should perform. The Normal Round Rail with the diameter of 850 mm were loaded full with pants, see Figure 33. With a reasonable overload could 72 pants be hung on the circular ring, which means that the product manage to carry 72 nip hangers.

![Figure 33. The maximum number of pants on the current Roundrail](image)

To also obtain the information about how many regular hangers that can be hung on the product, a Normal Round Rail where filled with thin T-Shirts. The product was estimated to be fully loaded at 200 T-shirts, which is shown in Figure 34.
Figure 34. The maximum number of tops on the current Roundrail

Load
A test of what the Roundrail may be loaded with was carried out in H&M's Men Flagship store on Smålandsgatan 16 in Stockholm the third of March 2015. Jeans in size 36/34 with rough quality were used, since they are used as reference in height control. This was also assumed to be the heaviest product that is hung on the product. Ten pair of jeans was weighed, including hanger, yielding the mean value of 700g. How it was conducted is shown in Figure 35.

Figure 35. Ten pair of jeans was weighed, to be able to calculate the load the product needs to manage.

The maximum weight was calculated through the information about the maximum number of garments and weight of product. To manage this load, it was decided to design a product for 60kg.
The requirement specification shows measurable requirements that the product shall or should deliver.

**Functional Requirements**

**The product shall**
- Provide space for 72 nip-hangers
- Provide space for 200 regular hangers
- Provide at least 4HU*
- Be movable for the personnel
- Allow the customer to access all of the garments
- Display at least one price sign
- Be able to stand still at the same place in the store

**The product should**
- Be accommodated in the maximum area of $1m^2$
- Enable the customer to access all of the garments from one point

**Construction Requirements**
- The material shall withstand friction from the hangers
- The material shall be rustproof
- The product shall be able to be manufactured in Europe, Asia and North America
- The product shall withstand the weight of 60kg
- The height 1330mm shall be available
- The product should be adapted to all H&M's clothes hangers
- The product should retain good quality for ten years
- The wheels should be designed in such a way that it prevents dirt to get stuck in them

**Design Requirements**
- The product should express quality
- The design should fit into H&M's product range
- The design should suit all types of H&M stores
- The product should not take attention away from the garments

*H&M defines the number of garments that shall be hung on interior products as Hanging-Units, HU*
This appendix shows the agenda for the workshop that was conducted with Interior Store Engineers at H&M.

**WORKSHOP**

**INTRODUCTION**
- Purpose of the group
- The problem
- What is expected of participants
- What will happen to the result

**PROBLEM AREAS**

“We fail more often because we solve the wrong problems than because we get the wrong solution to the right problem”
- Russel L. Ackoff, Redesigning the future, 1974

**Find out the needs**
Individual perspectives of the needs that the product has.

- Write/sketch/describe what needs the product has
- All needs are solution independent – no solutions should be displayed
- Describe what you have found to the group
- Jana presents the needs she has found

*Aid: The work template “Find out the needs”*

**Find out the problems**
Individual perspectives of the problems with the product and the reason that they exist.

- Write/describe what problem (and problem area) the current product has
- What is the cause of the problem?
- Describe what problems you have found to the group
- Jana presents the problems she has found

*Aid: The work template “Find out the problems”*
BRAINSTORMING

“The best way to get a good idea is to get a lot of ideas!”
- Linus Pauling, Nobel Prize winner

Brainstorming in pairs

- Make use of all information that has been found so far, problems and needs, and find solutions or new ideas
- Write down and post phrase/word/sketch.
- Aim for as many ideas as possible, if you think it – post it!
- All criticism and “but...” are forbidden

Aid: Post-its, pencils

Create concepts

- Create 1-4 concepts
- It is okay to build on the ideas of others
- Write, sketch – be visual when describing the solutions

Aid: Post-its, colored pencils, A4 paper

Presentation
Present the whole brainstorming and the final concept for the group. Explain from what insights your ideas came from.

Reflection/Discussion
Your opinions about the workshop.

Thank you for participating!
This appendix shows the agenda for the workshop that was conducted with H&M’s core costumer, which are women between 20 and 40 years old.

WORKSHOP – THE CORE COSTUMER

H&M caters to a large target group; children, youths, men and women. The quote below illustrates how the company describes its customers. Due to this large target group, H&M has a core customer that is a woman between 20 and 40 years.

“We see no line between H&M and our customers. They are just like us. Or you. They love fashion or just to dress the way they want. All ages young at heart.”
- H&M

INTRODUCTION

• Purpose of the group
• The problem
• What is expected of the participants
• What will happen to the result

DISCUSSION

Shopping experience and expression

First, the participants think for themselves and fill out the questionnaire with the following questions. After that the questions are discussed in the group.

• What kind of expression does an H&M shop give you?
• What elements make you experience good quality in a store?
• What is good shopping experience to you?
• Do you have ideas of how the shopping experience could be improved at H&M?
• Which stores give you a good shopping experience (not necessarily clothing stores)? Why?

Aid: The questionnaire “Shopping experience”
The current Roundrail
The group will discuss the following questions about the round rail. Jana will then explain what H&M wants the product to express.

- What kind of clothes do you expect to find on the round rail?
- Does it present the clothes in a great way? Why/Why not?
- How could the presentation of the clothes be improved?
- What expression does the product give you?
- Does the round rail give you a sense of quality? Why/Why not?

Aid: The questionnaire "The Round Rail", Picture of a round rail from a store

BRAINSTORMING
"The best way to get a good idea is to get a lot of ideas!"
- Linus Pauling, Nobel Prize winner

Brainstorming in pairs
The participants are divided into two groups. The groups will create ideas according to the product’s needs, presented by Jana.

- Write down and post phrase/word/sketch
- Aim for as many ideas as possible, **if you think it – post it!**
- All criticism and “but…” are forbidden

Aid: Post-its, pencils

Create concepts
- Create 1-4 concepts
- Write, sketch – be visual when describing the solutions
- Make use of the information that has been found so far, the ideas and your answers in the questionnaire

Aid: Post-its, colored pencils, A4 paper

Presentation
Present the whole brainstorming and the final concept for the group. Explain from what insights your ideas came from.

Reflection/Discussion (10min)
Your opinions about the workshop.

Thank you for participating!
A11 Hanging length for straight surfaces

This appendix shows the calculations for hanging length for straight hanging surfaces.

To be able to determine what size the new product has to have to receive according to correspond with the same Hanging units, HU, as the current Roundrails, hanging length for straight surfaces was calculated. This was conducted by using Equation 1

\[
\text{Hanging length} = \text{Number of } HU \cdot \text{Length of } HU
\]  

(1)

where the length of HU for straight floor stand is 625mm.

The current Roundrail has two tops with different sizes that are adapted to the different garment allocations in the stores. The HU for the two different Roundrails are 4HU for the Normal Roundrail and 4,7HU for the High Selling Roundrail. The calculation of straight hanging surface that corresponds to these two different sizes is shown in Equation 2 and Equation 3.

\[
4 \cdot 625 = 2500 \quad (2)
\]
\[
4,7 \cdot 625 = 2937,5 \quad (3)
\]

Thus, to create a new shape with straight hanging surface instead of the current round surface, two tops with the total hanging length of 2500mm and 2940mm needs to be created.
The choice of wheels is justified in this appendix.

After conversation with different suppliers, the wheel supplier TENTE was chosen. This supplier has the possibility to deliver wheels to all H&M’s manufacturers and delivers wheels with a great quality and variety in design.

A discussion with the supplier was held to together find the wheels that solve the current problems, manage the requirements and had a suitable design. The 3rd of May 2015, a meeting was arranged together with the supplier at H&M’s head office. Selected wheels were showed and discussed, some of them are shown in Figure 36. The final choice was made based on price, design, sufficient durability and performance.

![Wheels that were discussed with the wheel supplier TENTE](image)

The model Linea from TENTE was chosen, with a diameter of 65mm. These wheels have a design that gives a more luxury feeling and are more suitable for interior than the current used industrial wheels. Each wheel is composed of two wheels that will stabilize each other, making the wheel not spin around as easily when the costumer spins the top. These wheels will facilitate the problem with wheels that are spun out. This will also prevent that the whole product moves when the costumers spin the upper part of the product, as it does today.

The wheel has a brake that is very efficient, a total lock, which also will provide the wheels from spinning and moving. In contradistinction to the current Roundrail’s wheel, this wheel has precision ball bearing, allowing the product to roll easier. This allowed that a smaller wheel could be selected, which was the wish from H&M.
The benefits with having a plastic wheel is that it delivers good quality for a low price, since plastic is cheaper than for example steel. Choosing a plastic wheel also gave the opportunity to choose color of the wheel, to match other parts of the product.
This appendix shows detailed drawings of the Rotary Floor Stand.