BRAIDED BODY, STRINGS THAT MOVE

PER HANSSON

- TO DEVELOP NEW EXPRESSIONS IN CONTEMPORARY MEN’S WEAR THROUGH EXPERIMENTATIONS WITH TUBULAR BRAIDING
ABSTRACT/

The perception of the expression of traditional handcrafts needs to be challenged. Therefore his bachelor degree work aims to develop new expressions in contemporary men’s wear through experimentations with tubular braiding.

This works aims to utilize and express a progressive approach of the technique in terms of materials and method with the desire to create a contemporary expression when a handcraft method is utilized in fashion.

Starting to explore the handcraft technique braiding the tubular braiding technique was found. While the technique itself is similar in expression and properties to flat braiding the tubular braiding opens up for other possibilities for garment construction. Using the tubular braid as a starting point, the aim is to explore new ways of constructing contemporary menswear garments with the technique itself as well to construct new materials and find to a new expressions.

The work also deals with the gap between the technique flat braiding, tubular braiding, construction and materials with different properties altering the initial expression of the technique.

By experimenting with unconventional materials and scale for such an handcraft technique as braiding the expression and the traditional view of braiding and its construction and use will be altered and questioned - discovering that the tubular braid has possibilities to construct or sculpt garments on the body in a seamless manner.

Hopefully machine-engineers of the future can invent new and progressive braiding processes to create fabrics for commercial application in fashion and also understand the potential of the tubular braiding method formed by the examples here.

KEYWORDS/

Braiding, Handcraft, Contemporary, Menswear, Fashion, Paracord, Experiment, Design, Art
TABLE OF CONTENTS/

P. 9        ABSTRACT – KEYWORDS/
P. 10       TABLE OF CONTENTS/
P. 11        BACKGROUND/
P. 20        BACKGROUND OF MATERIALS/
P. 23         METHOD - DESIGN METHODS AND RESEARCH METHODS/
P. 24        LIVE DESIGN EXPERIMENT IN FULL SCALE/
P. 25        DEVELOPMENT/
P. 27        BRAIDING AND BODY/
P. 31      FLAT BRAIDING/
P. 34        BRAIDING MATERIALS/
P. 37        FRINGES/
P. 39        MATERIALS/
P. 42      COLORS/
P. 49        RESULT-LINE UP-LOOKBOOK/
P. 68        REFLECTION/
P. 70        REFERENCES
BACKGROUND/

Braiding has been used industrially since the 1800s to produce textile fabrics (Ayranci, C, Carey J, 2008) A braid is a structure with a pattern formed by intercrossing three or more strands of material, historically the most common materials to use is textile fibers, wire, leather, or human hair. The difference between a braid and a weave is that a weave contains two separate, perpendicular groups of strips or strands, warp and weft, meanwhile a braid is most often long and narrow, with each strand zigzagging forward, across over and under the other strands that the braid is composed of. (Absolute Astronomy, 2014) The simplest and most known and used braid is the flat three-strand braid which in some countries is called a plait. This is a braid commonly encountered in daily life often utilized as a hairstyle. More intricate and complex braids can be created from a larger amount of strands to create vastly different kind of structures and patterns, wider ribbon-like bands, hollow cords such as paracord or solid cylindrical cords such as rope. Braiding techniques most common application areas are both industrially and domestically utilized to create ropes, decorative handcrafted objects and hairstyles if one would consider hair-braiding. (Askdefine, 2013)

Throughout history braiding has been an important process of transforming fibers to more useful and precious structures. It is definitely one of the first textile process practiced by ancient civilizations. Starting with strands of thinner, natural-fibers as raw material and braiding them in order to create thicker, larger and stronger structures such as rope. (Branscomb, 2013) Still If one would consider the large number of possible application areas, braiding is a relatively less explored subject area within the context of textile engineering and production. (Potluri, 2011) In Journal of Composite Materials (Xu, Jong Kim, Ong, Ha 2012) showcase the range of the most common braiding patterns industrially today. (Illustration 1)

Illustration 1: Most common braiding patterns: (a) diamond biaxial braid (1/1); (b) regular biaxial braid (2/2); (c) Hercules biaxial braid (3/3); (d) regular triaxial braid (2/2).

Braiding can be classified into two and three-dimensional braiding. Two-dimensional braid structure is the flat braid, commonly used for traditional handcrafting and leather works.
Decoration of items and used as details on garments or belts. Three-dimensional braiding circular braiding is relatively new and is developed mainly for composite structures in industrial applications such as cable shielding. Two-dimensional braids refer to single layer structures whereas 3D braids refer to multi-layered inter-connected structures. (Gopalakrishnan, D, Bhuvaneswari, Ramakrishnan, V, Sabarinath T, 2007)

Illustration 2 showcases and explains the difference between flat braids and tubular braids, their stretch directions and material properties. (Xu, L, Jong Kim, S, Ong, C-H, Ha S-K, 2012)

Tubular braids are tubular in form and may be hollow or have a center core of some material. The traditional circular braiding machine contains a series of bobbins of yarn mounted on a moving track at the bottom of the machine. The braid is produced as the bobbins move in and out around the base of the machine such as Maypole dancers do. Interweaving yarns by braiding produces a flexible fabric; the braid material can easily be stretched in one direction but then it contracts in the other direction, which means that a braid is easily shaped for example a body, conforming to the shape since it has such flexible properties.

This principle of fabric construction is today most common used for Industrial applications and not for consumer cut and sew textiles. Braiding is today one of the most common fabrication methods for composite reinforcement structures such as electrical wires and cables, harnesses, ropes, industrial belts and surgical structures. (Palash, 2013)
Tubular braiding is a technique which within a fashion context is still unexplored and has much potential for structural, textural and technical development, as well as expressional development when the technique is introduced to contemporary menswear fashion. On the other hand the more traditional and common hand weaving technique has been used by contemporary efforts on the market earlier, principles and knowledge used in these examples has been utilized in this project to build and expand upon.

The 2011 Artisanal line by Maison Martin Margiela introduces a hand woven brown leather caged armour jacket. It is woven from hand cut strips of thick dark leather, created in Margiela’s Parisian atelier. The jacket is woven in an intricate manner in which the sleeve continuously comes out from the bodice without a shoulder seam giving the jacket a sculpted and seamless expression. This is an individually handcrafted piece that is different to the technique of braiding but is a reference of how a handicraft technique could be used how to create a garment.

The stiffness of the leather and the usage of the woven technique where the leather strips of the jacket has cuts where the strips intersect create an armory expression where the material creates a cage for the body. The shape, material and finishing are referencing back to a traditional leather jacket. Working this way with clear recognizable references back to iconic garment makes the message of the piece easily understandable. The hand-weaving and the pattern it creates is what is communicated since there are no other alien-elements featured in the piece. This is a common method of working when introducing new elements into fashion, whether it is materials or techniques, if the work contains recognizable features or non-alien elements it often raises the understanding of the piece. This is something that this work takes...
into consideration since the collection has recognizable forms and details even on the braided pieces. The braided sweater referring back to a knitted sweater in its components and form but are still affected by the characteristics of the braiding. In this works the traditional materials are replaced by paracord, since one may argue that there is a gap of usage of non-traditional textile materials in craft-fashion. The use of paracord abstracts the recognition-factor further than in Margiela’s example above but are building on the same principles.

Another one from the house of Maison Martin Margiela (Illustration 5) is another hand woven jacket where the strips of material do not intersect each other in the same way as the jacket in illustration 1, but is rather woven in a more traditional way. The jacket features the leftover-strips of material that are left hanging giving the piece a deconstructed aesthetic. These strips of material left on the piece brings another more fluid and fragile element to the piece and it also enables the viewer to read the construction, easing the understanding of the directions of the weave and how it was made. The jacket also features a one-piece construction where there is no shoulder seam. This example are constructed with shoulder pads creating a very sharp and pointy shoulder line, this blurs the effect of the technique in relation to the body since the of the woven-jacket contains a static-ghost body that will retain its shape no matter what unaffected by the wearer. The paracord braided pieces in this work are unconstructed in a way that they have no additional construction elements added to the braiding. This enables the pieces to on their own communicate the relationship between the technique, material and body. The body affects the braids in a way that the braid conforms to the wearer also in movement because of the fluid pliability of the material.

In some cases when the braiding technique is utilized in a fashion context the focus has not been to develop the technique in a way to create new kinds of braided materials, but rather to apply the technique into the garments construction, this example from Damir Domas Menswear SS09 Collection (Illustration 6) he included with a braid which comes out of the garment integrated into the construction. The piece is intricate in its making since the material
is a fragile silk/cashmere mix. This is an example of how flat braids can be worked into a detail of a garment but it does not develop the technique in itself from a material-making perspective. A new expression is found but still it is braids in the form as we have seen before and recognize but put as a detail in a context where it is seldom represented. A take on this is introduced into this work with applied braids into garments as show in the paracord collar tank top. It is a reference to how braiding has been used before in fashion but within the framework of this project. The purpose of this is to give recognition of the technique to the audience, showcasing the normal usage of the braids to enable understanding of the completely braided pieces.

*Illustration 6: Damir Doma Menswear SS09 - Braided Tanktop Detail*
The designer Boris Bidjan Saberi created a “whole body-seamless hand-braided leather jacket” in 2011, (Illustration 7) which is an example of how flat braiding could be applied to contemporary menswear fashion. This jacket consists of thinner flat braids that are butted together by leather laces. Visually it is an example of how a garment could be created by flat braids but construction-wise, from a technical braiding perspective it is not a development material wise since the separate smaller braided pieces are butted together instead of being one complete body-covering braid as show through the examples in this project.

Illustration 7: Boris Bidjan Saberi, ”Whole body-seamless hand-braided leather jacket 2011”.
STRINGS AND FRINGES BY BRAIDING/

Since braids are constructed from a certain amount of independent strings/cords/strands, the braid needs to be finished in some way to not unravel or be an open braid. A natural aspect that comes with the strands of the braid is the string that is left after the braid has been finished. The strings will fall in a certain way since the braid has a perpendicular direction of 45 degrees. Since the leftover strings becomes a natural integral part of the braid one decision of this project has been to leave the strings as they are, since the tubular braided pieces becomes quite stiff and sculptural in their appearance because of their sculpted making and the paracord material the fluidness and movement that the strings add brings another element to the piece that enhances the expression of the braid and highlights the piece overall.

While fringes has the role of being flowy, fluid and soft the braid itself takes the role of rigid, static and armory. Similar contrast in dress can be seen in historical ethnic dresses for example the Chasubles dress from Haiti, (Illustration 8) where the torso part is decorated heavily with sequined Voodoo symbols and bird images, making the piece quite armory in its expression and behavior. Underneath the torso part fluid parts of fabric peeks out to create this contrast and movement in the dress while they perform their dance-rituals. Their sequined armour also features a fringe edging going all the way around the piece that enhances this contrast.

This aspect of fringes contra static contra movement is something that this works takes into consideration and aim through this develop and enhance the expression of the pieces.

Illustration 8: Rara Etoile de Bethlehem, Ethnic Dress Haiti
A similar contrast can also be found in more contemporary efforts in fashion. Rick Owens FW 2014 Womenswear show featured stiff and sculptural felted wool jackets with cut up fringes at the bottom giving the otherwise rigid outfit a more fluid element. The strings are very controlled and applied, which gives a certain expression, in this work there is a balance between the even perfectly cut strings and the more rough ones, the roughness in the expression of the rough pieces ones helps the understanding of the technique and the understanding of that the piece is made by a hand by a handcraft. The imperfection makes it easier for the viewer to understand how the piece is created and constructed.

Illustration 9: Rick Owens FW 2014 Womanswear - Fringe Jacket Detailing
Jil Sanders Womenswear show SS09 featured dresses with an excessive amount of fringes where there is a breaking point for the viewer where it can be hard to judge where is the dress and where is the fringes. Is the fringe holding the dress or is the dress holding the fringes? This excessive use of fringes are interesting and something that this project utilizes but when they are used in such a thin and light material as in the example above the movement of the fringes behave more as one unit than as separate independent strings coming out of the piece. This affects the movement of the fringes making them behave more as a draped fabric than independent strings. The thickness of the paracord material in this works makes each string has its own life with independent movements.

Illustration 10: Jil Sander Womenswear SS09 - Fringe Dress
BACKGROUND OF MATERIALS/

FOR BRAIDED PIECES/

HISTORY OF PARACORD/

This work explores the possibilities of braiding with paracord (Illustration 11), which is a nylon cord consisting of a core of seven nylon threads which is enclosed in tubular braided outer sheath. Paracord is short for parachute cord and that is also the original intention and usage area for the cord. The U.S. Military started to use the cord during World War II and from there it was popularized. First it was being used only by the military then to be spread use to civilian use.

“The braided sheath has a high number of interwoven strands for its size, giving it a relatively smooth texture. The all nylon construction makes paracord fairly elastic and is now used in a number of applications including bracelet making, survival accessories, hiking products and of course parachutes. Due to this demand manufacturing of paracord is aimed at both military and civilian purposes”. (Silver, 2010)

The influential internet-handcrafter Strom-Drane creates various tyed-items from paracord and these pieces have gained recognition worldwide in crafts communities and the tying-possibilities of paracord have been highlighted. His approach of tying techniques

“Tying our shoes might be a person's first introduction to knots, and most folks probably never need or want to go beyond that. For those that do, there are many knots that can be useful, decorative, and often do both at the same time.” (Storm-Drane, 2013)
FOR NON-BRAIDED BOTTOMS/

FIVE POCKET JEANS/

COLOR PRINTED AAND ACRYLIC COATED LINEN/

The linen and polyamide fabrics used in this work are all pigment-color printed and coated with an HP-11 Nanoflam Acrylic Coating. Conceptually speaking this action has the same narrative as the way the braiding techniques has been used in this works. To start with an age old traditional material as linen weave and impregnate the fibers with acrylic coating to create something new both materialistic expression-wise. This could be seen as a metaphor to how the braiding technique has been used in this work. Where ancient techniques meet the new material and are put into the framework of contemporary menswear to find new functions and purposes.

“In many other European countries the production of alternatives is already well advanced and the use of lighter acrylic coatings has largely replaced the use of controversial PVC in coated tablecloths. Acrylic coating is a more expensive treatment where products such as the trademarked Teflon are used to provide a highly resistant and durable coating. Not only is this considered to be a hardwearing green treatment but it also allows the fabric to retain more of its natural feel and drape and retain its wipe able properties even after washing”

The acrylic coated linen works here as a substitute for heavy-weight denim since that is what it relates to in material properties. Expression-wise the use of the linen is to contrast and enhance the expression of the matte paracord in the braided pieces.

Coated denim and waxed jeans has been popular for a while in fashion and many designers have explored it already in various ways. An example that arguably may be the first to bring the idea to the masses is Hedi Slimane era-Dior Homme where his AW 2003 “Luster” collection featured shiny jeans with a thick layer of melted wax creating a wet look (Illustration 12).

Illustration 12: Dior Homme Waxed Jeans from AW 2003 Luster
Illustration 13: Boris Bidjan Saberi SS13- Partially Waxed Jeans
Boris Bidjan Saberi’s SS13 collection features black stretch cotton jeans that has undergone a partial wax treatment which gives the piece distressed uneven appearance (Illustration 13). The uneven application of the wax in these jeans is similar to how the pigment printed and coated fabrics in this collection are made, since they are printed with an open screen-print frame there will be some color variations and unevenness in the tones of the color, which makes the of the material more alive and expressive playing with the contrast of the even colored braided pieces. This is a conscious choice made early on in the process since it otherwise would have been easier and less work to just dye the fabrics and materials to the right color and the tone, but with dyeing techniques the same saturation in the color variations would not have been achieved.

What differentiates the coating used in this work from these examples is the base material, while arguably the most popular material to apply coating on is Twill weave denim jeans this work features coated linen, which has a more uneven and rough weave that penetrates through the coating making up an alternate expression to the one we already know through the examples above.

**FOR NON-BRAIDED TOPS/**

**SHIRT JACKET, LOOP COAT, TANK TOP/**

**STRETCH POLYAMIDE/**

The garments mentioned above features a stretchy breathable-tech-polyamide with an crepe-like texture. The fabric was acquired through a sponsorship of the Swedish fabric mill FOV Fabrics. FOV slogan states -”innovator of high tech fabrics, technical textile and apparel” (FOV, 2014), which is descriptive for of how they work.

The Stretch Polyamide is printed with an open frame with pigment color and acrylic in the same manner as to how the coated linen weave is treated. Series of experiment to acquire the right color tone and saturation was made and then observed before proceeding with the printing of the materials.

This kind of finishing with the acrylic coating creates a glossy finish while still the crepe-like texture of the fabric and the drape still is preserved.

**BACKGROUND SUMMARY/**

The previous examples and the comments made about them shows the starting points and fundamental ethos of this project. This research and analyze of the field will act as a base of knowledge and guide through the project. To objectively analyze what already has been done in the field and what kind of possibilities there is to develop and push something further will help one to find new solutions and expressions.

The finding of the tubular braiding was the most valuable finding in this part of the process since it opened up the view of the braiding technique from being limited to flat braiding or butted together flat braids such as in Boris Bidjan Saberi example in Illustration 7. The tubular braiding technique is optimal as a technique to create materials or one piece shapes as Margiela’s in Illustration 5.
METHOD/

DESIGN METHODS AND RESEARCH METHODS/

When reconstructing the industrial tubular braid through reverse engineering principles a greater understanding of the technique and possibilities was received. As Chikofsky states (1990), reversed engineering is the process used to understand a design, principle or system that is previously formed and help you change and develop the system further through analyzing its properties. By reconstructing the tubular braid. An understanding of the direction of the strands and the basic philosophy of the pattern was gained and experiments on how the tubular braid could be altered to accommodate the human body were carried through. Since the human body is not exactly shaped like a tube the braid pattern had to be altered to accommodate for the human limbs and form. Biggerstaff (1989) states the design recovery as a departure of the litigation of reverse engineering where outer knowledge, information and conclusions are added to the observations made.

To explain the design process in this work the simple four-state model of the design process explained by Nigel Cross (1994) in Engineering Design Methods can be used. Exploration leads to generation of an artifact which is evaluated and in order of improvement turns into another artifact with a feedback loop between the generation and evaluation stage. Eventually this leads to the communication of a final design (N. Cross, 1994)

One could also draw similarities to Archers model of the design process which consists of 6 activities, divided into three phases. First comes the analytical phase where observation, measurement and inductive reasoning is made. This is the first part of the design process. Then it carries on to the creative phase where evaluation-judgement-deductive reasoning and decision. In this phase often most crucial decisions are made and the data collected are being developed and processed. The last stage is the Executive phase where description, translation and transmission of the data collected are made. As Archer suggest; “One may call the design process a creative sandwich, the objective analysis may be thick or thin, but the creative act is always there in the middle”. (Archer, L.B. 1984)

When designing the collections iterations of sketched and collaged lineups are made in order to observe the relation between the separate components within the collection as well to enable to visually capture and understand the expression of the collection overall. This lineup has its roles as a specification writing with the aim as N Cross (1994) states; “To describe an acceptable outcome for designing that has yet to be done”. When the final design is made it is photographed and put into a new iteration of the lineup to observe the outcome of the result and its relation to the other components.
LIVE DESIGN EXPERIMENT IN FULL SCALE/

The sketching method of this work began with strands of material, sculpting the strands directly on a full scale mannequin that imitates the human body in a static position. In one way the principle is similar to draping with fabric on a model, yet different as the base materials are in separate strands or strips and are sculpted and molded directly on the mannequin through braiding, going from strands of material at the start and later on becoming a new material out of the strands molded according to the humanoid body of mannequin instead of draping with an already united fluid fabric.

To create these materials out of the strands a series of experiments were made. Most often a smaller piece is made to understand the materials properties and to see the texture, pattern and structure since different tensions and base materials create vastly different expressions and properties.

These material tryouts were photographed, analyzed and documented for further experimentation. In the process a braided material library was built to gain understanding of how the materials behave and its expressional possibilities. A selection of the materials is then chosen for further development, where bigger pieces of braided material are made in order to gain a deeper understanding of the relation of the materials scale, pattern and structure to the body. This process is to see in which scale, placement and material the braided unit works best in relation to the technique, body and material.

A conscious choice during the process has been to avoid to work on a half scale mannequin, as working on a smaller scale mannequin would only mislead and confuse, since the base strand material has determined circumference and could not be changed or doubled. Therefore, the same expression would not be possible recreate.

How can the composition of the collection and the outcome of the pieces be be improved? As John Chris Jones states in Design Methods For Everyone “By presenting your design to an affirmative group. This is the most popular and effective design method I know. Each person presents a preliminary design which is to be discarded and replaced by a better one based on the affirmative comments of the others”. (Jones, J.C, 2009) This method has been used throughout the whole process with monthly seminars with an affirmative group. The pieces has been shown on live-models and sketched/photographed Lineup composition with the intended materials has been looked upon to enable possibility to gain feedback to enhance the expression of the collection overall and direct the work in desired direction.

As Thornquist explains in Arranged Abstraction (2012) while describing the Backpack sofa by Hella Jongerius "the main motive behind Hella Jongerius (2003) work is to explore craft in relation to the common understanding of industry and technology by looking into the processes and techniques for creating unique pieces or using alternative materials". By doing so Jongerius proposes new expressions and definitions of industrial design. A similar approach to the technique versus material has been utilized in this project, aiming to create unique pieces. In Artistic development in (fashion) design Thornquist (2010) suggest a practice to enable rapid active design decisions, fig … This model of working has been of used while composing the lineup digitally through collage techniques to gain understanding of which components such as materials, colors, tones, textures and shapes blend homogenous and work heterogeneous in a desired ways for the expression.
DEVELOPMENT/

THE TUBULAR METHOD – GAINING FUNDAMENTAL UNDERSTANDING OF THE TECHNIQUE/

As the flat braiding technique is not optimal for creating united materials or form braids another braiding technique had to be considered and developed. As the process evolved tubular braiding was found. Experimentations of tubular braiding around a circular object were made to gain understanding of the technique. The tubular braid chosen for experiments was the biaxial tubular braid shown in illustration 1 and not the triaxial tubular braid shown in Illustration 14.

*Illustration 14: Industrial Triaxial Tubular Braid Scheme*
Step 1 of the exploration of the biaxial tubular braiding started through braiding around a 33 cl beer bottle to understand the basic principles of how the technique could be applied on smaller tubular objects (Illustration 15). After knowledge was gained through that experiment step 2 was to test the technique on a 1.5 liter water bottle to understand how it works in bigger scale (Illustration 16). After successful result the next step was to move on to the human arm to gain understanding how the technique works in relation to the body and how the technique could be adopted to use on the human body.

Illustration 15: Experiment 1- Circular braid around a 33 cl Beer bottle

Illustration 16 Experiment 2 - Circular braid around a 1.5 L PET-Bottle
BRAIDING AND BODY/

A tubular braided sleeve was constructed by using the human arm as a core to tubular braid around (Illustration 17). Conclusions made after the experiment was that the sleeve became tight to the skin since it was form braided directly on the arm. As the tubular braid does not contain a core the object the braid is braided around needs to be static and hard. The mannequin has an average human shape of since the braided sleeve will become tight and body close as it is basically a sculpt of the arm it was braided around.

Illustration 17
Experiment 3 - Circular
Braid around a human
Next step to explore the possibilities within tubular braids was to braid around the torso of a body.

Illustration 19 shows a successful experiment of tubular braid around body, the braid decreases in width when the piece is taken off the mannequin. After this experiment a fundamental understanding of the tubular braid had been found and it was time make an experiment where the technique is translated into a garment.
BUILDING A NEW MANNEQUIN

In order to braid pieces that are not totally form fitting to the body a new mannequin had to be built. The circumference of the mannequin’s arms and torso would need to be built up bigger to be able to braid a more voluminous shape and make the piece less tight. A finding after trying this out was that it is not possible to create a tubular braid that is looser fitting unless the density of the braiding is very high. If the braids have low density tube falls out in itself as it increases in length and contracts in width and the tube decreases in width and increases in length when not put on a body which fills out the empty space of the core holding the strands.

Illustration 20: Experiments shows how the tubular braid contracts in width and extends in length

Illustration 29 Built up mannequin

The tubular braided pieces in the collection are body-tight since it was found out that the method of building up the mannequin was not ideal. Since the the tubular braided paracord material will not drape accordingly as it instead collapses and becomes irregular in the pattern if one piece of wider circumference would be put onto a smaller body. After this finding it was decided that the pieces needs to be form braided tight around the mannequin in order to perform as desired on the human body. As a result of this the tubular braided examples in this work has a tight and body-close fit.
A collar and a yoke were produced through flat braiding for experiment 5 to act as a foundational base to connect the strands of paracord to braid from. The circular braid that comes out from this base is produced in the same material. Working in this manner where the strands has a base creates a more intricate expression that is more easy to relate to since it contains elements from garments that are relatable, such as in this case the collar and form on Experiment 5 could be related to the collar of a knitted sweater.

A finding in this experiment is how to construct a sleeve out of a tubular braid. The tubular braiding pattern creates an open gap under the sleeve which helps ease of movement taking in a functional aspect of the braiding technique in a fashion garment context. Experiment number 5 was later on taken further and rendered into the grey-green tubular braided sweater in the collection.

The base material of the strands and the number of the strands and the tightness of the braid decides the pattern of the braid and the material properties and the shape of the piece. Through experiments the outcome can be determined but it cannot be controlled in any other way then being conscious about the chosen materials and the how technique is performed.
FLAT BRAIDING/

Besides tubular braiding the more common braiding technique flat braiding has been included in the works to observe and show the difference in the techniques.

In the braided paracord tank top and the sweater the collar and the endings are flat braided, the braiding pattern are the same as the tubular braid featured in the piece, the only difference is that one strand of paracord are braided instead of two strands, this creates a more pliable and moveable material which is needed especially in the collar since it is a straight flat braided panel.

Illustration 22: Flat Braiding - Technique, Pattern and Method - For ending of braided tanktop

Illustration 23: Flat Braided Collar - On Braided Tank top - created as as straight panel and then shaped on the body

Illustration 24: Flat Braided sleeve ending on braided sweater
The approach of flat braiding is different than the tubular braid. The processes of the flat braided pieces are such as, taping up the pattern piece of the desired form against the wall. Tape or stitch a row of the amount of strands needed for desired width according to the pattern piece. Then the setup is ready to be flat braided into one united material following the pattern piece. This method of flat braiding with woven tapes was an idea that was thoroughly explored and tried out, but late in the process it was decided that the expression of the material itself was not ideal compared to the paracord which has a sleeker and more effortless quality when braided. Therefore this method of working was left out and is not featured in the final line up.
Illustration 29: Material of prototype for flat-braided trouser. Woven Tape is stitched around the flat-braided pattern piece to close and finish the braid. After this step the piece are ready to be stitched together.

Illustration 30: Result in Flat-Braided Trouser

Tubular Braided vs Flat Braided Trouser
Flat Braided Trouser was more successful
While experimenting with material in relation to a technique it may often not be easy to determine the outcome of the experiments. Often the material leads the technique and lends itself to certain shapes. Therefore a trial and error approach was taken by the making of continuous experiments with different materials to find out and gain understanding of which combination of material and technique correspond in a desired way. Sometimes the outcome of the experiments was not always as determined and desired but not in all cases this was an negative thing. This way of working experiment-oriented with materials is often spontaneous, responsive and most often leads to new findings.

After these experiments were made the selection of braiding material was narrowed down to only paracord and woven tape to be able to create a cohesive fashion collection and not only limit the works to become a material investigation, since the usage of the technique also may appear more clear when using one kind of material, letting the technique speak and not only the material. It was a conscious choice made to enable to see the subtle differences in the braiding patterns used in the paracord for eg. 1X1 Braid, 2x2 braid, 3x3 braid.

*Illustration 31: Example of range of the most interesting flat braided material experiments from early in the process*
Illustration 32: Scale experiments were carried through early in the process. Was neglected since the expression turned out to be more suitable to costume than fashion.

/INTEGRATING BRAINDING INTO GARMENTS

After developing the tubular braiding technique ideas about trying to integrate suggestions on seminars came up that trying to integrate the braiding into a fabric garment may be interesting. Rick Owens worked in a similar manner for his FW2013 Woman’s collection where he inspired by Japanese Basket Weaving created handcrafted structures that he integrated into his tailored outerwear.

Illustration 33: Rick Owens Womanswear FW2013 - Japanese Basket Weaving

A series of experiments of this was made on the subject. An early finding was that the base fabric has to be felted or non-woven to not fray when it is cut up and braided through. The balance between the base fabric and the base material of the strands in the braid has to match each other as well not to pull the fabric.
The first experiment on the subject (Illustration 34) was to integrate tubular braided woven tape in the jacket in a natural flowing way. The pattern of the braid is extracted from the pattern of a tubular braid that goes around the body. However the result did not turn out in a satisfying way since the braid is more braided around the jacket instead of actually being integrated into the construction of the jacket. This experiment could have been developed further as it has great potential as it creates patterns as well as an outer structure on the jacket. According to the aim this method of working did not appear as interesting or progressive in its approach and expression as the completely tubular braided pieces. Therefore this experiment was neglected.

Next experiment was more literally braiding through fabric. The paracord is embroidered through pre-made holes in the fabric. The braid follows pattern of flat braid the difference is just that that the unit has fabric that it goes over and under. The Braid through the fabric is made with the cut out pattern piece flat on a table, a grid is made and then small holes are made with a sharp scissor. Then the braid is braided through the fabric with the strand material. The result of the technique was not optimal since the teddy-fabric was too soft for the paracord which resulted in pulling and runching of the
fabric, resulting in an expression that aimed to be sharp in theory but was not practically. Because of that the experiment was considered a failure and that specific technique was laid to rest.

Another experiment that was more successful and actually made the way into the final collection is a more applied and less integrated usage of the braiding technique. As a reference back to how the technique has been used before in fashion, a collar is flat braided and applied onto the garment, in this case a tank top made in an acrylic coated polyamide tech-fabric. The collar is flat braided and then hand-stitched onto the base garment. The flat braid is closed with a plastic hardware-clip, which bring another playful element and texture into the mix.

*Illustration 37: Tank top with flat-braided paracord collar and plastic clips. Successful*

**FRINGES/**

The fringes are a byproduct of the strands of material the braids are composed of, thus as a natural result of the braiding of the strands there will be fringes of the strings left hanging. Leaving the strings left hanging on the braided pieces was something that never was planned but in the process after finishing the first braided pieces leaving the strings as they are was considered as they bring an element of movement, liveliness and fluidity to the pieces. The fringes are secondary to the braids but by this natural accident they created something that has a place in this work.

“There remains simple experience; which, if taken as it comes, is called accident” (“empirical”), if sought for, experiment... The true method of experience... The true method of experience first lights the candle” (hypothesis), “and then by means of the candle shows the way” (arranges and delimits the experiment); commencing as it does with experience duly ordered and digested, not bungling nor erratic, and from it educating axioms, and from established axioms again new experiments.” (Bacon,F.(1620) p.30)

“Here we have Bacon speaking of the results of initial experiments as a “first vintage” to guide further research” (Durdant, (1933)
Illustration 38 Applied Fringe Experiment of Shirt-Jacket referencing the classic Fringed Biker Jacket

The intention in the start of the process was to cut the strings off to clean up the expression of the pieces but then later in the process it was found that to bring more fluid motion to the static braided pieces the fringes had a great purpose. Therefore the fringes also works as an separate element of its own in the collection working as an application on garments such as the five pocket jean and in the shirt referencing the traditional fringe biker jacket. The fringes connect the piece with the other paracord pieces and also to bring an element of movement.

On the fringes of the braided pieces; the end of the braid results in fringes since the braid is constructed from separate strands of paracord this results in natural fringes not applied as they are on the Fringe-Shirt jacket. This gives the piece an easy-to-follow pedagogical quality, with a naturalistic approach.

The construction of the piece makes it evident of how it is made and constructed and the fringes eases the understanding that the piece is constructed out of separate strands of material. As Thornquist describes, “Looking closer, the model revealed certain particularities about its construction, how it is made is evident through the simplicity of its composition. (Thornquist, 2012)
MATERIALS/

PIGMENT PRINTED AND COATED FABRICS/

To enhance the expression of the braids supporting garments has been added to the collection. The fabrics of these garments have been treated in a way in order for the texture to the same language as the nylon paracord material. The five pocket jeans that covers most of the bottoms in the collection is a loosely weaved rough mangle cloth linen weave that has been printed with an open screen-print frame with pigment color and then being treated with HP-11 Nanoflam Acrylic Coating.

The coating closes the weave making it impossible for the loose weave to unravel even with raw edges. The coating also gives the material a shiny - wet look that compliments the nylon paracord and together with the pigment colors pattern of the loose weave is enhanced and gives it an expression that corresponds with the nylon paracord.

The original intention of the usage of the coated materials was that as the coating closes the weave and opens up the possibility to slice or cut up the material of the fabric to enable one to braid with the flat slices of the material and give the possibilities to also braid into other strands of material for eg. paracord into the sliced up fabric.

Through experiments successful examples of using this technique was found but in discussion in relation to the other tubular-braided pieces in the collection the decision was made that the expression of the slice-cut-braid technique is something that could be made into a collection of its own and that the expression itself do not enhance the qualities of the completely braided pieces in the collection. Therefore the technique is left out but the coated material remains since it was found that the texture of the material compliments the paracord.

The technical polyamide fabric which is produced in Sweden by FOV Fabrics has from the start a matte texture that is made flat and even with layers of pigment color applied with an open screen-print frame. After the desired color is applied two layers of HP-11 Acrylic

Illustration 41: Pigment Colored and Acrylic Coated Tech-Polyamide as found on Fringe shirt-jacket in the collection

Illustration 42: Pigment Colored and Acrylic Coated Rough Weave Linen fabric as found on Five pocket jeans in the collection
coating is applied to create a shiny and sticky - wet-look texture. This shiny coated surface works as a platform for the texture of the nylon paracord in the braided pieces to be highlighted against. The expression of the coated woven linen fabrics in the collection introduces new textures for menswear fashion.

**WAVE KNIT NET JERSEY**

After finishing the Paracord-braided cardigan it was possible to try it together with the coated tank top. The conclusion was that the materials were fighting over the space, the stiffness and rigidity of the coated acrylic toned down the expression of the braided paracord in an undesired way. Therefore the decision was made to bring in a more matte, light and body-conforming material. Different sorts of circular-knitted jerseys was tried out in combination with the braided piece. The jersey that enhanced and fueled the expression the most was a beige Wave Knitted Net jersey fabric. A material that may be referred to the classic wife beater-tank top but in this context hopefully it will not. The wave knit shares the same material properties as the tubular braid. It elongates when being pulled lengthwise and then contracts in the other direction. The wave knit also shares the same diamond-diagonal pattern as the biaxial braids in this work, therefore the materials corresponds both conceptually and materialistically. The wave-knit is featured in the tank top undergarments that complement the braided pieces and the leggings that compliments five pocket fringed jeans-shorts.
PLASTIC HARDWARE/

PLASTIC KITCHEN CLIPS

In the process of making the braiding pieces plastic-kitchen clips has been used in order to close the braids and to keep the strands together in place. These plastic clips comes in a variety of colors. The intention from the start was not to keep these plastic applications, but in the process it was decided that the element of the plastic texture and the color that it brings is a desired one and enhances the expression. The plastic clips has been put on the pieces randomly but then organize them slightly to create a more conscious but still spontaneous expression. Illustration below showcases how the both the plastic locking clips and the plastic kitchen clips has been used in the process of making the braided pieces.
PLASTIC LOCKING CLIPS/

In the paracord-tying subculture established by Storm-Drane mentioned in the background chapter it is a common solution to close and finish the paracord-survival-bracelets with plastic locking clips. Therefore this kind of hardware is a natural choice to utilize as hardware on the pieces in the collection since the measurements and structures of the clips are special made to be used with paracord.

COLORS/

This work has also featured a sub-exploration on the subject of pigment printing and acrylic coating with open-screen print frame. Experiments has been made through an intuitive and spontaneous trial-and-error approach where print samples are made on a wide range of materials to later on narrow down the selection to pinpoint the most expressive and for the purpose accurate results. The samples has through the process always been put in relation to the braided paracord materials since the main function of the printed materials are to highlight the braided pieces and not to blur the expression.

During the Artistic Development course right before this Graduation Work, one assignment was to create a mood board as an exercise to create a mood for the collection. At this part of the process the paracord material was already in consideration for this works and therefore the concept of this collage mood board was to recreate the natural setting of a Parachute-trooper. The finding in the mood board was the stark contrast between the signal colored ropes the parachute-trooper is wearing and the more subtle silver grey environment. This finding was something that was carried through the whole process and incorporated in the reasoning
behind the colors. Since the paracord is the base-material for the collection it was a natural decision to utilize the common paracord-colors like the bright-signal orange, the ACU Camouflage and the golden rod and mix these with more unconventional colors like the silver grey and white in a paracord tying-context.

The reasoning behind the colors of the complement garments follows the chosen paracord-colors in a sense that they blend with or contrast them.

If one would reason generally about color palletes in contemporary menswear fashion one may argue that designers often tend to stick to muted monochrome color palletes or go all the way with mixing stark saturated colors. This work aims to sit somewhere in between with stark saturated colors next to muted greys and beiges to create a harmonious but expressional mix.

Illustration 50: Collage Moodboard created in the start of the process
GARMENT TYPES/

By combining the braided pieces with non-braided pieces the aim is to achieve a new kind of depth in the handcrafted braided pieces as well as in the overall composition.

The garment types has been chosen to contextualize the work, as this work intention is to be put into an menswear fashion context there is a need of garments that is not braided to highlight the braided pieces and enhance the expression of them inside the framework of menswear fashion, therefore a line of non-braided garments have been developed to enhance and support the braided pieces.

The thought process and reasoning behind these was to not start with the construction and of archetypal menswear garments but rather to create something more contemporary in terms of cut and material choices but derive the shapes from recognizable garments in terms of silhouette and cut.

The method used to develop the non-braided garments is by reverse engineering existing garments of contemporary competitors by tracing down the pattern with a tracing wheel. After the pattern is traced down it is ready to be altered and reconstructed. By trial and error prototyping approach changes are made, documented and evaluated for further improvement. These garments were originally chosen because of the cut’s comp ability with the expression of the braids. If one has a garment of suitable cut and proportions it is not of less value to trace the pattern for altering than to reconstruct it from a commercial block-pattern.

As Rickard Lindqvist explains in his “On the logic of pattern cutting”
“Copy the work of earlier masters or contemporary competitors is a Natural way to learn and find one’s own artistic voice. These works may become the foundation for development, deconstruction and reconstruction. I would distinguish this evaluation and ability to see the potential of new developments of pieces of existing work, whether they are historical, one’s own work, or someone else’s creations, as a most important skill for a fashion designer”. (Lindqvist, 2012)

After enough rounds of prototyping the garment is recreated in the final prepared material to observe the expression of all the garments components in relation each other to create a dynamic line up

BRAIDED PIECES/

Since all the tubular braided pieces are braided around a mannequin the form becomes rather close to the body, this is decision that was taken quite early in the process as there is a lot happening within the pieces itself with the strand, braiding patterns, colors and materials. To understand the intricacy of the braided pieces the form of the pieces had to take a step back to not conflict with all the other features of the piece, to be able to communicate the desired effort in an easily understandable way.

The braided sweater derives its principle and form from the knitted sweater. The function of the flat braided cuffs in the sleeve and the body is applied after the tubular braid is done to
finalize the piece and to lock the strands as well to make the piece into a finished garment with recognizable features.

The orange braided tank top derives its principle and form from an archetypal tank top. The function of the flat braided cuffs in the sleeve and the body is applied after the tubular braid is done to finalize the piece and to lock the strands as well to make the piece into a finished garment with recognizable features. The piece features a zipper in the left side to make it possible to enter and to take-off the piece without distorting the braid. The piece also has fringes at the bottom to serve the purpose to make communicate that the piece is braided by hand and to highlight the amount of strands in the piece.

**NON BRAIDED PIECES/**

**FIVE POCKET JEANS/**

The collection features two different jeans models that draws form and stitching ethos from the Archetypal denim jeans. The cut and the silhouette is updated though with one slim carrot-cut jeans with slightly dropped crotch and one wide legged cropped jean. The both models features an alternative way of construction in the sense that they do not feature side seams to create a more tubular shape conceptually speaking with the tubular braided garments in the collection.

The jeans feature a panel in the back where the pocket goes into. This back panel is a cut that is extracted directly from the flat braided trouser in the collection. To be able to flat-braid a trouser without a big and unnecessary material waste a cut in the back has to be made. On the flat braided trouser this was made and then the cut was extracted and translated into the cut of the five pocket tube jeans.

Detail wise the fly-construction use an continuous panel, similar to a traditional blouse-slit. The jeans features outer pockets in the back that has rounded corners unlike the traditional jean slanted and angled jeans pockets first created by Levis.

**SHIRT-JACKET**

The collection features a long sleeve shirt jacket that has a rounded collar and a regular fit. The sleeve contains of an over and under-sleeve with a slight curve and articulation in the elbow referencing of how men’s-jacket sleeves traditionally are cut.

Instead of using a traditional shirt collar a rounded collar is used for a more contemporary look that speaks the same language as the braided pieces. One may argue that we have enough shirt maker’s in the world and for the expression of this project it may not be interesting to bring in traditional menswear details - such as a shirt collar but instead figure out alternative details and constructions that create a new expression.

The shirt is closed with clip-closures that is looped thorough a piece of paracord sewn into the placket of the shirt. This clip-closure is a detail that in its traditional use is utilized in paracord-bracelets to as a closure system. The reasoning behind bringing in this detail is that the plastic texture brings something into the mix as well as it is a direct reference to the paracord-tying-culture which in the context is justified since paracord is the base material of the collection.
Illustration 51: Fit-Prototype of Shirt-Jacket

TANK TOP

A simple tank top has been made following the same cut and round-collar detailing as the Shirt-Jacket mentioned above. The tank top also features the same colored and coated tech-polyamide material as the Shirt-Jacket.

Since the top is made in a non-stretchy woven material a closing system had to be applied to be able to put the garment over the head. Therefore a hidden-zipper was put into the left shoulder seam continuing into the collar, enable the wearer to open up the piece and put it over one’s head.

COAT

A long coat is featured that follows the shape and paracord-loop edging detailing of the silver colored tubular braided cardigan. The coat is unlined and has a sharp cut with natural falling shoulders for a more contemporary expression, speaking the same language and sharing construction principles of the braided pieces.
The traditional lapel and collar that coats traditionally are finished with are reduced and instead the coat has the same paracord edging as on the braided cardigan to further integrate the coat into the collection expression and form-wise. The coat can be seen as a proposal of how the paracord material could be used in a commercial ready-to-wear fashion context since it its materials and shape is fairly conventional but are still in the same aesthetical universe as the full braided pieces.

LINE UP COMPOSITION/

To keep track of the collection and to gain access to an overview digital collage techniques were used to create line ups of all the looks. Material samples were photographed and then manipulated digitally to be able to piece together on a male body which braided materials, forms and colors corresponds well together. During the process there were many different iterations of the lineup progressing, changing and updating through discussions with tutor.

In the start of the process the project was attacked with an maximalist approach with not so much thought or reasoning behind the composition lineup since the thrill of successful experiments easily overrides the urge of having a well composed lineup.

Before the 50% seminar the composition was fairly confused and divided since its featured garments from all the fields of experiments that was made. Tubular braided garments besides flat braided garments besides regular woven garments with applied braids besides woven garments that were sliced up and braided with.

The project needed a focal point, both in colors, usage of technique and general refinement. Comments during the seminar gave understanding of that one does not need to make three collections at once. Therefore the lineup was cleaned up and a more focused approach to the tubular braiding was found. The flat braiding technique was still there in some garments since it brought a welcoming element to the mix with its patterns.

Illustration 53: Line up before 50 % seminar
First after the 75% seminar some kind of focus in the composition was found, this is something that was not realized at the time but something that was found out later. More emphasis was put on the tubular braiding and things started to get their shape. The colors were more or less the same as in the final lineup just in a less focused way of using them. In fashion when one start to see finalized pieces is often a time where one changes their opinions.

The flat braided pieces followed through all the way to the final examination even though the tubular braiding was more interesting and developed. The reasoning behind was that the flat braiding was a good example for commercial application and they got nice critique during discussions and seminars. When all the pieces were shown on live models at the examination
the conclusion was made that the flat braided pieces did not appear as sleek and effortless in comparison to the tubular braided pieces. Therefore the decision was made to leave these pieces behind in favor for another braided paracord piece. Another comment and realization during the examination was that the excessive use of fringes possibly was not in favor of the technique and that they may blur the expression. Therefore they were looked upon to see where they were needed and where they were not.

Illustration 56: Line up from 90% Seminar

Illustration 57: Line up from Examination
RESULT - FINAL LINE UP/
MATERIALS AND COLORS/

FOR JEANS/
LINEN – PIGMENT COLOR PRINTED AND ACRYLIC COATED, TWO LAYERS OF EACH/

FOR COAT, SHIRT-JACKET, TANK TOP/
TECH-STRETCH- POLYAMIDE- PIGMENT COLOR PRINTED AND ACRYLIC COATED, TWO LAYERS OF EACH/
FOR UNDERLAYER TANK TOPS/
WAVE KNITTED NET JERSEY-BEIGE IS NATURAL - ORANGE IS REACTIVE DYED

FOR BRAIDED PIECES/
NYLON PARACORD/
JEANS DETAILS, FRINGES, RIVETS, POCKETS, CUTS/
OTHER DETAILS/

Flat braided collar on Tank Top look #3  Zippered Jet-Pockets on Coat in look #3

Neckline on under layer tank top in look #1 and #7  Seam tape, closure system and neckline on shirt look #5

Seam Tape and interior on Loop Coat
FLAT BRAIDED PARACORD SKIRT APRON/WAVE KNITTED TANK TOP/FIVE POCKET PAINTED TUBE JEANS
3x3 Diamond Flat Braided Apron – ACU Camo mix of grey and black camo.

First out is a 3x3 flat braided paracord piece of material worn as an apron, which is held together by a belt in the back that is closed by plastic kitchen clips. First look in the lineup, meant to showcase the flat braided technique as it is a more common and traditional approach to braiding than tubular braiding.

The choice of the simple form and construction of the apron is to highlight the pattern and texture of the mixed paracord colors as well as to contrast the tubular braided pieces that come afterwards in the lineup. The open fringe-ending and the mixing of the colors are derived from previous experiments with flat braiding in woven tapes. The ideas are echoed here but re-appropriated in paracord. The apron is paired with an orange dyed wave knitted tank top and white pigment printed and acrylic coated jeans. The orange color is chosen to pop against ACU camo of the paracord and the white jeans are chosen to compliment the both other components.
TUBULAR BRAided PARACORD SWEATER/FRINGEd AND PAINTED FIVE POCKET JEANS

2x2 Diamond Tubular Braid Sweater of Paracord Type II and III

This is the first tubular braided example in the project, a tubular braided sweater showcasing a more rough side to the technique since it was the first tubular braided piece that was completed. The piece has two different thicknesses of paracord, the thinner paracord type II and the regular type III. This affects the tension of the piece, creating a more irregular pattern of the braid. The sweater is made in a way that a flat braided yoke and collar first is created, to act as an foundational base to fasten all the strands of paracord from to create the tubular braid. The piece has flat braided endings in the hem and the sleeves to refer back to how knitted sweaters are finished with rib-knitted endings, to create an recognizable element.
PARACORD LOOP COAT/FLAT BRAIDED COLLAR TANK TOP/FLAT BRAIDED PARACORD FRINGE BELT/COATED FIVE POCKET JEANS SHORTS
1x1 Diamond Flat Braided Paracord Fringe Belt
2x2 Diamond Flat Braid Paracord Collar Tanktop

This look aims to have a more commercial approach where the techniques are applied instead of actually creating the base material. A flat braided collar is applied to the coated-polyamide tank top to refer back to how braiding could be applied in a ready-to-wear context.

A coat in the same material as the tank top features applied loops of paracord in the same technique as the grey paracord cardigan in look #4 and the green paracord jacket in look number #7 are using to start-off the tubular braid.

The coat is finished internally with heat tape to create a neat finish and also since it is a natural way to finish a piece in tech-polyamide fabric. The look also has a flat braided belt that contains a skirt with paracord fringes to highlight that the strings are a result of the braid.

The look is finished with a pair of coated-jeans shorts to balance out the silhouette of the long coat. The shorts have their signal-orange color as a reference back to the paracords origin as a survival tool.
4x4 Diamond Tubular Braided Paracord Cardigan

Look #4 features a tubular braided paracord cardigan with fringes coming out from the armeye and hemline. This one is braided with 4 paracord strings in each strand which gives the material a lower density and a softer hand.

Cropped silver blue Jeans shorts are worn underneath with a color tone that is referring to old worn and washed denim. The shorts are of the same length as the cardigan so they are obscured while the cardigan is closed and revealed while in movement. The cardigan features small plastic clips in the front that goes directly into the paracord loops as it was the most logical and natural solution.

Since the collection it built upon yellow or orange tones this look breaks that red thread featuring colder tones of silver and grey, this look was therefore placed in the middle of the composition of the lineup to create more dynamic.

The plastic clips are left on the strings in the armseye to bring another element into the mix for a stronger expression.
TUBULAR BRAIDED OBJECT DYED HAT/FRINGED COATED SHIRT-JACKET/COATED FRINGED FIVE POCKET JEANS

2x2 Diamond Tubular Braided Paracord Hat

In this example the tubular braiding technique is showcased through an accessory, a tubular braided hat in this case which is referring back to the traditional and common knitted hat. This look is also how shows how the fringes could be used in a more commercial context since they are applied to the shirt-jacket and the jeans just as they are.

The shirt-jacket are referencing the traditional fringed-biker jacket in the pattern of the fringes, creating a bow along the back which continues into the fringes of the jeans to create a movement in the look.
2x2 Diamond Tubular Braided Tank Top

This was the second tubular braided piece made, enabling more precision and accuracy in the making and more mastering of the technique itself. The tubular braid is hard, tight and high in density in this example which generates an armor-like expression. Form-wise the idea is to derive the shape from the traditional men’s- tank tops to follow the idea of the braided sweater in look #2.

This braided tank top is made to the same principle as the braided sweater in look #2. A flat braided yoke and collar first is created, to act as a foundational base to fasten all the strands of paracord from to create the tubular braid.

The piece has flat braided endings in the hem and the armcye to refer back to how the traditional men-tank top usually are finished with rib-knitted endings, to create a recognizable element.

The piece has a skirt of the leftover strings dangling below, cut to precision to create an interesting movement while in motion.

The bottom half of the look has white five pocket jeans to pick up the whites from the plastic clips and to let the signal-orange speak.
TUBULAR BRAIDED JACKET/ WAVE KNITTED NET TANK TOP/COATED FIVE POCKET JEANS
3x3 Diamond Tubular Braided Jacket

The braided jacket in this looks is to be seen as a commentary on the whole collection, as a summary of all the pieces since it contains the core elements that the collection is built upon. It features the endings of the apron, the plastic clips, the edging loops from the coat and cardigan, the density of the braided tank-top and the braiding pattern from the cardigan. The strings are left at maximum length for a more chaotic expression to contrast against the more controlled braiding in this piece.

The piece are braided with a green paracord to pick up the green tones of the ACU camo but still share similar color values as the other more saturated pieces in this collection.

The piece is combined with an orange dyed wave knitted net tank top for contrast and the five pocket jeans as seen before.
REFLECTION/

BRAIDED MATERIALS FOR COMMERCIAL APPLICATION/

The material world in the contemporary fashion industry built up on woven, knitted and non-woven materials, one may ask we have not developed techniques to use one of the most foundational techniques to transform fibers into more precious structures, braiding. Focus of developing new technologies to enable these techniques to be utilized.

How could the findings in this work being used in a commercial industry. If we could engineer industrial braiding machines similar to knitting machines. How would that change the way we use and perceive the technique?

As the braiding technique will be forming the mechanisms of future braiding machine. We have hopes for that in the future engineers can invent new and progressive braiding processes to create fabrics for commercial application in fashion and also possibly formed by the tubular braided examples here understand the potential of the tubular braiding method and therefore engineer machines in order to enable to produce these braided structures processes industrially made for usage in a fashion context.

One of the issues when creating the tubular braided pieces in this project is that they are fragile, in a similar manner to how a knitted sweater rips when a yarn is pulled, if a strand of a tubular braid is pulled this will alter the tension of the whole piece, creating an inconsistency in the material and unevenness in the tension. Arguable this is a problem that would be bypassed by tubular braiding with tighter tension in smaller scale, creating a very hard and rigid material that is less fragile, but as the tension rises the material also becomes less suitable as a material for dress since the rigidness is not comfortable or functional for everyday day life. Therefore these materials are in this stage of development more suitable to showcase the possibilities of the technique in a fashion context rather than to be ready to be sold in a store.

The braided pieces in this collection do require a big amount of strand material to produce a united material. Especially when the braiding is executed in this scale as in this project, the braiding technique in itself does not require more material than weaving. If machine-engineers would accept the challenge to produce industrial braiding machines to enable to produce braided fabric for fashion, it could change how we perceive the expression.

SUSTAINABILITY/

From a sustainability point of view this works is responsible in a way that it preserves the ancient braiding technique and develop and broadens the expression of the technique and hopefully changes and passes on the knowledge and inspires another generations to utilize the possibilities. This is meant in a sense to inform about the expressional possibilities of the technique.

To continue on the question that arose in braided materials for commercial application, braided materials developed by high-tech machines could work from a sustainable point of
view. At the same time the opposite of this proposal, letting the braid technique remain a traditional handcraft, executed as in this project could also benefit sustainability since it does give the pieces other qualities and values, socially and economically, especially since it is a craft that anyone from young to old could learn easily with just a portion of personal patience and determination.

These techniques used in this work could also be applied to other fields than fashion. Textile art, interior design, industrial design could all use these techniques to find new ways to use the technique.

**TECHNICAL/**

As Goran Demboski describes regarding braids and form in “Textiles structures for technical textiles' in Bulletin of the Chemists and Technologists of Macedonia.

“The braid is a flexible product that can be adjusted to various shapes. With the special device called mandrel the braids can be shaped into various forms directly on the machine at the manufacturing stage.”(Demboski, G, Bogoeva G, 2004)

What Demboski describes is industrial tubular braiding processes on a maypole braiding machine. By developing this method further and by using this mandrel device possibly forms braided pieces to accommodate the human body could be created, building on not the exact braiding patterns in this project but the same principle and approach to the technique. Possibilities of developments in this area are great.

The way of braiding directly onto the mannequin used in this project has given understanding and observation of how the braiding works. Given a hands-on approach where the maker has all the power in their hands to decide everything from tension to braiding pattern to number of strands. Part of these experiments made the maker fully understand the patterns and intuitively give understanding of where all the strands should be placed. For this technique this way of experimenting has been optimal since once can see an instant result the hands action working the braids, which is something that never could be accomplished in the same manner since one’s mind cannot easily estimate tension and amount of strands while collage sketching or drafting in 2D.

Throughout this project the braiding techniques has been analyzed and a method of constructing garments out of braiding has been developed, questions regarding how the construction works in relation to a moving human body and how it needs to be altered to enable the piece to function as wearable garments without compromising the expression has been made. Hopefully these findings can be recognized and implemented into fashion to open up for further development.
REFERENCES/ 


Bacon, F (1620) Novus Organum pg.30


Durdant, W (1933) The Story of Philosophy, pg.170


Thornquist, C. (2010) Artistic development in (fashion) design pg.113

Absolute Astronomy, Braid 2014, accessed 2 May 2014,  
<http://www.absoluteastronomy.com/topics/Braid>

Askdefine, Extensive Definition 2014, accessed 2 May 2014,  
<http://braid.askdefine.com/#wp/>

FOV Fabrics, accessed 21 May 2014,  
<http://www.fov.se/start.htm>

Gopalakrishnan, D, Bhuvaneswari, Ramakrishnan, V, Sabarinath T, Braiding & narrow width fabrics 2007, accessed 2 May 2014,  

Jones, J.C, Design Methods For Everyone 2009, Accceeded 2 May 2014,  
<http://www.softopia.demon.co.uk/2.2/designmethodsforeveryone.html>

Palash, I, Main Features of Braid Fabric 2013, accessed 2 May 2014,  

Silver, J, Craft Secrets 2010, History of Paracord, accessed 2 May 2014,  
<http://craftsecrets.blogspot.se/2010/01/history-of-paracord_17.html/>

Storm-Drane, About 2014, accessed 2 May 2014,  
<http://stormdrane.blogspot.com>

ILLUSTRATION REFERENCES/ 

Illustration 1; Journal of Composite Materials, American Society of Composites 2012, Xu, L, Jong Kim, S, Ong, C-H, Ha S-K ss..2

Illustration 2; Journal of Composite Materials, American Society of Composites 2012, Xu, L, Jong Kim, S, Ong, C-H, Ha S-K ss..2

Illustration 3; http://www.braider.com/images/braidbasics/braidbasics.jpg


Illustration 5;  http://www.svd.se/migration_catalog/margiela_docka_382372.svd/representations/d_standing/margiela_docka?1223819975000

Illustration 6; http://s7.postimg.org/7bay7lbyv/RIMG0381.jpg

Illustration 7; Book, Boris Bidjan Saberi 11, 2013, Fabriano Fabbri, pg-190, Alex Cruses
Illustration 8: Book, The Shining Cloth, Dress and Adornment That Glitters, pg-102 Victoria Z. Rivers, Hudson & Thames


Illustration 10; http://www.runway.vn/tl_files/blog/2012_Return_of_the_flapper/000_Jil_Sander_SS09_show.jpg

Illustration 11; http://i2.guns.ru/forums/icons/forum_pictures/004434/4434121.jpg

Illustration 12; http://i5.photobucket.com/albums/y197/wenwen89/IMG_7950.jpg


Illustration 14; http://1.bp.blogspot.com/_EKwhWV4Jxws/TKuW7ax6z9I/AAAAAAAAAFc/-gQ45SSuKM4/s1600/bread.jpg

Illustrations 15 - 33; Authors own

Illustration 33; http://www.style.com/fashion-shows/fall-2013-ready-to-wear/paris/rick-owens/collection/_RIC0342.450x675.JPG

Illustration 34 - 38; Authors own

Illustration 39; http://www.bikersparadise.co.uk/Mens-Elite-Fringed-Classic-Motorcycle-Jacket.html

Illustration 40 - 46 ; Authors own

Illustration 45 ; http://www.ikea.com/se/sv/images/products/bevara-pasklamma__0138678_PE298424_S4.JPG

Illustration 46-47; Authors own

Illustration 48; paracordshop.se

Illustration 49; http://juvblog.files.wordpress.com/2013/01/paracord_bracelet.png

Illustration 50-57; Authors own