

CHALMERS

University of Technology Gothenburg



Enabling storing, displaying and dispensing of hygiene products for public rest-rooms

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Master's Thesis in Industrial Design Engineering
Department of Engineering and Industrial Design
Product and Production Development

**Enabling, storing, displaying and
dispensing of hygiene products for public
rest-rooms**

**Möjliggöra förvaring visning och utmatning
av hygienprodukter för offentliga toaletter**

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Chalmers University of Technology
Engineering and Industrial Design
Product and Production Development
Gothenburg, Sweden 2004
ISSN 1651-1875
Master's Thesis 2004:0085**

Preface

This Master's Thesis is the final course of the program Teknisk Design at Chalmers University of Technology, which leads to a Master in Industrial Design Engineering with Industrial Design as the area of specialization. The project is conducted at SCA Hygiene Products' Away From Home (AFH) division.

The years at Industrial Design Engineering (Teknisk Design) at Chalmers University of Technology leading to this Master of Science have been exciting and rewarding. I would like to thank Per Olof Wikström for his dedication and enthusiasm throughout this time. I would also like to extend my thanks to everyone that has contributed with their knowledge and support to this Master's Thesis project, among those Björn Larsson at SCA and Anders Warell, Erik Olsson and Li Wikstöm at the department of Engineering and Industrial Design, Product and Production Development.

Abstract

In this Master's Thesis project I have on the behalf of SCA Hygiene Products been working on dispensers for public rest-rooms. Letting the products express the Tork brand personality was an important issue in the development of the form. An iterative process of analyzing, sketching and building models resulted in two concepts, Cover and Lid. Due to, amongst others, reasons of manufacturing the Lid concept was chosen. As the change of material is rather large it might motivate a similar great change in visual form, there is however to be an evident relationship to the existing Tork 2000 series. The concept includes and reinforces form elements from this product range in an attempt to create a distinguishing mark i.e. a form attribute that makes the user immediately recognize the dispenser as a Tork product. However, trying to replicate in detail the esthetical language would prove a mistake, a new material brings new expectations and associations, positive and negative and this has to be taken into account. The Lid concept is following the guidelines of the Scandinavian tradition. It offers a large value of modification, with its sharper radii and double direction it takes a leap away from its predecessor and without doubt adding force to the expression attentive and producing a solid, mutual form language for this product series.

This Master's Thesis is part of the program Industrial Design Engineering (Teknisk Design) at Chalmers University of Technology. The project was conducted at SCA Hygiene Products and the objective was to develop a design concept for a dispenser range suitable for the *Tork* image segment.

The virtues of the *Tork* brand personality were uncovered in the *brand analysis*. To learn about the market, *Tork's* main *competitors* were looked into. Another measure was learning the different *categories* and *customer segments* of SCA. While working with the *image board* certain style trends were analyzed, looking at the automobile industry was therefore natural.

Before the idea generation process a few methods were used to find a starting point. The *semantic analysis* was performed in hope of getting a better understanding of how the typical user interprets dispensers found in public rest-rooms.

The *format analysis* is a means to detect visual patterns by describing the form e.g. the form attributes such as content, structure, dimension and material. The *formal aesthetic analysis* is dividing the form into different levels and identifying the active form elements for each such level.

The *technical code* deals with the effect that factors such as material, manufacturing and surface texture have on human's experience of the product. At the introduction of a new product it is reasonable and even important that the visual shape enlighten the customer of changes to earlier versions, this refers to the *value of modification*.

Following this a tool was created in order to help evaluate and decide on ideas, sketches and concepts.

The idea process began by generating quick sketches; those were supported by sketch models, from this material two concepts were to be developed. One concept was named *Cover* as the front part is sweeping around the back part. The other concept was called *Lid* because of how the front part connects to the sides of the back part. Full-scale models were built to support the renderings and a form evaluation was also conducted. With this, an *evaluation tool* and the formal aesthetic and semantic analyses were used to choose concept. Continuing with the *Cover* concept would mean such changes to the originally intended form that it was decided not to proceed with it and instead attempt to realize the *Lid* concept.

The back parts of the prototypes was made at the workshop at Chalmers whereas the front parts, which had to be rolled were made by a mechanical workshop. The prototypes make it possible to evaluate the goals of the project and enable communicating the form idea to all concerned parties.

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1 Introduction

Background

SCA Hygiene Products is a global company involved in the development, manufacture and marketing of hygiene products. The products are found in most homes - toilet paper and kitchen towels, napkins and handkerchiefs, baby diapers, pantyliners as well as incontinence care products. The customers of SCA Hygiene Products include larger international retailers as well as institutions, industries, hotels, restaurants and catering operations. SCA Hygiene Products, headquartered in Munich/Germany, is the largest business area within the Swedish SCA Group. The 18,800 employees in 42 countries contributed to a turnover of 4.9 billion euros in the year 2002. The AFH (Away From Home) division sells mainly tissue products to industrial, administration and service sectors, hotels and catering operations, healthcare institutions and other public establishments.

Objective

SCA Hygiene Products governs a number of brands recognized world wide, Tork being one of them. The aim is to develop a design concept suitable for the Tork image segment. The design concept is to consist of a dispenser series of four products made out of a metallic material and meant for public rest-rooms. Further more, the dispenser group should manage storing and dispensing paper towels, toilet paper and soap, whereas one is to hold waste. Introducing a waste basket into a dispenser range is new for SCA and this explains why waste baskets will not appear in the analyses of existing SCA dispensers.

Problem

The Away From Home department offers their customers a wide range of products varying in purpose and quality. AFH does however not at this point have dispenser programs to match this versatility. There has for some time been a demand on the market for a higher-end dispenser, often so in stainless steel. In efforts taken to answer to this demand awareness of cost is important.

Delimitations

The design concept is to be presented by the aid of four models representing each and every one of the products in the dispenser series mentioned in Objectives. For each dispenser there is a designated hygiene product which it is to accommodate e.g. the Xpress paper towel. The concept will however not include detailed solid modelling drawings.

2 Brand Analysis

Analyzing the brand Tork

One of the immediate goals in this task was to let the products express what the Tork brand personality represents. This of course is done by carefully developing the form but before such work could begin getting to know the Tork brand was imperative. The facts and information presented in this chapter have been gathered from SCA Hygiene Products material.

Mission

To offer products, services and application areas delivered as whole solutions making it possible for customers to create a better user environment. For AFH the key words are hygiene, comfort and ease.

Tork Brand Personality

Tork is European with Scandinavian roots.

The culture and the fundamental values include informality, power of initiative, responsibility and kindness. In terms of aesthetics, form and function harmonize elegantly with clean lines, soothing colors and a high level of usability.

Placing the Tork brand values on the IMP map^{picture[7]} (based on the IMPSYS system developed by Infratest Burke) reveals that the Tork personality is to a great extent open, warm, generous and caring.

Positioning and differentiating

By simplifying the IMP (International Marketing and Purchasing) map to a triangle^{picture[6]} the Tork brand positioning can be defined as close to customer. The assumed positioning of the competition^{picture[7]} shows how Tork is differentiated.

Essence of meaning

Tork personnel realize the Tork identity by

- Being Pro-active
- Paying attention to their customers
- Listening to their customers' needs
- Responding to their customers' needs
- Acting courteously towards their customers

This can be summarized by one word, the *essence* of Tork;

Attentive



The images reflect the Tork brand personality. Pleasure, expectation e.t.c.

I need to translate these human properties into product related properties in order to achieve a formulation, which I can work from. Doing this translation gives the following;

- Exceed expectations
- Easy to handle
- Easy to understand
- Give feedback

And of course the product should be perceived as:

Attentive

Ethical Values

- Open and caring attitude towards customers and co-workers
- Honesty
- Cooperation
- Protecting the environment through sustainable development

I translate these human properties into product related properties, which results in the subsequent;

- Be consistent with expectations created by the product shape
- Easy to understand
- Choice of material

Unique selling proposition

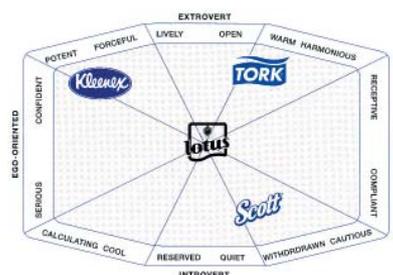
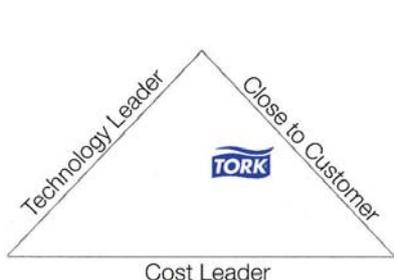
Offer the customer a whole solution

Emotional selling proposition

Taking very good care of the customer



The images reflect the Tork brand personality. Life, attraction and power of initiative e.t.c.



Two different ways of showing Tork's positioning, the triangle is a simplification of the IMP-map.

3 The competitors

To get a general picture of the market, the main competitors were investigated.

Kimberly Clark

The North American based company Kimberly Clark is the technology leader on the market of hygiene products. They have delivered many breakthroughs, not least so on the diaper market. Their *slogan* is; “Yesterday today tomorrow” and their *mission* include the following three expressions; Deliver innovation and value, Exceed expectations and To be everyday and everywhere. Their *value* is; Caring for others. Thus it can be concluded that Kimberly Clark wants to be perceived as the company that cares for you, no matter where you are and they do it by handing you the best quality possible. To the left dispensers from two different categories^{chap[4]}; Health Care and AFH are displayed. The dispensers belonging to the Health Care category (only in Europe) are quite successful in complying with the environment in which they will be used. The product shape resembles a water drop, which is thought of as something pure and clean, in the western world at least. The transparent window contribute in leading the observers thoughts to water and thereby to something hygienic. The pastel colors used create a somewhat childish expression, whether this is desired or not is unknown. The dispensers aimed at the AFH category (only in the US) are subtle but at the same time they are almost futurist, perhaps due to the front window and the colors because the shape is very organic and would not lead our thought to outer space.

Georgia Pacific

Georgia Pacific’s, also this company based in the United States, main objective is to be the price leader, their ambition is not to lead the technological progress. For *mission* they state “To make things that make you feel at home”, which in its own way implies not to confront their customers with products they have not grown used to. Georgia Pacific’s *values* include Educational, Environmental and Community involvement.

Their dispensers are quite interesting in terms of how they meet or rather do not meet the articulated mission and values. The dispensers project formality through the rectilinear way of creating the forms, of course the choice of material and surface structure also play a part in forming this language, that does not deliver the home feeling one might expect.



above
Dispensers by Kimberly Clark
below
Dispensers by Georgia Pacific



Katrin

This is a Scandinavian competitor brand under the Finnish company Metsä Tissue. Their slogan “Less is more” is actually somewhat vague and it seems it has been used by others in other contexts. Their *mission* is; Comfort for everyday and their *values* are; Added value, Trust and Continuous improvement. The dispensers are far from being extravagant almost to the point where they appear dull. If this is meeting the slogan “Less is more” then they are home. But the *added value* and the *continuous improvement* are well hidden in these very restrained dispensers.

Intra

Intra is a Swedish company specializing in home appliances in stainless steel, especially kitchen sinks. They are not involved in the production of paper products at all. Intra manufactures the wash basins for the Boeing 737 airplane and they are often the architect’s first choice when planning dispensers for high-end rest-room environments. Their mission; Modern design and Elegant and functional creations is well reflected in their dispenser products and their craftsmanship skill is evident. Note though how the waste basket resembles a urinal, placed at an appropriate distance from the ground one should hope that rest-room visitors are not too affected by the fine wine or they might be mistaken.



above
Dispensers by Katrin
below
Dispensers by Intra



4 Categorizing customers

Given how the task was targeted towards a certain customer segment the next step was to learn about the different categories of customers, they are by SCA Hygiene Products divided into the following four:

Hotels, restaurants and catering

Industries

Commercial (public buildings; shopping malls, air ports, office buildings etc)

Health Care

Definition of the terms washroom and wash station

Washroom;

there is one or several toilets

Wash station;

there is one or several washbasins, no toilets

General wash station;

a multi-function station e.g. a pantry

Segments

The different segments are based on usage, quality and price.

Image

focus on aesthetics

appearance has superiority over function

High performance

focus on total cost of use (the total service cost)

focus on function

form is somewhat more important than function

Basic Performance

focus on total cost of use

form is not important

only basic functions are important

Price

focus on cost per package of hygiene product e.g. toilet roll,

low demands on function and form



The images show environments from different categories.

5 Image board

The task of developing a new suitable design for the SCA dispenser series is surrounded by different criteria. There should be a connection to the existing dispensers and to the Tork brand^{chap[2]}. There is also the important aspect of bringing in something new to the form, something that will put Tork ahead of its competitors. Therefore working with the Image board it was interesting to analyze certain style trends. Thus, turning to the automobile industry was natural. The meeting of surfaces seems to be going towards a sharp radius as opposed to earlier car models where maintaining curvature did the transition between surfaces rather large. The car industry seems also to be turning it into a habit of producing smaller car models that still are perceived as being rather spacious inside.

The imageboard, used to inspire but also to mark a direction for the coming form. The reason for looking at the automobile industry has to do with how, although conservative, many styling trends are born here.



6 Semantics

Semantic analysis

The semantic analysis is performed on dispensers from the existing *Tork 2000* product range in hope of getting a better understanding of how the typical user interprets dispensers found in public rest-rooms. In the analysis of the semantic functions the elements that make the whole are analyzed as well as the whole. The context in which the elements are found is also taken into account. The answers are based on peoples experiences of storage boxes but also on the current product sign (the *current product sign* is the market's idea of how a certain kind of product usually looks) for dispensers. It is not of interest if the product is recognized as a dispenser, but how, in its shape the product describes its functions. The relatively detailed description of how the product is used happen in reality by a very quick action and is usually performed subconsciously. After all, for a majority of us these are merely uncomplicated tasks, part of every day life. Before the actual analysis is presented a couple of semantic terms are explained.

The product sign

The foundation of a semantic analysis is for the observer to consider the product as a sign. 'A sign or representamen, is something which stands to somebody for something in some respect or capacity' (Charles S Peirce, CP 2.228). A sign is simply something, which sends a message to us, as often does a product. The product shape can be described as an arrangement of several elements in which they are perceived and function as a whole. Form, color, surface texture and material are examples of such elements. A product may through its shape describe facts, express properties, identify product belonging and encourage someone to use it.

Describe purpose

The purpose of the product is the main reason for why one would want to use it. In describing its purpose the main function of the product should be obvious.

Describe use

The product shape should as much as possible describe how to handle the product.

Express properties

To express something is to reveal something about yourself, what kind of person you are, the qualities you have. A product can very much in the same way tell us something about itself through its gestalt and functions. It is not uncommon for us to speak about products using the same words we would expressing a person's properties. An easy-chair looks hospitable and a coffee pot looks friendly. Vice versa, we often use words more common to express a machine's properties to express people's properties.

The difference between describing and expressing can sometimes be hard to distinguish. This example might help clarify it, auto designers generally have the same way of describing a car, four wheels and a box. The expressions nonetheless vary, some express speed, others comfort and yet others status.

Encourage

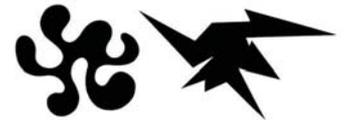
When stopping at a red light the driver is acting on a signal. The signal stands in direct relation to its object and the interpreter need not consider the meaning of the signal. The product shape could for instance urge the user to be cautious, to be precise or simply to use the product.

Identify

The product shape can for example identify purpose, heritage, and product area. The product itself can be identified through its logotype, color, form or the current product sign etc. The product shape can make it possible to identify the product with a certain context, in this case a rest-room. It is then important to ask what rest-rooms the dispenser is meant for. Rest-rooms at an airport probably require a product shape that is different from that required in an office building. The product shape should also correspond to the quality of the product it contains.

Illustrating the power of form, not least when it comes to expressing a virtue.

When asked which of these figures is called Lumbumba and which Takete, hardly no one is mistaken. The smoothness of the word Lumbumba is easily recognized in the figure's curves.



The Xpress-Box

What purpose does the product describe?

The main function is storing and dispensing paper towels.

In which way and by what means does the product describe its purpose?

This is done in six different ways.

The volume of the product.

The transparent window that allows the user to see that it contains paper towels.

The elliptical cut-out found on the front surface's lower edge leads the user to get paper towels at the right place.

The keyhole on the right side of the product indicates that it is possible to open it, partly also how it opens.

The frame (the back part) sweeping around the entire product indicates that it can be parted.

Its placement, that is that the product is found in a washroom or wash station, this however describes use more than purpose.

How to handle the product?

Refilling

The window makes it possible to see when the paper towels are about to run out. Whenever refilling is necessary the container is unlocked with a key on the right side of the product. The frame running along the rear of the product enhances the feeling of the product being able to open. It is however the placement of the keyhole that explains to which side the product is opened.

Taking paper towel

The user can through the window see that the product contains paper towels and the product shape is easy to connect with the current product sign^{page[17]}. This makes it possible for the user to identify the purpose, now the user has to understand where he or she can obtain the paper towel. Often there is a piece of paper towel visible at the lower edge of the product, but the elliptical cut-out support in making it obvious where the opening is.

What properties does the product express?

Friendly, uncomplicated and attentive.

Through which means does the product express these properties?

The property *friendly* is expressed by the large radii which ties together the more or less flat surfaces. The round edges and corners can be interpreted as something soft, a property often thought of as friendly.

The property *uncomplicated* is expressed through the simplicity of the shape. The product shape originates from a square block, a very common figure which is easily understood.

The property *attentive* is expressed through the *tight curves* ^{picture[28]} which gives the front a camber in two dimensions. Convex towards the wall on which the product is set and also convex towards the products center line.

Three views of the Tork Xpress-Box.



Does the product shape encourage use?

When paper towels no longer are visible through the window one is urged to refill the dispenser. Whether the product actually encourages to use the paper towels is hard to say. The vertical direction of the Xpress-Box together with the cut-out and the center line might incline the user to reach for the paper towel.

What is the product identifying?

The container identifies the type of product, brand belonging and manufacturer. The product also identifies family belonging and context.

By what means is the product identified?

The product is recognized through the product shape, which well represents the current product sign. The brand is identified by the Tork Logotype placed in the upper corner of the window. The manufacturer is identified by the SCA logotype placed directly underneath the window. The family belonging is made obvious by means of material, color and surface texture. The form with its large radii and round corners also contribute in helping the observer recognize the product as member of a family.

Conclusions

The main function of the Xpress-Box is quite obvious and is made so by different visual factors. Playing a part in this does also the placement of the dispenser. The window and the elliptical cut-out partly describes how to use the product. The Xpress-Box has three expressions; friendly, uncomplicated and attentive. It also identifies brand belonging and product family belonging by the large radii and the smooth surface.

The black lines emphasize the tight curves, which create the expression *attentive*, but also describe in which direction the product operates.



The S-Box

What purpose does the product describe?

The main function is storing and dispensing soap.

In which way and by what means does the product describe its purpose?

This is done in much the same way as with the Xpress-Box, there is one difference though. In this case it is the large elliptical knob found directly underneath the front surface, which helps the user realize where to obtain the product inside.

How to handle the product?

As with the Xpress-Box, the S-Box describes how to refill and how to dispense. It is also done by the same means except for the ergonomically shaped knob. Its size makes it easy to notice, and it also describes in which direction it operates. The dividing line tells the user that the knob is mobile.

Which properties does the product express?

Friendly and uncomplicated.

Through which means does the product express these properties?

The property *friendly* and *uncomplicated* is expressed in the same way as in the case of the Xpress-Box. Note also what the product shape does not express^{picture[30]}. The Brand personality would have been more obvious if the shape also expressed *alertness* as does the Xpress-Box.

Does the product shape encourage use?

When soap no longer is visible through the window one is urged to refill the dispenser. The large knob might incline the user to dispense soap.

What is the product identifying?

In an identifying purpose the S-Box functions in the same way as the Xpress-Box. The type of product, brand belonging and manufacturer but also family belonging and context is identified.

By what means is the product identified?

The product is recognized in much the same way as is the Xpress-Box. But this could however have been supported further if the shape had had the *tight curves* ^{page[19]}, as does the Xpress-Box.

Conclusions

The S-Box is very obvious in describing its main purpose. The window and the knob describe how to use the product. The S-Box carries two expressions and compared with the Xpress-Box it is lacking the expression *attentive*, this is bringing the overall impression down. As with the Xpress-Box it identifies brand and family belonging through its large radii and smooth surface.

Three views of the Tork S-Box.



The form creating element is straight vertical and therefore the product is not interpreted as *attentive*. The horizontal surfaces are angled to the center of the product, calling for the user's attention.

The T-Box Mini

What purpose does the product describe?

The main function is storing and dispensing toilet paper.

In which way and by what means does the product describe its purpose?

This is done in much the same way as with the Xpress-Box and S-Box. In this case it is the rectangular cylinder found directly underneath the front surfaces, which helps the user realize where to obtain the product inside.

How to handle the product?

As with the Xpress-Box and the S-Box, the T-Box Mini describes how to refill and how to dispense the product inside. Its vertical direction and its edge with wave shaped teeth make an apparent opening.

Which properties does the product express?

Friendly and uncomplicated.

Through which means does the product express these properties?

The property *friendly* and *uncomplicated* is expressed in the same way as in the case of the Xpress-Box and the S-Box. Important though is to note what the product shape does not express^{picture[30]}. The Brand personality would have been more obvious if the shape also expressed *alertness* as does the Xpress-Box.

Does the product shape encourage use?

When there is little paper left on the roll, which can be seen through the window, this urges the need of refilling. I believe the context play a great part in encouraging the user to dispense the toilet paper, the large square opening contributes as well.

What is the product identifying?

In an identifying purpose the T-Box Mini functions in the same way as the Xpress-Box and the S-Box. The type of product, brand belonging and manufacturer but also family belonging and context is identified.

By what means is the product identified?

The product is recognized in much the same way as is the Xpress-Box and the S-Box. But as in the case of the S-Box this could have been supported further if the shape had had *tight curves*^{page[19]}, as does the Xpress-Box.

Conclusions

The T-Box Mini is very obvious in describing its main purpose. The window and the rectangular opening describe how to use the product. The T-Box Mini carries two expressions and compared with the Xpress-Box it is lacking the expression *attentive*, this is bringing the overall impression down. As with the Xpress-Box and the S-Box it identifies brand and family belonging through its large radii and smooth surface.

Four different views of the T-Box Mini.



The rather large radius build the expression *friendly*.

7 Form Theory

Format analysis

The format analysis is a means to describe the visual form by identifying form attributes such as content, structure, dimensions and material e.t.c. Finding the characteristic and familiarizing language of the form, both regarding the separate elements and how those together create the whole form, does that. In the matrices^{page[25] [27]} such elements are represented on the y-axis whereas the x-axis represents the products to be analyzed. The circles and squares found in the cells indicate how well the theme of the design format is being used. A square equals zero points, a circle one point and a filled circle equals two points. The vertical sums show the level of correlation between the product and the format and the horizontal sums point out to what level the design format has been implemented in the products. The figures indicate the quality of the product form compared to the described *design format*, in other words the coherence of the form's content. It is probably important to point out that the selection of attributes is subjective and should be done with care but there after, as long as every product is being judged equally according to those attributes, the method presents a rather objective way of categorizing and investigating the product form.

The Tork 2000 series

The paper towel dispenser's superior shape is similar to a *square block*, but not completely therefore it has been given a circle i.e. one point. This is not indicating whether its is a bad or good thing, it is however telling where it stands in relation to the frame of reference, in this case a square block. The form elements chosen for this analysis were *corners* and *radii*, *cut-outs* and *windows*. For all three of those elements the Xpress-Box scores full point. The *cut-out* adds flavour to the overall impression in a subtle way. The *window* is leaving the box a little bit naked, it might have worked better if it was semi-transparent.

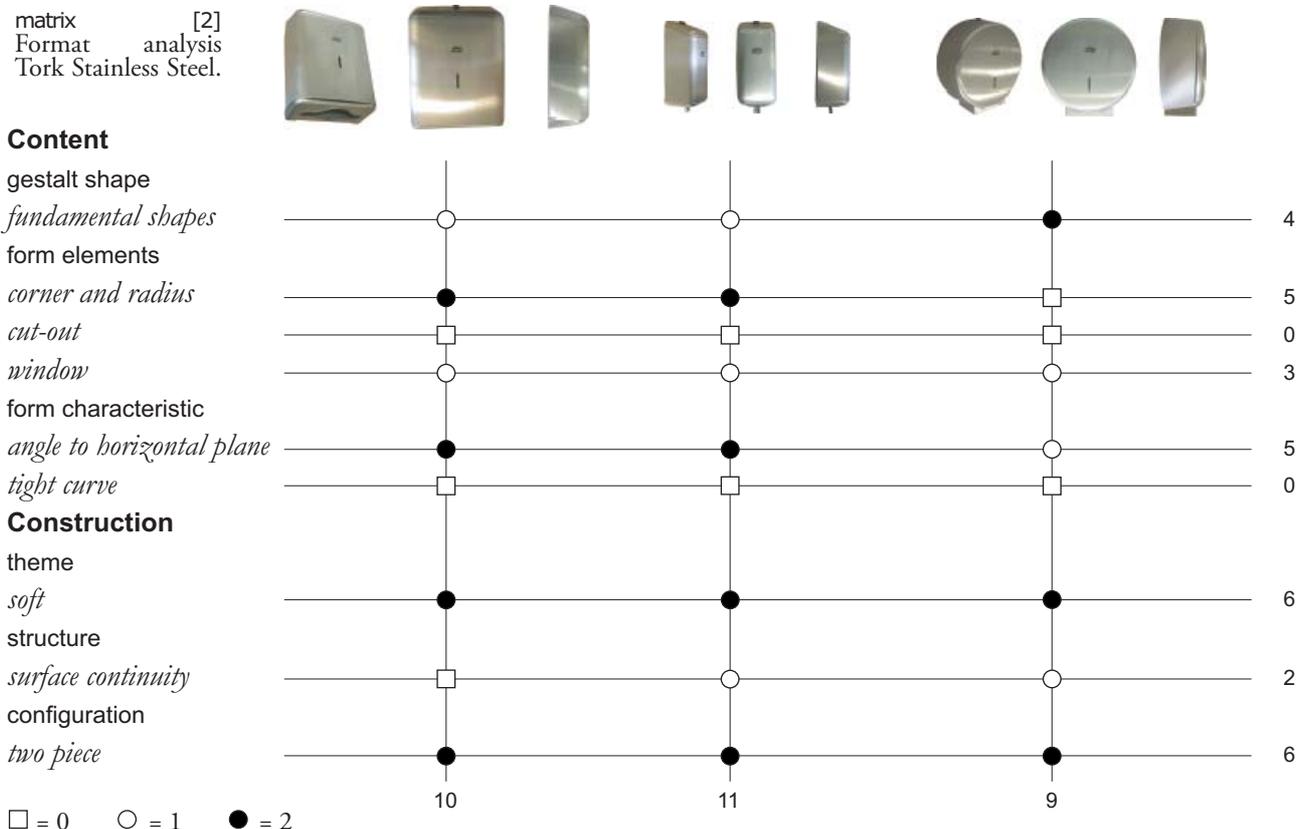
The *corners* and *radii* are creating the main expression of the Xpress-Box; *friendly*. They also tie together the different surfaces in a harmonious way. The form characteristics, which include the *angle to the horizontal plane* and the *tight curve* attribute contribute to the superior shape. Those are important factor for how we perceive the product, without the angle to the horizontal plane, which produce *alertness*, it would have been rather dull. The tight curve refers to the vertical curve, which appear in the side view and the two symmetrical and vertical curves, which appear in the front view. These curves are very important for the expression attentive, they make the dispenser appear fast, dodgy and the same time stable. For both of the form characteristics the Xpress-Box scores two points.

The heading *construction* includes *theme*, *structure* and *configuration*. By *theme* we mean the motif or the subject of the shape, in this case *soft*. *Structure* or how elements create the whole is to a large extent in the Tork 2000 range performed through surface continuity. By *configuration* we imply different form systems. For these dispensers there are two systems; the front part and the back part.

The stainless steel series

One really has to see the series in stainless steel in real life to fully understand the vast differences compared to the Tork 2000 series. It is actually quite apparent that an attempt to reproduce a series previous to the Tork 2000 has been made, without any consideration taken to the change of material. This has to do with the *technical code*^{chap[8]}. When comparing the paper towel dispenser in stainless with the Xpress-Box there are three prominent differences; the *cut-out*, the *tight curve* and the *surface continuity*. It has to be remembered that this is due to the *design format* used here, which is in favor of the Xpress-Box one might say. There is a reason for this though, the *design format* is based on attributes which support in bringing out the *brand personality* in the products. The vertical sum is indicating the coherence of the form i.e. how well the *design format* has been implemented in the product shape and can be seen in the matrix^{matrix[2]}.

The lack of *surface continuity* has to do with restrictions of the material in the manufacturing process. Observe that the products are intended to maintain *surface continuity* but the designer has not taken into consideration all the aspects needed for a successful result. In connection to this chapter it might be worth discussing the use of *design format*. If the *design format* is applied through out the whole product line the dispensers will be easily recognized by the users, which is positive. At the same time there is little diversity, which makes it difficult, visually, to respond to the varying characteristics of categories and segments. Looking at it from this point of view might motivate design formats for varying purposes.



Formal aesthetic analysis

The form is important for how we perceive and experience the product. The semantic properties e.g. the *describing*^{chap[6]} and *expressing*^{chap[6]} make one part of this experience, they turn to the interpreting part of our consciousness that tells us something about the product's message. Another part is made up by the non-interpreting experience of the form. A conception is based on subjective and contextual factors, which result in individual preferences regarding the formal aesthetics. The product form can be seen as an arrangement of different form elements in a visually perceptible, sometimes complex structure of varying levels as indicated in the *format analysis*^{chap[7]}. These levels differ in number depending on the type of product and the construction of the form. The levels are defined in conjunction with the form elements that create the whole; in this analysis where we will be looking at the Tork 2000 range the product form has been divided into three different levels, superior, characteristic and identity.

The *superior* level contains gestalt creating forms and other primary form elements that make the foundation of the product shape, such elements are contour lines and other well-defined components. Strong connections between those superior elements contribute in creating an explicitly accentuated form language. Together with the other two levels a form arise that can be more or less consequent, characteristic or accentuated.

In the *characteristic* level form elements that supply the form's consequence are identified e.g. such elements that help us read the form as one whole. At this level a large amount of visual links, which according to the gestalt theory are necessary for the eye to be able to connect separate elements, are fashioned.

The form elements at the *identity* level could also be called brand connecting since they to a large extent represent what in general is viewed as the visual identity of the company's products. The elements belonging to this level are decided by the markets opinion and by what the company itself point out as significant for creating a distinguishing mark.

The first column in the matrices shows the product from an appropriate view, the second column shows the active elements at the specific level. The third column describes the abstract form functions. Thinking of a specific form problem that the elements at each level solve may generate yet other possible solutions to the problem. The fourth column address the possibility of adding or optimizing various functions such as ergonomic, technical or semantic ones. The rows represent the different levels of detail. The first row from the top represents the *superior* level, followed by the characteristic level and the identity level.

The formal aesthetic analysis can be used for different reasons and in different phases of the design process. It has been used here prior to the idea generation to identify the different levels but also to look at how different form problems have been solved.

The Xpress-Box

The *superior* form elements are the larger surfaces. They decide the dispenser's volume and create the platform for the product shape.

The *tight curves* that operate in a vertical direction contribute with important characteristics. Also important for how the observer perceives the product is the proportion of the front surface and the side surfaces. This relation creates a slender product shape, which together with the *tight curves* give an impression in accordance with the *Tork brand personality*. The most significant form function is carried out by the *tight curves*, which create the expression *attentive*. The form elements at the *characteristic* level are the radii and corners, they have a strong uniting function and the theme becomes obvious through the soft continuity of the surfaces in the *superior* level, the radii also contributes to the expression *friendly*. The form elements at the *identity* level are the window and the cut-out. The cut-out is unique for this product and could very well become a distinguishing mark if implemented in other products as well. The Xpress-Box is exceptionally well balanced between the expressions *attentive* and *friendly*, at the same time it appears rather *uncomplicated*.

matrix [3]

Formal aesthetic analysis of the Xpress-Box.

level 1	<i>superior form elements</i>	<i>abstract form structure</i>	<i>form functions</i>
		the separate surfaces create the volume and foundation for the product gestalt. There is significant characteristic in this product through the tight curves operating vertically. These can very well become a distinguishing mark helping the user recognize the product as a Tork product. Accomplishing this at the superior level would indicate a well-developed form language	the form creates certain expressions. The same functions may be achieved using other fundamental form elements. It might be possible to increase and optimize the functions such as technical and ergonomic ones. The tight curves correspond well to the brand essence <i>attentive</i>
		the form elements here give meaning to the surfaces in the superior level through their uniting function. The theme becomes obvious by means of the large radii and use of surface continuity.	contributes efficiently to the expression of the product, the soft shape is easily connected to the brand virtue <i>friendly</i> . At the same time the product family belonging is made evident through the radii of corners and edges
		the form elements at this level accentuates the product by means of the window and the cut-out in the lower end. They partially work as brand identifying instruments	identifies brand belonging. Semantic functions encourage refilling when so is needed and guides the user to dispense the paper towel. The cut-out creates an ergonomic expression by its size and comfortable shape

The S-Box

The surfaces at the *superior* level are those of a half circular cylinder with a slanting top and bottom.

The characteristics here are not as strong as in the case of the Xpress-Box, which result in a less interesting impression. The radii belonging to the *characteristic* level give meaning to the surfaces and while doing so the expression friendly is realized. At the identity level we find the window and the knob. The window is a form element that appears in the Xpress-Box and the T-Box Mini as well and is therefore filling an important identifying function. The S-Box is optimized to its content, the soap container, but the connection to the brand platform is cut short.

matrix [4]

Formal aesthetic analysis of the S-Box.

<p><i>level 1</i></p> 	<p><i>superior form elements</i></p> 	<p><i>abstract form structure</i></p> <p>the separate surfaces create the volume and foundation for the product gestalt. There is little measure of characteristics in this product and without the other two levels it is lacking a distinguishing mark, making the user recognize the product as a Tork product. The central form is that of a circular cylinder with vertical direction.</p>	<p><i>form functions</i></p> <p>the form creates certain expressions. The same functions may be achieved using other fundamental form elements. It might be possible to increase and optimize functions, such as technical and ergonomic ones.</p>
<p><i>level 2</i></p> 	<p><i>characteristic form elements</i></p> 	<p><i>abstract form structure</i></p> <p>the form elements here give meaning to the surfaces in the superior level through their uniting function. The theme becomes obvious by means of the large radii and use of surface continuity. The radii contribute to a form language connected with Tork.</p>	<p><i>form functions</i></p> <p>contributes efficiently to the expression of the product, the soft shape is easily connected to the brand virtue <i>friendly</i>. At the same time the product family belonging is made evident through the radii of corners and edges. Adding some <i>edge</i> to the form language could reinforce the brand property <i>attentive</i>.</p>
<p><i>level 3</i></p> 	<p><i>identifying form elements</i></p> 	<p><i>abstract form structure</i></p> <p>the form elements at this level accentuates the product by means of the window and the well-dimensioned dispensing button. They also function as brand identifying measurements.</p>	<p><i>form functions</i></p> <p>identifies brand belonging. Semantic functions encourage refilling when so is needed and guides the user to dispense soap. The relatively large button makes it possible to operate with the palm of the hand.</p>

The T-Box Mini

The creating of the form for the T-Box Mini is identical to that of the other two dispensers. Larger surfaces form a *gestalt*, which is viewed as a whole due to the radii. The T-Box Mini is, as the S-Box, optimized to its content i.e. its shape describes what it contains. This may not be necessary as the placement of the dispenser provides such information. More important would have been to project the desired expressions and maintaining the *design format*^{chap[7]}. There is a major esthetical difference to the Xpress-Box, perhaps to big.

matrix [5]
Formal aesthetic analysis of the T-Box Mini.

<p>level 1</p> 	<p>superior form elements</p> 	<p>abstract form structure</p> <p>the separate surfaces creates the volume and foundation for the product gestalt. There is little measure of characteristics in this product and without the other two levels it is lacking a distinguishing mark. The central form is that of a circular cylinder with horizontal direction.</p>	<p>form functions</p> <p>the form creates certain expressions. The same functions may be achieved using other fundamental form elements. It might be possible to increase and optimize functions, such as technical and ergonomic ones.</p>
<p>level 2</p> 	<p>characteristic form elements</p> 	<p>abstract form structure</p> <p>the form elements here give meaning to the surfaces in the superior level through their uniting function. The theme becomes obvious by means of the large radii and use of surface continuity. The radii contribute to a form language connected with Tork.</p>	<p>form functions</p> <p>contributes to the expression of the product, the soft shape is easily connected with the brand virtue friendly. At the same time the product family belonging is made evident through the radii of corners and edges. Adding some <i>edge</i> to the form language could reinforce the brand property <i>attentive</i>.</p>
<p>level 3</p> 	<p>identifying form elements</p> 	<p>abstract form structure</p> <p>the form elements at this level accentuates the product by means of the window and the teeth in the lower end. The window has a brand identifying function, the teeth however are not as important in this aspect since they only appear on this product.</p>	<p>form functions</p> <p>identifies brand belonging. The relatively large opening makes it obvious where to take paper. The wave shaped row of teeth does not conflict with the expression friendly, which could have been the case if it had had the typical saw teeth shape.</p>

8 Technical code and Value of modification

Technical code

The area of technical code deals with the effect that features such as material, manufacturing and surface texture have on human interpretation of the product.

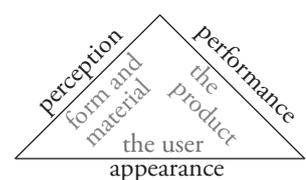
Awareness of technical code helps evading errors; a regular shortcoming is that the product does not equal the users' expectations. For instance that a product is not as safe as it appears to be or that it in fact resists a heavier load than it seems to be able to. In both events a misinterpretation of the product and its properties is likely. In the latter case the user anticipates more of the product than it offers, it expresses properties it does not have, and in the former case the user will not use the product to its full advantage since it does not articulate properties it in fact has.

On the subject of a dispenser series out of a metallic material consideration of the user's expectations has to be taken. This can for instance be, positive as well as negative, a certain sound, a cold surface, weight and durability. The user might associate with certain environments such as hospitals or kitchens. Everything is depending on the type of product and the environment in which the product is going to be applied, but also on the users' previous experiences, education and culture etc.

The *appearance* i.e existing expectations on the material can not be changed or affected, at least not in a short term period. The parameters, which can be influenced, are *perception* i.e. experienced properties created by form and material, and *performance* i.e. true properties. Assume that the user is expecting the metallic dispenser to make a certain sound when dispensing toilet paper, a loud, distinct and cold sound that is not a pleasant one. If the tear-off edge was made out of plastic, effectively changing the sound to a low quiet one, this would be *performance*, a true property in accordance with the *perception*, experienced property at tearing of the paper. It would mean that the dispenser could surprise the user positively by exceeding his or her expectations.

It is important that the perception do not surpass the performance. If the product appears really durable it should also be really durable. A successful product in terms of technical code is about good balance between performance, perception and appearance.

Technical code is about balance of appearance, perception and performance.



Value of modification

At the introduction of a new product it is reasonable and even important that the visual shape informs the customer of how large the value modification is.

When Volvo in 1997 introduced the V70 model replacing the 850, there was little visual change. This reflected the content well, since the vehicle remained on the same chassis as before. When the new series of the S80 and S60 was introduced the visual change of the V70 was potent. Once again the content was reflected in a truthful way since the V70 now was created on a new chassis (P2X). The new V70 was an all-new automobile with little in common with its predecessor and it was obvious also in an esthetical sense.

Conclusions

In every case of product development it is important to consider the relation between the value of modification and recognition, not least so in this project. As the change of material is rather large it might motivate a similar great change in visual form. In this project there is still to be an evident relationship to the existing Tork 2000 series, but trying to replicate in detail the esthetical language would prove a mistake. A new material brings new expectations and associations, positive and negative and this has to be taken into account. However, the foundation, which the current series in plastic and new series in metal should have in common, is the Scandinavian ancestry where form and function are to harmonize elegantly with clean lines, soothing colors and a high level of usability.

From above, Volvo 850, Volvo V70 built on the same chassis as Volvo 850 and Volvo V70 built on the new chassis (P2X).



9 Tool for evaluation

In order to help evaluate and decide on ideas, sketches and concepts a tool for this task was created. It has its origin in the MAP (meaning, advantage and property) analysis.

Meaning Pro-active.
Advantage Prepared for unforeseen situations.
Property The product contains hidden functions, which will only reveal themselves at specific happenings.

Meaning Friendly.
Advantage Positive approach to the product.
Property The product is to be perceived as warm and alive. Friendliness is expressed through soft and bending lines.

Meaning Listen and answer to customers needs.
Advantage The customer is offered what is asked for.
Property Paper is easy to find and dispense. Soap can be dispensed by the aid of one hand. It should be easy to detect when the paper or soap is about to run out. The dispenser should be easy to clean. These properties are realized by giving the product a clear direction and by marking openings with cut-outs.

Meaning Humble towards customers.
Advantage Easy to handle.
Property The product should not have double meanings. The product form should as much as possible help the user understand the product. The product family should have the same way for opening and refilling. The product form should not contain more than necessary.

Meaning Honest.
Advantage Keeps its promise.
Property The product form should not express properties, which are not found in the product. This is realized through good function, it should be easy to dispense paper and soap.

Meaning Cooperation.
Advantage Easy to understand and to handle.
Property Through using few irregular details the details carrying functions are made more evident. A palpable direction of the product form might make it easier to understand.

Meaning Protect the environment.
Advantage Creates a good image and trustworthiness.
Property Carefully choosing material and method of manufacturing.

Meaning Scandinavian heritage.
Advantage Implies good quality.
Property Is possible through economical use of material.

Meaning Attentive.
Advantage Taking initiative and being responsible.
Property The product form should be lithe and alert. This could be done by giving the form a direction in some way and by letting surfaces meet in a somewhat sharp edge or corner. The use of tight curves could also manifest the asked for expressions.

Meaning Hygiene.
Advantage Appearing and being hygienic.
Property To hinder unauthorized persons to alter with the content, also to avoid spilled liquid to enter into the dispenser reaching the paper products. The dispenser should be closed, appear almost to be sealed.

10 Idea generation and Realization

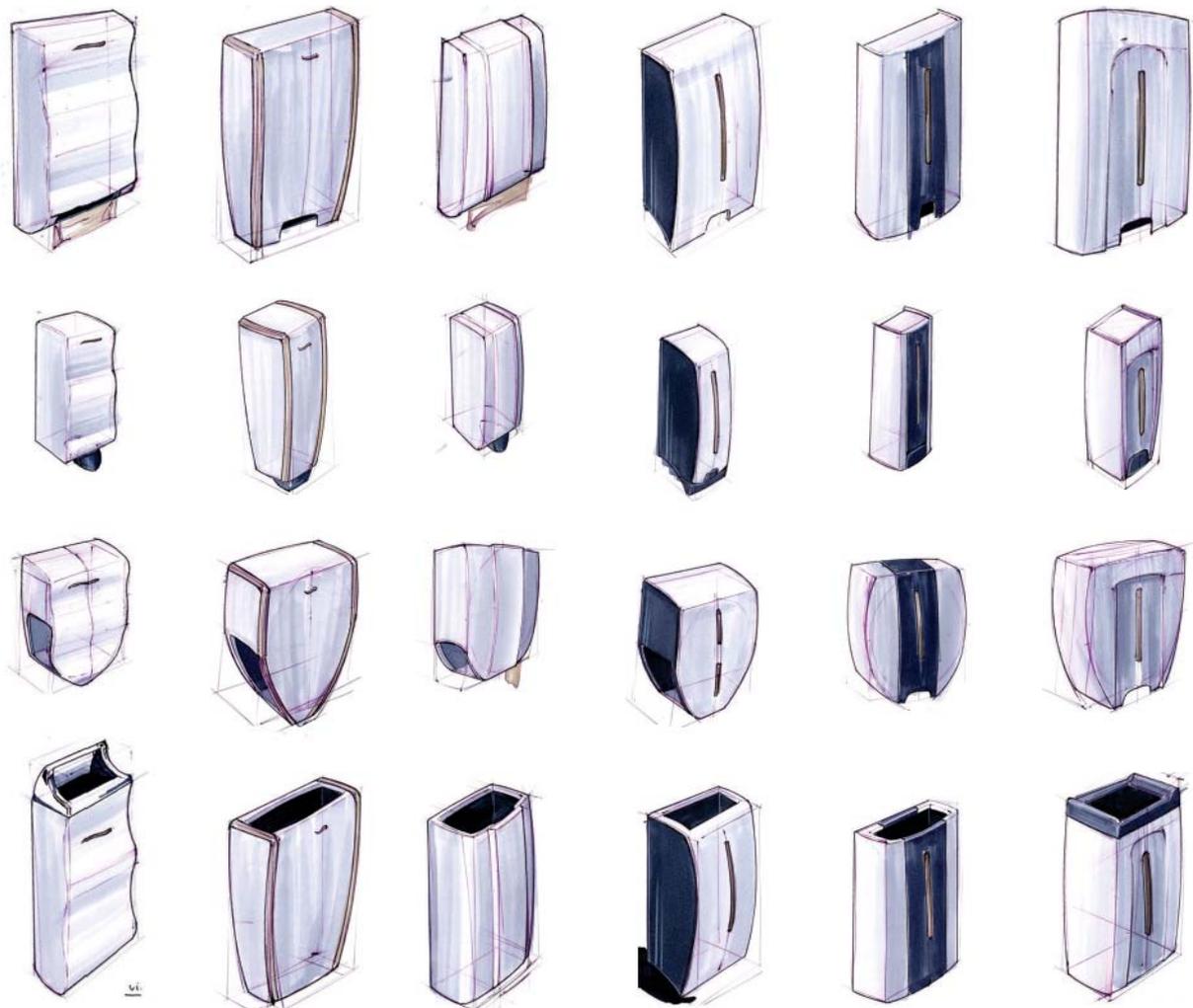
Sketching

The idea process began by generating quick sketches for one dispenser product at a time. In this early stage it was not important to focus on proportions and details, more so on finding a first expression which to proceed with and to develop further. Although the mission only stated the use of metal I found it interesting to experiment with a combination of metal and plastic. In turn the paper towel dispenser, soap dispenser, toilet paper dispenser and the waste basket were drawn. Sketches from this stage of the idea generation can be seen on this page.

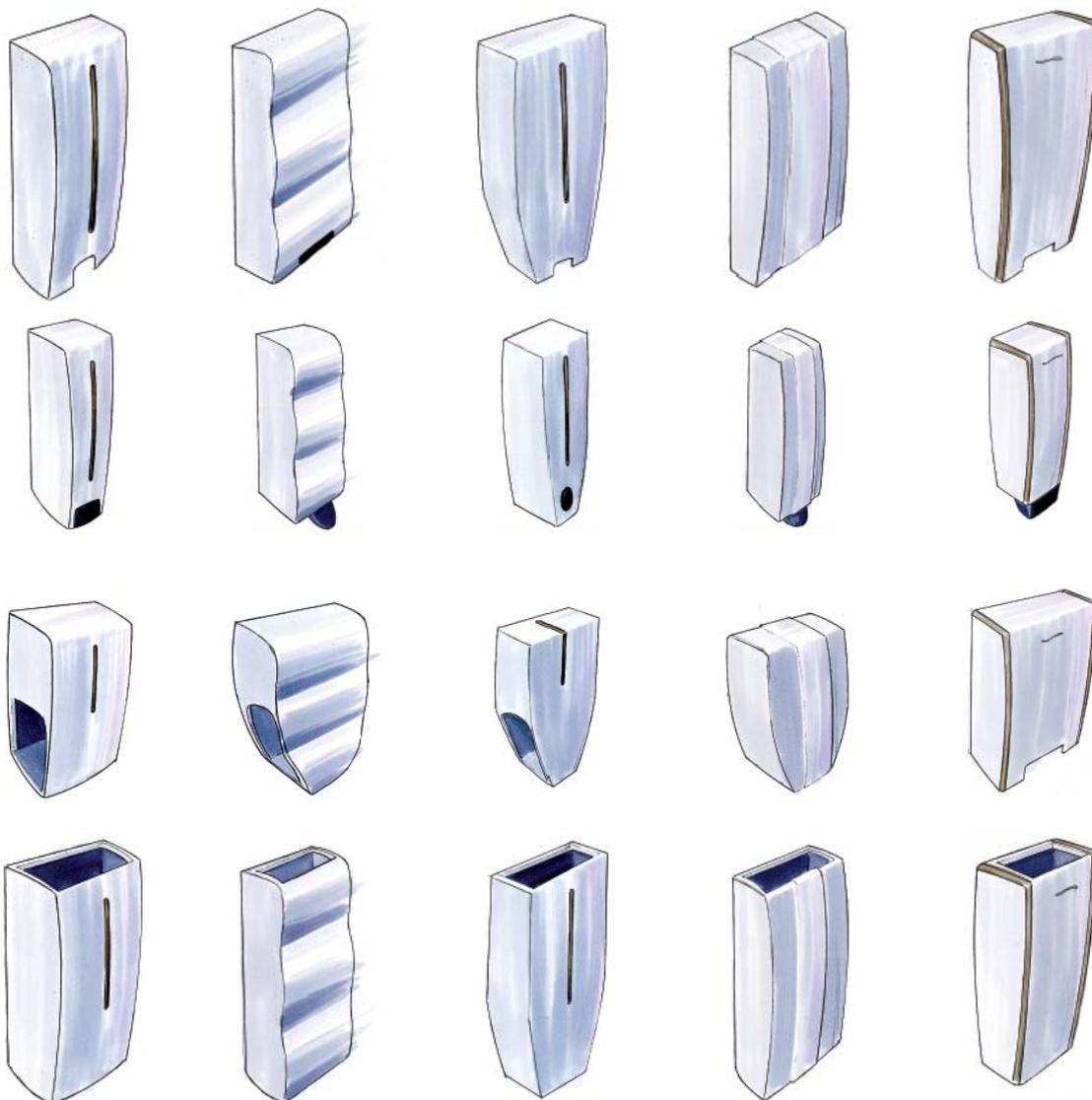


Samples from the first phase of sketching.

In the next step, promising sketches from each product category were chosen and from those a family was developed in the same manner as the parent sketch. The selection of the parent sketch was not based on science, but more so on the feeling, which I had developed so far into the project, of what I thought the product form ought to represent. Examples from those first dispenser series can be seen here.

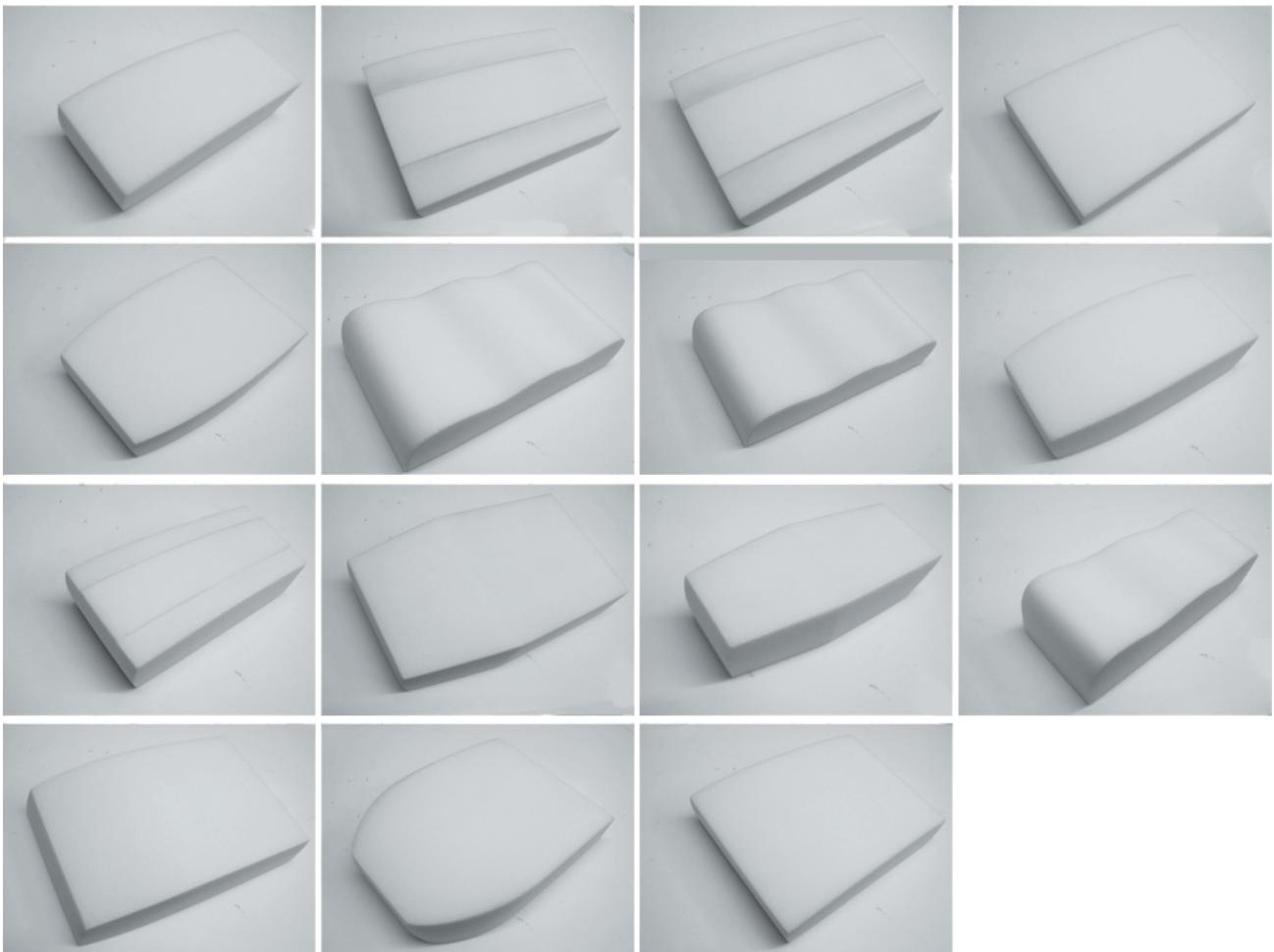


Finally in this first phase, five product series were selected for a first presentation or rather a discussion about in which direction to continue. Some of them are easily recognizable in the concepts that were developed later on, whereas others still would be further explored, for instance in terms of use of material.



The hand drawn sketches were supported by sketch models in Rohacell®, scale 1:3. Working with models proved an excellent way of getting a real feeling for the proportions and the form. Being able to hold the model and to view it from different perspectives was really helpful. From all of the gathered material it was decided to develop two separate concepts. No specific form idea was chosen at this time, but instead two different principles of structure was pointed out and from those it was decided to continue with the work of styling.

Sketch models in scale 1:3 out of Rohacell® supported the sketches.



Generating concepts

One concept was based on more or less the same principles or structure, as the *Tork 2000* series where the front part envelops the back part, which then have little or no function in creating the form language. In the other concept though, the back part was to take an important roll in generating the visual. As pointed out earlier I firmly believed that the meeting of the two materials metal and plastic would produce an interesting contrast, even more; they both have special advantages when it comes to forming and manufacturing.

Above, the paper towel dispenser from the *Cover* concept is shown. The plastic rails are supposed to add contrast to the product and at the same time offer a way to get around the manufacturing limitations of stainless steel. The rails can then be said to have at least two functions; a form function and a technical function.

Below, the paper towel dispenser from the *Lid* concept is shown. Here the back part have a big influence on the generated form language. One advantage of the *Lid* concept is that it is very economical in use of material, which of course have a positive affect on cost.



One concept was named *Cover* as the front part is sweeping around the back part. Plastic rails are meant to create the radii and connect the three surfaces, thus avoiding the difficulty of manufacturing such a shape from of one single sheet of metal. The concept was presented with rails in various colors to illustrate the flexibility of being able to customize color according to customers' preferences. There was of course also the possibility of forming the front part in one piece, however complicating the manufacturing and requiring larger radii. Esthetically the *Cover* concept nurses the expression *friendly* and is also responding strongly to the requirements of hygiene. It is in some sense resembling its ancestor and therefore the value of modification^{chap[8]} is low, which is not necessarily something negative; in some markets diminutive changes are preferred. The top row shows the paper towel dispenser, the second row shows the soap dispenser, the third row shows the toilet paper dispenser and the fourth and bottom row shows the waste baskets.



The other concept was called *Lid* as the front part is connecting to the sides of the back part, which would be made out of plastic. The front part could be made out of either stainless steel or aluminum. The front part is thought to rest either on top of the sides or in between the sides, changing the expression of the dispenser to some extent. The *Lid* concept offers a larger value of modification, with its sharper radii and double direction it takes a leap away from its predecessor but without doubt adding force to the expression *attentive*^{chap[2]} and producing a solid, mutual form language for this product series. The top row shows the paper towel dispenser, the second row shows the soap dispenser, the third row shows the toilet paper dispenser and the fourth and bottom row shows the waste baskets.



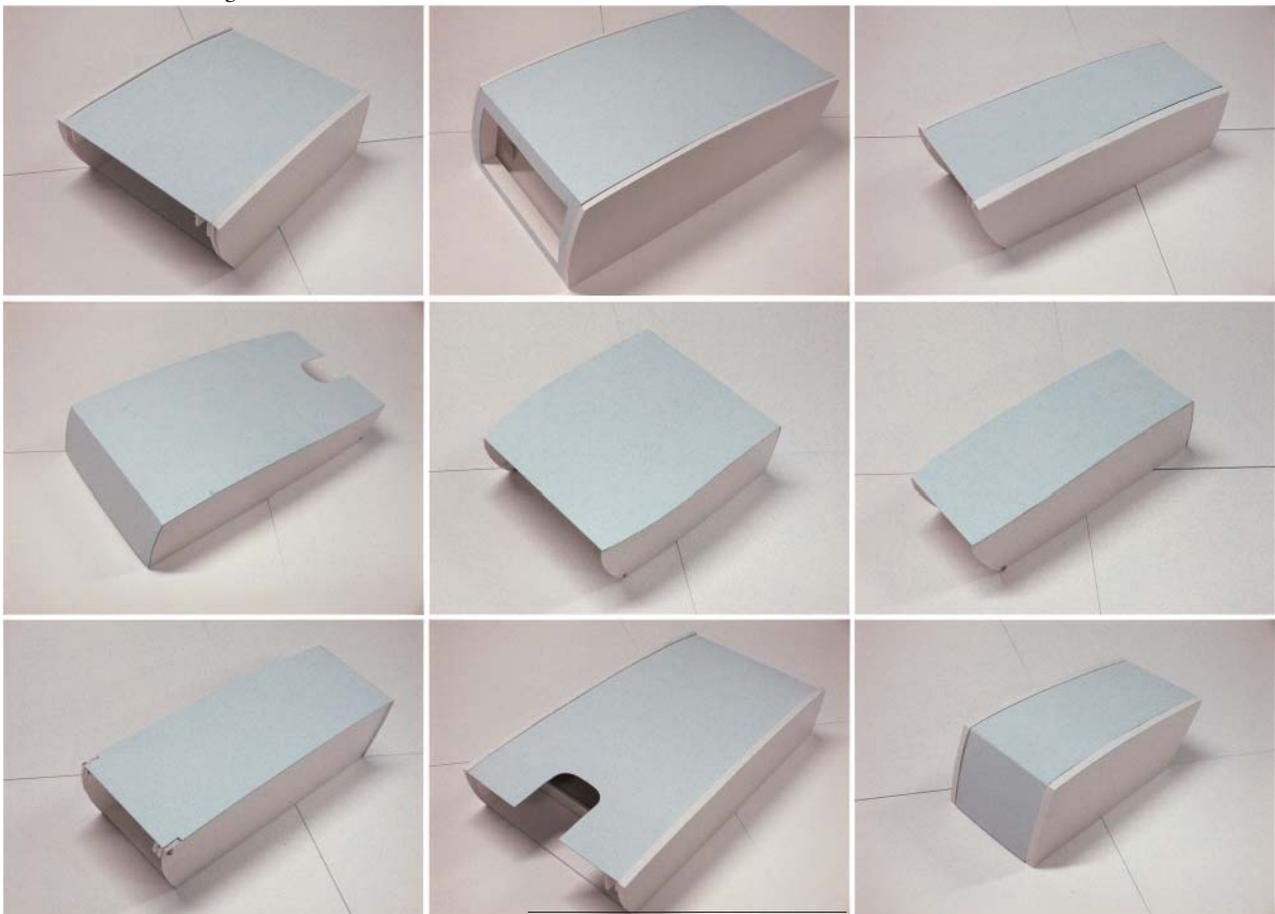
Mock-ups

In order to get a true feeling and understanding of the concepts' forms, not least of the proportions, it was necessary to support the renderings with full-scale sketch models. Paper and foam core boards were deemed suitable materials for the task due to their combination of low weight and high rigidity.



From the work shop, quite a few models are being built.

Contact sheet showing the end results.



Selection of concept

The evaluation tool^{chap[9]} and the formal aesthetic^{chap[7]} and semantic^{chap[6]} analyses were used to sort out the pros and cons of the two concepts.

The *Cover* concept is fulfilling the requirements of hygiene and also the expression of friendliness, the form language is easily associated with current Tork dispensers.

The *Lid* concept has a very straightforward form language, following the guidelines of the Scandinavian tradition and it is really responding to the essence of Tork^{chap[2]}; *attentive*. It is believed to be uncomplicated in the aspect of manufacturing, since the back part is to be injection molded plastic, and the front part in metal is bent in one dimension only.

At first, the *Cover* concept was selected, it was also decided that it should be made without the plastic rails^{page[41]}. This of course would complicate manufacturing as pressing exposes the metal sheet to very high stress, especially around corners. To learn more about the possibility of actually getting the *Cover* concept into production a visit to one of Europe's largest manufacturer of metal dispensers was made. During the visit the questions surrounding manufacturing rather increased instead of decreased. Coming to terms with them all would mean such changes to the originally intended form that it was decided not to proceed with the *Cover* concept. Finally the *Lid* concept was chosen, partly due to manufacturing, and focus was now turned on bringing it to completion.



Specific solutions to certain functions illustrated by sketches. Some were more promising than others. Discussing feasible solutions for each concept also supported the decision making.

11 Final Proposal



Discussing the concept

In the beginning of this project a couple of analyses were conducted in order to establish a direction and an aim for the form language to be developed. It stood quite clear that the brand analysis was important, this meant having the dispenser series visually deliver what is formulated by words in the brand platform. The essence of Tork is *attentive*, but *friendly* is also ranked high. Besides involving the brand, making connections to the Tork 2000 dispenser range was desirable; the aim here was to pick up a distinguishing mark i.e. a form attribute that makes the user immediately recognize the product as a Tork product. As the semantic analysis showed, the Tork 2000 series is successfully expressing friendliness, to a large extent this is done by the radii. The series is also hygienic; the surfaces are smooth and without any crevices. There were other criteria as well, the products to be developed should suite a certain category and segment.

I believed that using the *tight curve* found in the semantic analysis of the Xpress-Box would deliver the expression *attentive*, if handled correctly. The *Lid* concept has three such curves, which together create a desirable profile. This form, considered now at the superior level, has from my point of view also a clear connection to the image board. It is difficult to create a form that is perceived as both *attentive* and *friendly*, I believe they counteract each other. This is where I had to make an important choice, the size of the radii. Form theoretically speaking we are now at the characteristic level. The sharp radii reinforce the attentiveness but at same time hold back the friendliness, since the dispensers are intended for the High Performance/ Image segment I believe that keeping the radii sharp was the right step to take. On the issue of the window, which obviously fills important semantic functions; identifying the products inside, establishing that there is a sufficient amount etc, I found that allowing a window on the front surface would somehow interfere with the play of contrast that arise from the dark and matt sides enveloping the brighter and glossy front. By placing the windows on the sides, those were made more interesting while at the same time achieving the desired semantic functions.

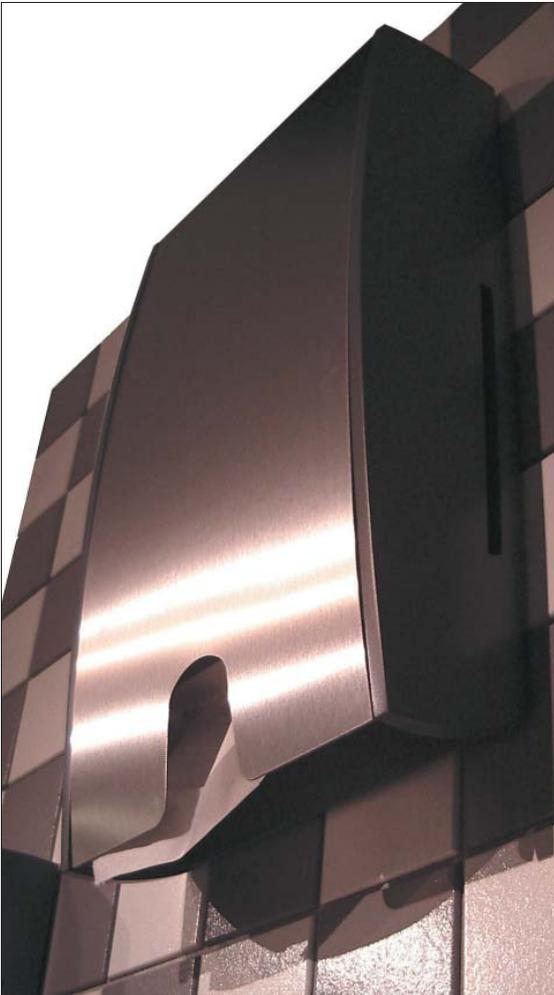
The back part of the Tork 2000 series is only a few inches high from the wall but as it envelops the front part it creates a less hygienic expression, but it is literally impossible to get any liquid inside the dispenser unless you consider the opening at the bottom of course. The *Lid* concept is completely different in how it is built; this refers to structure in the format analysis. The back part is very active in the form and contributes a lot to the form language. It leaves a slot at each side of the front part thought. While it is possible to design the sides so that spilled liquid will not reach the products inside the hygienic expression of the Tork 2000 series cannot be matched. The question of where and by whom the products will be used can serve as guiding light when judging if the hygienic expression of the *Lid* concept is sufficient or not.

Prototypes

Before starting the prototype construction, drawings were made in Auto Studio based on the Mock-ups. The back part could be made at the workshop at Chalmers whereas the front part would have to be made by a mechanical workshop. The materials used for the back part were Ureol[®], Plastic Padding[®] and plastic boards.

The prototypes have two main objectives; they make it possible to evaluate the goals of the project and they, better than any renderings or mock-ups, are able to communicate the idea to concerned parties.

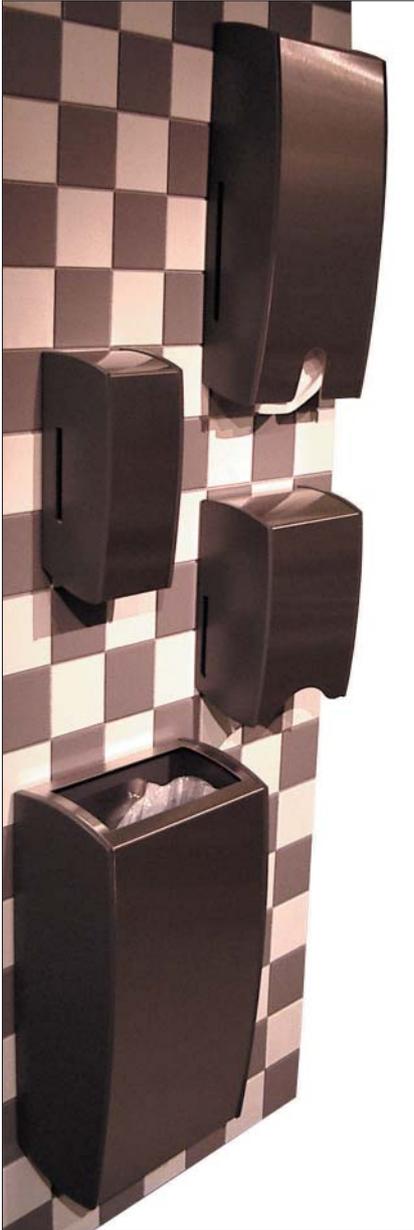
The paper towel dispenser prototype.



The toilet paper dispenser prototype.



The soap dispenser prototype with with its nearest and dearest in the background.



The prototypes representing whole product family.



A close-up of the soap dispenser.

The toilet paper dispenser prototype basking in the limelight.



Photos showing the process in the work shop.



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Matrices

- Authors material
- [1]-[5]

13 appendix



Kimberly Clark
Dispenser belonging to Kimberly
Clark.

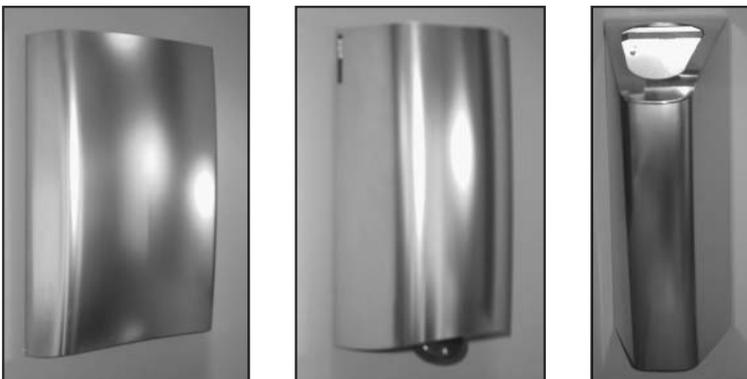


Georgia Pacific
Dispenser belonging to Georgia
Pacific.

Katrin
Dispenser belonging to Katrin
from picture [15].



Intra
Dispenser belonging to Intra from
picture [16].



Tork 2000
The Xpress-Box.



Tork 2000
The S-Box.



Tork 2000
The T-Box Mini.

