HDK – VALAND
ACADEMY OF DESIGN AND CRAFT

CARVING STEEL

Exploring the contrast in texture and material with reflection to viewers experience

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Abstract

This exam project will be a conclusion for a long working process which started a year and a half ago. During this time, I have developed my own way of working with a plasma cutter and use that with different forged forms to create sculptures with varying textures. To me my work talks about the long learning process and trying to find my own language in the world of art and forging.

The pieces focus on tactility and the experience the viewer gets while they interact with them. The interaction between my work and the viewer is highly touch based, as having these differently textured sections provide the viewer with more ways of investigating my work than just visual. By using organic shapes, the viewer is given a contrast of shapes and textures between the exterior and the interior.

My exam pieces are upscaled versions of a set I had made earlier during my third year. This was done to see what would happen to the tactile expression of them as they get bigger and how the viewer changes their way of investigating the objects.

Keywords

Forging, Tactility, Touch, Plasma cutting, Blacksmith, Texture, Contrast

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Introduction

My intention for my exam was to create a body of work, which combines forged forms with sections that are textured with a plasma cutter. These two combined give the viewer a more tactile experience when exploring my work. I have worked with this subject and technique for a year and a half now, and this series will be a conclusion for my ongoing process.
My work has been process driven for a long time, meaning that one project has led to another. This has given me the chance to work with my intuition and change details and plans as the work progresses. Working through trial and error, thinking how to change the piece to create something new and wanting to develop my personal working style has led me to this exam project.

My work focuses on the interaction between the viewer and the piece. Combining the organic shape with my textured sections give the viewer multiple tactile aspects of the piece to experience. My way of texturing steel highlights the tactility of the material. The texturing looks rough, but it is comfortable to touch and encourages the viewer to experience more, even though one would expect it to be sharp and unpleasant to your fingers. These different surfaces combined with a touch-based interaction give the viewer an idea of the possibilities and the diversity of the material.

The production included forging big pieces of 20mm sheet steel with a hydraulic press and by hand to create the shapes for my pieces. Each step of the working process will be explained to give the reader an idea how my pieces are created. Forging was followed by texturing the form with a plasma cutter. Plasma cutting has become my personal way of working with steel, and I want to highlight what this new technique can achieve. Plasma cutter creates an electric arc and that combined with high pressure air melts the steel away. I use this method to create texturing to steel, and I have made this technique my own way of working. In the end, I made two finished sculptures.

Because of the restrictions and actions the university had to take due to the coronavirus pandemic, my set was not unfortunately fully finished.

Background

I have had an interest in forging since I was a child. Seeing the blacksmiths work in an old sea fortress just outside Helsinki, making forged parts for the big wooden ships the old dry docks housed, was always fascinating to the young me.

I come from a more classical blacksmith background. Before coming to Sweden, I was studying in Finland to become a metal artisan, which was all about handcrafted metalwork. During my two years there, I focused almost purely on forging. That gave me a good skill set to continue working and learning.

During my first year at Steneby Metal Art, HDK-Valand (Högskolan för Design och Konsthantverk), I was still in a forging mindset and almost everything I made in every course had to be forged. This was a restricting aspect for my work since I was looking at things from only one point of view. Due to my background in handcraft and in traditional forging, the craft side of work has always been important to me.

The second year started off with the 'Body of Work' course and I decided to work mainly with something else than purely forged pieces and start the year with an open mindset of figuring out something new. This course was the beginning of my work with the plasma cutter. During the course, I worked with contrasts in texture, working technique and colour.

Figure 1. Part of my set 'Dualities' during the 'Body of Work', Halkosaari, 2018

Realizing the potential of this new working style, I decided to continue working with it.

Through the comments and feedback from my colleagues and wanting to try out something new, I downscaled my work and created jewellery using the shapes I had used during the ‘Body of Work’ course.

It was a new kind of challenge to work on something that small, especially with the plasma cutter since it is not the optimal tool to use for tiny objects due to it melting material off rapidly. I designed and created a series of earrings and pendants using plasma cutting, milling and heat to colour the metal.



Figures 2a, 2b, 2c. Moonglow and Nightshade series, Halkosaari, 2018

After deciding to downscale my pieces, I wanted to keep on working without adding any extra materials and focus just on what I can do with steel and go bigger again to add more detail to the pieces. A set called ‘Nox’ was created, which was made by forging out a rough shape, plasma cutting the surface and colour it with something from the working process, including heat colours or blackening the piece with forge flames.

Figure 3. Nox, Halkosaari 2019

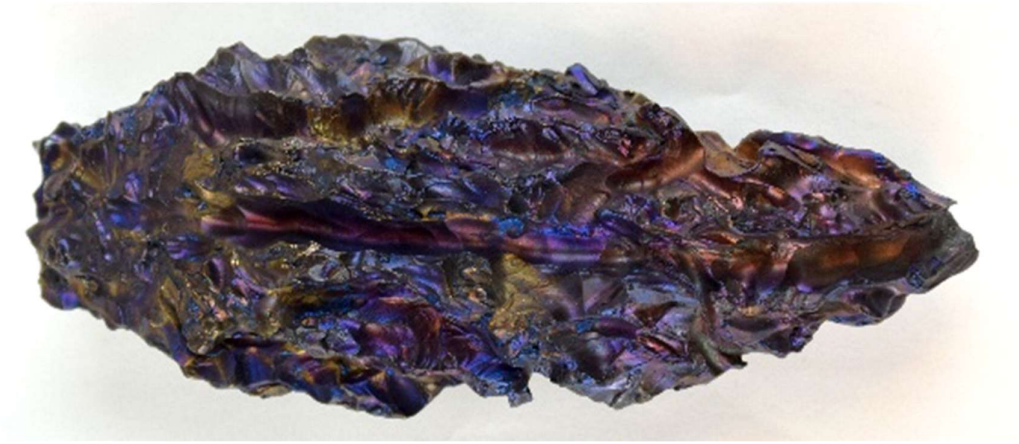


Figure 4. Nox, Halkosaari, 2019

At the beginning of the third year, I had to make decisions on how to continue my working process. The options I had set for myself were: continuation of my abstract plasma cut shapes, focus on animal stories, or go back to working with songs and lyrics.
I had worked with all of these subjects at some point during my studies and they were the main themes during different projects. Eventually after some planning, panicking and struggling, I decided to continue with my abstract pieces and leave the others as an option for future investigations and projects. Working with abstract shapes would give me more freedom in deciding the direction of my upcoming projects.
Continuing the 'Nox' series was the first thing I wanted to try, and the idea was to make them bigger. The challenge of going bigger and making them out of solid steel is that the weight increases rather quickly, and they become difficult and cumbersome to handle. To fix these issues with weight, I tried to make them out of sheet metal instead. I started with paper models and thinner sheet steel to figure out how to get to the desired double taper shape as I had done in my previous pieces.

This shape has been a thing that I cannot get rid of for some reason. I have always come back to it, even when trying to find new shapes and forms to work with. Archaic shape like this always pulls me back to it as it is important to me that the shapes in my work look like this.

Through experimentations, failures, trial and error, I created a series which still followed the same type of shape as I have worked with a lot before, but this time keeping it hollow. Made out of 10mm sheet steel in order to keep it easily forgeable but still thick enough to texture some areas. This time I was not creating the shape by plasma cutting, but have it just as a texture rather than the overpowering effect in the piece.

The main properties of artwork are usually in visual interaction, and I believe this restricts the experience of the viewer exploring your work, but in my work physical interaction is a major part. I want to highlight the tactility of my work by giving the viewer different surfaces to touch: the rough plasma cut surfaces with the smooth and soft shape allow for more sensations than just visual. My views were confirmed when people wanted to pick up the objects and feel them in their hands.


Figures 5a, 5b. Halkosaari, 2019

My main inspiration and another artist that works in a similar way was John Goodyear, a wood artist from Newfoundland, Canada. His series 'Icons of the forest' focuses on finely detailed wooden sculptures, made with wood turning and detailed by engraving with hand tools and more modern machines. (johngoodyear.ca, 2010)
In his work Goodyear takes shapes from the nature and his pieces vary from organic and natural-looking to more elegant and controlled shapes. His way of texturing the pieces is more delicate than mine, but still we have similarities in our work and working method. Even though Goodyear and I work with different materials, we both focus on texturing and organic forms.


Figures 6a, 6b (Goodyear, 2019)

Plasma Cutting Explained

For me plasma cutting has become a normal thing, but the details and advantages of this method are not that known for everyone. Plasma cutting was first developed in the 1950s but came into wider use in the 1970s when it was made more accessible as the technology advanced, so it is still a relatively new invention.

In a simple way of explaining, it creates an electric arc from the nozzle to the steel which melts it, and the high-speed gas blasts the molten material away. The shape and depth of the cut is regulated by the amperage, the shape of the nozzle which the plasma passes through and the amount of air it comes with.

Plasma cutters work by sending an electric arc through a gas (Oxygen in our case) that is passing through a constricted opening. This elevates the temperature of the gas to the point that it enters a 4th state of matter, plasma. As the metal being cut is part of the circuit, the electrical conductivity of the plasma causes the arc to transfer to the work. The restricted opening (nozzle) the gas passes through causes it to squeeze by at a high speed. This high-speed gas cuts through the molten metal. The heat of the plasma can reach up to 25.000 degrees Celsius.

(www.Torchmate.com, 2020)

The conventional way of using a plasma cutter is to cut out sections and shapes out of the material you are using. The majority of plasma cutting is just that, cutting shapes, and the gouging process that I use, is mostly used in fabrication for removing excess material from welds or to create a groove for it. To my knowledge, nobody else uses a plasma cutter in this way to create sculptures, yet I cannot be completely sure. Mainly the artistic work done with a plasma cutter are shapes cut out from sheet metal.

Plasma cutters require three different consumables, which wear out as they get used and they need to be replaced.

The electrode is a narrow piece of copper containing hafnium (which is an excellent conductor of electricity). Its job is to receive the electrical current from a cathode block inside the torch to which it is connected, and to focus the charge through its tip, which causes it to arc onto the workpiece.

The nozzle focuses the plasma arc and the gas that surrounds it to make a clean and precise cut. A nozzle with a larger opening is used for gouging, while a nozzle with a smaller opening is better able to direct the gas and so is used for fine, detailed work.

The shield is there to protect the torch and its other components from the sparks and molten metal that result from the plasma cutting process. It takes the brunt of the fallout so that wear to other components is minimised as much as possible.

(Espritautomation, 2020)

Figures 7a, 7b. New plasma consumables, from left to right: electrode, nozzle and shield. Halkosaari, 2020

Figures 8a, 8b. Worn out and unusable electrode and nozzle. Halkosaari, 2020

The electric arc wears out the parts and, as they get damaged, they do not function as well as they should. This leads to the plasma arc cutting less and the cut is not as clean.

Figure 9. Handheld plasma torch, Halkosaari, 2020

Figures 10a, 10b. Halkosaari, Postlmayr, 2020
Left: Plasma cutting in process. Right: Close up. You can see the slag starting to puddle up.

While plasma cutting, some protective gear is required. The electric arc radiates UV light which causes sunburns on your skin if exposed to for a long period of time, so you have to wear long sleeved clothes in order to protect your skin. Having thick clothes on you also protects you from the heat, molten metal and sparks flying everywhere. As your hands are right next to the arc, thick gloves are a necessity. The plasma cutter is quite loud, as the electric arc combined with high pressure air coming from the nozzle creates a loud hissing sound which would be unbearable in the long run without ear protection. The plasma arc is extremely bright, so a welding mask is required to see what you are doing and to prevent any damage done to your eyes from the brightness. As the sparks cool down, they turn into dust and that is not the healthiest thing to inhale over a long period of time. For this reason, a good ventilation is required. The plasma cutting table has a ventilation built into it and a spot ventilator was added as well to improve the air quality in the plasma cutting corner.

My Plasma Cutting Style

The way I use the plasma is somewhat unconventional, as I use it to texture the surface of the material and remove a lot of material in the process. I have turned a very expensive toy into a loud carving knife.
In my personal style, I gouge out the material creating multiple grooves, usually going in the same direction with varying depth, to give height differences between the grooves in order to create a more visually impressive surface. The handheld plasma cutter is held in a steep angle in relation to the surface of the material to ensure that the molten slag does not spray everywhere as the gouging goes on, but rather is guided into one direction. This makes the groove cleaner and I do not catch fire that often.

The plasma cutter only removes material, so with each piece the material loss is around 30-50%, depending on the depth of the texture and if the texture is only on one side.
Plasma cutting is a time-consuming process and requires a lot of work, especially when the pieces are as big as the ones I have worked with. As you create a groove, all of that molten metal has to go somewhere, even if parts of it turn into sparks and dust, most of it turns into sticky slag, which fills the already cut grooves. On flat surface this is not an issue as the slag has only one flat surface to stick to and it is easy to remove. Cleaning the grooves is the main cause for time consumption because you have to manually go through every single groove, no matter if big or small, and chisel out the slag to create a clean looking surface. Before chiselling you have to sand blast the entire piece to remove the loose slag and clean all the dust from the surface, otherwise you cannot properly see what you are supposed to clean.

Chiselling out the slag was the way of cleaning that I found to be working quite well, even though it is a slow method. This way you can control the amount of force you use to hit the chisel with and the angle of it. I could have used a pneumatic hammer instead, which would have been possibly faster, but would leave more marks on the plasma cut grooves.
The slag is hard as it is re-solidified and oxidized molten metal. The tools that I used to remove it with required a lot of maintenance and sharpening, even though they were made out of spring steel,

which is a durable and hard steel. Even though this working method is a very time-consuming process, it is necessary to take care of the small details as well.
When it comes to the quality of the finished surface, I tend to take great care of having everything as clean as possible to give the viewer a pleasing surface to look at and touch. As a 'pioneer' of this exact technique, I was committed to have the best possible result throughout the entire piece.

Narrative Aspect

Describing my work has always been a major issue for me and it has taken a long time for me to come up with what my exam pieces are or represent. Explaining the craft side of my work is easy since that comes more naturally out of me. Having a story or a narrative as a background support for my work has made it easier during past projects for me to talk about my work and also help to understand what I do, instead of just talking about the technical aspects. I have worked with stories during the previous years as well: during the first year I made a grave marker based on song lyrics and the story behind them. During the second year I worked with Frölunda culture house and made an owl out of bronze reading to two bear cubs for their library. This was based on the story reading room inside the library and a wooden owl sculpture outside the building.

Figure 11a, 11b. Postlmayr, Halkosaari, 2018,2019

Grave marker I made during my 1st year. Owl and bears for Frölunda culture house during 2nd year.

This is what I planned to do with my exams as well. I would create a story around my pieces during the production period and use that as a background for my pieces.

Through making the smaller pieces earlier this year and making differently textured versions of them, I started to think some aspects of them as deteriorated and withering since I did not texture the whole piece.
Rather than seeing them as metal being eaten away, I began to think if they were remnants of something bigger, like a body part or something broken.
So, in the end the idea of a life cycle was born. I would show this by making different versions of the shell of some imaginary creature to show a specific point of its life. The idea is to show how the life of this creature changes by looking at the shell it has left behind.
Rather than focusing what is or was on the inside, I wanted to just focus on the outside and leave what happens on the inside to the viewers imagination.
But in the end, this was not really something that I could stand behind of.
The things I was going to talk about started to feel very forced and it was something that eventually I did not want to continue. Everything was from the perspective of other people and not my own words, thoughts and views anymore. Since it has been such a journey with my work, it felt important to keep this very personal.
I have always had a very honest way of looking at my work and talking about it. I cannot add forced concepts in order to try to make myself and my work sound like something better than it is. I do believe a narrative aspect is important, especially since most of the people seeing my work see it only through pictures, but in this case, I wanted to take a different route to my work and focus on the tactile aspects.

I began to look at my work from other perspectives and turn focus back on the craft part of the pieces and how that could be highlighted. This brought me back to the importance of touching the piece. But all of these ideas from other people were not wasted, as they led me to think more about viewer interaction, and how people perceive my work in different ways. This is what my work is all about. I realised I do not need to create a story around my pieces, as people investigating my piece come up with their own.

What Happens Between My Work and the Viewer?

As the viewer approaches the objects, first they see just the outlines and the large size of the piece. As they get closer, they start to see the texturing and the variations it offers. When the viewer is right next to the pieces, a connection is created, and they can explore the different surfaces closer and see the plasma cut surfaces clearly. They experience the tactility of the piece ranging from more soft forged surfaces to the rough, but still surprisingly smooth plasma cut texturing.

The plasma cut surfaces look rough and one would expect them to be uncomfortable to touch, due to the material being steel and most of the people expecting it to be hard and sharp. The textures are surprisingly comfortable and very smooth to the hand. This is where all the time spent cleaning every single groove comes to play. As the viewer runs their fingers through the piece, they experience almost smooth stone like feeling on the forged areas of the outside surfaces and on the inside, a combination of soft and hard merged into texture. The pieces call people towards them with their closed appearance, and having multiple surfaces lets people decide how to approach and

explore them. The majority of the texturing being on the inside allows for a dialogue between the work and the person exploring the piece, as there is a sense of intimacy with the viewer and the object being explored. We learn by touching, and kinaesthetic sense is the first sense that we are born into this world with and it is also the first sense that we use to gather information from our environment. This interaction with the work and the viewer goes back to the very primitive way of acquiring new information.

So far, most of the people that have seen the objects, have their own way of seeing what the pieces mean to them. The shapes are something that you cannot place in your everyday life and this causes the viewer to come up with their own version of what the piece is to them. The viewer might reference them to something they have seen in the nature or come up with something completely from their own imagination. There are some similarities in what people see, most common of them being that they remind the viewer of rocks, hardened lava, tree bark, something from space or under the sea. Some people outside the University did not even know that the pieces are steel. There are a lot of differences what people see, but what connects the viewers experience, is that they want to investigate it closer visually and physically. I believe that the reactions and the different views people give while interacting with my pieces are a positive thing, as they bring their own stories to my work.

Purpose

My intention is to work with combining forged parts with plasma cut textured sections, as I think that adding details and creating sculptures with the plasma cutter is a new and interesting way of working. Working with this technique has become my own style as I have developed and worked with it for some time now. I have made plasma cutting my way of working with metal, and it turns metal into this easily sculptable and soft material. I want to show what this contemporary technique can achieve as it brings out the softness of hard steel and provides something that the viewer might not expect. This way the audience can understand the diversity of the material and the possibilities of shaping it. I want to focus on the tactility of the pieces, so the viewer has a closer and intimate experience with my work.

Goal

The intention for my exam project is to create tactile sculptures that you can explore by physical and visual interaction and show my way of carving steel. It combines forging with more contemporary plasma cutting to create sculptures with organic shapes. This series will be a conclusion to a long and intense working process which started a year and a half ago. In the end I hope to have three to four finished pieces, which show variations in shapes, sizes and give the viewer different types of surfaces to investigate and touch. I want to hone my skills with the plasma cutter to improve myself within my personal style of working.

Approach

I am going use the plasma cutting combined with forged shapes to create tactile shapes with different surfaces for the viewer to look at and touch. The pieces will be made out of 20mm sheet steel in order to have enough material to gouge a lot of material away to create deeper patterns with the plasma cutter. My work will be process driven on the materials terms, meaning that I develop the shapes as the work progresses. I will work intuitively with the shapes, as in my core I feel that it needs to be a certain way and change them as I see fit. Having organic forms to start with gives me more freedom in changing the shape as the work progresses. When carving steel, I work until my gut tells me its good and that it looks right.

Questions

How does the viewer interaction change when the size of the work increases?

How can I develop myself as a craftsman through artistic work?

How to use tactility to show new qualities of the material to the audience?

Result of Process

The shape for my pieces is a product of a long working process, which started in the 'Body of work' course during my second year. This working process has led me from one project to another, whilst still using a similar shape, but changing it for every project and series. This development has sometimes been through feedback from colleagues, my desire to change a detail in the form to create something different or through references from other artists work.
The double taper (taper is a term for gradual narrowing of material) shape that I always come back to started on the 'Grave Marker' project during my first year. (*Figure 11a*). For my piece I made a lot of flat parts which have a taper towards each end to create a grave marker that looked like a stream. It is a very simple shape, yet quite versatile as you can use it in various situations.

The 'Nox' project was intended to be something that you can comfortably hold in your hand, and this shape fits it well. As you close your hand around it, your fingers automatically follow the shape and it is easy to hold on to. This interaction fascinated me, as it was something I had never worked with before and led me to work with it more during the beginning of my third year.
The interaction of holding 'Carving Steel' in your hands like in my previous sets is still there, even though they are bigger, but it is more demanding and requires your entire body to be used.

Figure 12. Interaction between a person and the piece, Hopp-Hegg, Halkosaari, 2020

Figure 13. Interaction between a person and the piece, Hopp-Hegg, Halkosaari, 2020

Yet while being bigger compared to my previous creations, I believe that the shape, curves and overall flow of these pieces are pleasant to follow visually. As the size increases, I believe that the aspects mentioned before get amplified. The form has a direction due to its long shape and has a

clear front and back end. The imperfect roundness of the shape makes it distinctive where the sides are.

I want to have some sort of movement in my work and this goes for the overall shape and the texturing that I do with the plasma cutter. This shape makes that possible. If I did a more strict and 'stationary' shape without any curves and direction, I believe the plasma cut textures would not fit it that well anymore. I prefer having more streamlined patterns with the plasma cutter that follow the form. To me, shape like this is just right.

I do not have an exact and strict plan on what I do when working. As mentioned before, my work is very much process based and I change details and shapes as the work progresses. Forms are not symmetrical, and they do not have intricate individual details and highlights. I do decisions during the project based on my gut feeling. After doing changes, work with the shape or texturing, I evaluate what I have done, and see if everything looks right to me. If there is something that I am not happy with, I try to change it slightly into a direction that I think will be better. For example, if the curve of the edge has sections that are not matching the overall impression that I wanted to go for, I try to work with it more until it looks right to me.

Wabi-Sabi is a beauty of things imperfect, impermanent and incomplete.

It is a beauty of things modest and humble.

It is a beauty of things unconventional
(Koren, 2020)

In his book, (Wabi-Sabi for Artist, Designers, Poets & Philosophers, 1994) Koren explains to the reader his experiences with the Japanese way of living and art style, Wabi-Sabi. It is a style which focuses on the facts that nothing lasts forever, nothing is perfect, and nothing is truly finished. Rustic and organic looks are appreciated, and a person should take joy in imperfection, for example the faults in one's own work are not hidden but highlighted. It is very much an opposite way of looking at the modernistic world.
My work follows some of the ideals and working styles of Wabi-Sabi. Wabi, loosely translated, means simplicity, whether elegant or rustic. Sabi, means taking pleasure in the imperfect.
I have always been interested in more organic and more free forms in my work. Having the freedom to make things not so perfect and accurate, but still good looking, has been my way of working for a long time.

Even though I have used similar forms for a long time, it is also important to move forward and find a new direction and shapes to work with. For my third piece, I wanted to do just that. Finding new forms is something each one of us struggles, and maybe that is why it is hard to move on at times, as it is possible to get attached to a particular shape or style. This has also been the case in my work and for that reason, I wanted to explore new shapes while still holding on to movement and the flow of the surface. Taking shapes from the nature is a great way of doing this, as you do not have to start from nothing, and nature has the tendency to not create straight forms.

Production

First two pieces are a continuation and an upscale of the smaller ones I had made earlier during the year. I found their expression interesting and I wanted to explore them further and see what happened in the tactile expression by upscaling them. Making them bigger posed some new challenges, but in the end the results have been rather satisfactory.

Before this project, almost everything I have made while studying at HDK has been quite small.
I started by making a 3x bigger drawing of one of the pieces in the latest series, with overall length at 900mm and width at 300mm. Making the piece bigger would give me an opportunity to create a more visually impressive piece, as there is more area to cover with the plasma cutter so the viewer can experience a wider variation of differently textured areas. The thickness is only twice as thick as the 10mm in the original smaller ones, since 30mm sheet would require so much more work than 20mm, and the weight would really become an issue.
Even with the weight and size issues, this project was something I really wanted to do and overcoming the problems is a part of the job.
Even for 20mm, we do not have tools to work with that size, so I had to make my own. As the small ones can be easily done on the swage block, the big one would require the big hydraulic press we have.
For the shaping I would require two different tools: one to make the sideways curve, and one to make the up and down. I have never worked with something this size which is why I decided to make everything extra safe, so the tools would hold the pressure from the press and that nobody would get hurt in the process.

I started with making a U-shaped press tool to get working.
The shape itself was cut out of 5mm sheet since it is the maximum thickness our rollers can take. I put two on top of each other to make it stronger, as one sheet would probably bend under the heat and pressure. To hold everything in place I made five 20mm thick support structures on both sides of the tool to make sure the weight is divided more equally. Everything was attached to a 10mm baseplate.


Figures 14a, 14b. Press tool, Halkosaari, 2019

This tool manages to bend only in one direction, and the upwards and downwards direction required another tool. Our workshop had one already, but that was too small and weak, so I made a bigger and stronger version of it.

Figure 15. Press tool, Halkosaari, 2019

The bottom part is 30mm square to give it some height and the top is 25mm round to reduce the marks left on the hot steel.

Carving Steel N.1

First the outlines of the shape were drawn into the steel and they were cut out with an oxygen-acetylene cutting torch. Bigger one 950x300x20mm, smaller one 600x300x20mm. This work could have been done with the plasma cutter as well and maybe make it easier too, but knowing how fast I go through the consumables, I wanted to save them for the texturing part. Cutting thicker material like mine requires high amperage from the machine and it wears out the parts faster while using the cutting settings.

Figures 16a, 16b. Cut-outs ready for forging, Halkosaari, 2019

After the shape was cut out, the edges were ground with a belt grinder and an angle grinder to make them smooth so I do not cut my hands on the slag and sharp bits which the cutting torch might cause. Also, this way the shape could be made more even, although it would be changed later in the

gouging process, but it is good to have even shapes for the forging part so it becomes a bit easier to make the bends.

Big pieces like these require a substantial amount of heat to get into a proper forging temperature. Luckily, in our workshop we have a long forge with four air blasters instead of the normal one, which can produce the amount of heat needed to make working with the steel manageable. Once the steel reached a good forging temperature, around 900 to 1000 degrees, it was taken to the 180-ton hydraulic press where I had the tools set up to make the sideways bend.
Using a big round tool, the steel was pressed against the U-shaped bottom tool to create the shape. The hot piece of steel was moved around in the tool and pressed against it multiple times in order to make a uniform shape throughout the piece. The sideways curve was made first on both halves of the piece so they would be matching pairs with their outside curvature. The insides of the pieces were full of tool marks, but this did not matter since the insides were going to be textured.


Figures 17a, 17b. First bend, Halkosaari 2019

The up and down curvature was made next.
Using the oval shaped tool that I made and a round handheld top tool, I was able to create the curvature without losing the already made shape of the piece. The smaller top piece was bent upwards in both ends in order to give it an even and gentle arch throughout the whole piece. Not having the bigger bottom piece bent led into a slight miscalculation of the curve in the top piece, which I bent too far, and it did not look good with the bottom piece once it was done. This was a rather easy fix to do afterwards: heat it up again and bend it back slightly.

Figures 18a, 18b. Second bend, Halkosaari 2019

There were issues working with the bigger bottom piece, since it weighs almost 38kg and was awkward to carry when cold, let alone move it around when the entire piece is close to 1000 degrees. Luckily, I was able to get help from my colleagues to carry it from the forge to the press. The upwards curve is a simple thing to do in the tool, but downwards required some rather unconventional methods. To bend it down with press tools without losing the overall shape would have been difficult, so what I ended up doing was clamp the entire piece with a press tool to the U-shaped bottom tool and with a sledge hammer, hit the front end down whilst the press kept it clamped still.

The top piece was worked on a lot due to making the curvature wrong and then fixing it afterwards and the outside surface was full of tool marks and bumps. There was more than enough material to grind the outside back to a smooth surface with an angle grinder, since even if you lose some millimetres of material, that will be unnoticeable in the final piece.

Figures 19a, 19b. Fixing the surface, Halkosaari, 2019

After grinding, the steel became shiny, and it was put back into the forge and repeatedly heated up to give it back the layer of forge scale.

After the scaling, it was time to start the texturing of the inside surfaces. I started with the small one since I was not sure at all that this whole thing would work and was worried that the workload would be too great to realistically make the pieces this big.
Texturing went rather well, and the time spent on it was not as long as I had feared, yet it still was a lot of area to cover and it burned quite a few consumables to make it. Once again, cleaning up the slag and making sure there were no flat spots took the most time.
I do not plan the patterns I make, but rather let them form as the work progresses. I do decide on the direction though, which has always been lengthwise to make the patterns follow the shape of the piece, and making all the grooves go roughly in the same direction makes the clean up easier, as you can control the flow of the slag better.

Figure 20. Texturing the interior, Halkosaari, 2019

The bottom piece was textured in a slightly different way.
I gave it deeper grooves and a direction which would make them move towards the edges throughout the piece. Once again start from one end, and gouge lengthwise towards the untextured area, which makes the cleaning of the slag easier since it puddles on mainly flat surfaces. I also started to use welding spray to help me with cleaning, and that spray creates an oily surface on the metal which stops some of the slag sticking to the surface while plasma cutting. This made the clean-up easier since the slag would not get stuck on the bottom of the grooves that much.

Figure 21. Texturing the interior, Halkosaari, 2019

I only textured the insides in this piece to preserve the clean outlines on the outside form. If the texture would have been on the outside, the focus of the piece for the viewer would have been mainly just on the texture. The shape itself would have lost its importance, as it gets overpowered by the texture, and the outside shape blurs too much to be well recogniseable. The inside is also an important aspect of the piece, and leaving that clean and empty makes it less interesting for the viewer to investigate.

Figure 22. Textured interior, Halkosaari, 2020

After both of the halves were done, I had to find a way to connect them.
I had not planned that out beforehand that well and realised that I had made the halves lower than they were supposed to be by changing the shape and height with the plasma cutter. The shape was rather squished and did not look good when the two halves were put on top of each other, so an additional piece of steel was quickly forged and cut to match the edge shapes of the top and bottom pieces. This gave the halves an extra ~40mm of space between them and the centre connection piece could be ground to match the curvature. The connecting piece was left quite long, split and tapered towards the ends so the shape would gradually blend into the halves.

The connector had to be welded on the outside as on the inside.
The inside weld proved to be an annoyance as I had to heat up the centre part, bend the whole thing open, weld everything on the inside and blend it with the plasma cutter afterwards. It was a struggle to get the plasma cutter handle inside the piece and have a good angle to gouge the weld seams to match the rest of the piece. Since the space was limited, also the clean-up had to be done in an awkward way of trying to fit the tools and my hands inside the piece, move everything and actually hit what I was supposed to hit. I could have opened the piece more to give myself an easier task, but I was afraid that the welding seams would start to crack open as they move, or as I close the piece back, the centre would warp or not bend back into its original position. This would have just created more and more work, so I wanted to do it carefully.

After everything was done and I was satisfied with the shape, it was time to blend the new clean welding seam with the rest of the piece. Once again, as you grind steel, it becomes silvery shiny and loses the black forge scale on the surface. I scaled the top half earlier on its own, so this part would

be easier to do, as there is more weight on now. I tried to avoid heating up the entire piece as it was in the forge, to reduce the amount of cleaning on the inside I would have to do afterwards. Fresh scale on steel is flaky and not always pleasant to touch so it had to be cleaned off afterwards.
Also, when you heat up steel and let it cool down over a long period of time, it creates a layer of rusty oxide on the surface. After my piece had cooled down, I gave it a wash to get rid of all the dirt and loose scale. With hand-held steel brushes and water, I cleaned the interior grooves and the outside surfaces to get the forged grey colour back.
Afterwards the entire piece was coated with Osmo oil wax, since it gives a long-lasting protection against rusting and is easy to spread on the uneven surface. Using a solid wax would be a nightmare with this kind of surface, trying to get it into every groove. From this I learned that a proper sponge or a small brush would have made my life easier, since I had to improvise my tools for applying the oil wax as I wanted to get the thing done as soon as possible. A piece of an old t-shirt, wrapped with wire at the end of a long spoon handle was not the greatest way to do it, but it worked. The outside has been also coated with Renaissance wax, which gives it a more pleasant surface to touch.

Figure 23. Carving Steel 1 finished and coated with oil wax, Halkosaari, 2020

Figure 24. Carving Steel 1 finished and coated with oil wax, Halkosaari, 2020

Figure 25. Carving Steel 1 interior textures, Halkosaari, 2020

Final dimensions 950x280x210mm, weight 38.5kg.

Carving Steel N.2

The second piece was made the same way as the first one, but with few small adjustments. The size was scaled down to 600x250x20mm and 450x250x20mm. Also, additional material was added to the centre connection part to make the fitting of the two pieces together easier.

Figure 26. First bend, Halkosaari, 2020

I wanted to give this one a rougher look instead of the smooth and cleaner form of the first one to give some variation to the series. After texturing the insides, I focused on the outside, although I did not want to texture the entire surface since the material was a lot thinner already from doing the insides.
I started by following the grooves from the inside and burnt through the steel with the plasma cutter to create holes in multiple places. This was done to give the viewer a more interesting object to investigate. On the outside, I textured the areas next to the holes and connected them in some cases with the other ones.

Figure 27. Texturing done and the two halves welded together, Halkosaari, 2020

To make the piece stand out more from the first one, I decided to rust all the plasma cut surfaces. This was done chemically by mixing Nitric acid and Copper sulphate to create a rusting agent,

which was applied to the surface of the piece with a normal paint brush. Over a few days, the chemicals were allowed to take effect, while re-coating it daily to keep the effect going.
When I was satisfied with the rusting, the acid had to be neutralised from the entire piece with Sodium Bicarbonate (baking soda) and soap in order to stop the acid from being active and to have a safe surface to touch.

Figure 28. Rusting in acid, Halkosaari, 2020

After the rusting was done, some cleaning had to be done to keep the rust only on the plasma cut parts. Water and steel brushes were used to clean the surface again. After everything had dried up, the rust was bright orange and looked great in contrast to the grey steel, but the rust was easy to wipe off with just a finger and for it to be long-lasting it had to be sealed in.
Osmo oil wax was used to coat all the surfaces and to seal the rust in, this time with paint sponges, which made the task faster and easier. Unfortunately coating the piece made the rust turn darker, which makes it less visually impressive, but it was a necessary thing to do. In hindsight, I should have used a clean coat of lacquer first to keep the rust brighter. Untextured sections were also coated with Renaissance wax for a nicer touch feeling.

Figure 29. Before surface treatment, Halkosaari, 2020

Figure 30. Before surface treatment, Halkosaari, 2020

Figure 31. Carving Steel 2 finished and coated with oil wax, Halkosaari, 2020

Figure 32. Carving steel 2 finished and coated with oil wax, Halkosaari, 2020

Final dimensions 600x250x180mm, weight 18kg.

Figure 33. Carving Steel 2 in nature, Halkosaari, 2020

Figure 34. Carving Steel 2 in nature, Halkosaari, 2020

I wanted to try out how the piece would look in a set environment and took it into a nearby forest. It is more at home in nature than with a white background, as if the object belongs there and it has been there for a long time already.

Carving Steel N.3

Due to the unfortunate circumstances of the coronavirus, our workshop got shut down and I was not able to finish my work. Yet, I felt that explaining what I was working on is important so that you, as a reader, get an idea of what my project could have been.

I wanted to look for something different, but still something that is close to the other pieces.
It was going to be a fully closed piece with a different type of texturing from the others, so there would be more variety in the series.

Figures 35a, 35b, 35c. Images of Billy Kidd's work that I used as an inspiration.

(Kidd, 2020)

When I found Kidd's work, I was fascinated by the rough organic forms in his leaf series.
There were lots of interesting forms in the leaves, so I wanted to use the shapes as an inspiration for the next piece. The shape of the leaf had a different expression from the other ready pieces, but it still had similarities in the shape so it would complement the rest of my pieces in my body of work.

Billy Kidd is an American photographer living in New York, United States. He works a lot with models and the human body to create his artistic pictures. In his pictures he mostly focuses on the person or the objects, highlighting them rather than the area surrounding it. Majority of his pictures are black and white, with few series being an exception with colours and his work can be found in magazines including Vogue, Vanity Fair and Glamour.

The size was something that took some time for me to figure out.
After playing with the size for a while, I realized that making it around 600mm long like the second piece would make the creation of the shape itself difficult due to the material thickness, since it had

more tight curves in it. The drawing that I chose would make the piece 750x360x200mm, which would be the biggest piece in the series.
At the beginning of the exam period my goal was to make a set of 5, but this was quite ambitious, so the goal was brought down to maximum 4 pieces due to time management, as I wanted to give the bigger piece extra care. The previous two were more straightforward objects to forge because of their simple shape, but this one was more complex and had more parts to fit together.

Making it out of two halves like the previous ones would have been a difficult task due to their size and shape, as the material would have to move in different directions throughout the section. Instead, I wanted to make it out of six individual pieces, fit them together and weld everything into one. I had a plan on how to do the overall shape, but the surface shapes would be made as the forging progressed. I did a rough 1:1 outline drawing of the shape I had in mind to act as a guideline for the forged shapes.

Figure 36. Drawing for the shape, Halkosaari, 2020

Due to this being a more complex build, I wanted to try out the shape first on 3mm sheet just to make sure that the shape would come out as wanted. In order to keep the width of the piece the same as in the drawing, some extra material had to be added to the edges to counter the shrinking of the material sideways as I forged the shape. This was also a good time to test the tools I made for this.

Figure 37. Shape try-out with 3mm sheet, Halkosaari, 2020

The first part that I worked with was the big top part which would make upper half of the centre body. The outlines were drawn to the 20mm sheet with an extra 30mm overall to give it enough material to stay in measurement after forging it. The outlines were marked with a shallow groove made with the plasma cutter in order to see them whilst the piece is hot, so there are markings which to follow instead of trying to guess where the end of the shape is. To mark the spot where most of the material would be forged downwards was also marked to have it on the centre of the piece.


Figures 38a, 38b. Cut out of the shape, Halkosaari, 2020

I encountered some problems since I was following the outlines of the ready piece and did not think what kind of form I needed to get to the ready shape. This caused some issues at the 'neck' part of the piece where it narrows down, as there was not nearly enough material for the two halves to meet.
I chose to ignore this issue and kept on going since I could just make an additional part and weld it on to match the curves and have the two halves meet in the middle. The idea for the shape was to have two inward curves at one edge and have them meet at the middle so they create a good-looking connection.

At the beginning of the forging of the shape, I started with the edges and rolled the edges inwards following the previously marked lines. To make the work easier later, I bent the edges quite steeply inwards so it would be faster to get them to have a more even curve.
Tooling for this part was a bottom tool, which was made out of 8mm sheet and two pieces of round bar with an empty space in the middle, so the steel has someplace to move and a handheld top tool which would press the steel in between the two round bars. The bottom tool was attached to the press table with a big clamp to prevent it from moving while forging and moving the heavy piece.


Figures 39a, 39b. Press tools, Halkosaari, 2020

What would have made this easier, is a top tool which was attached to the press itself, so I would not have to hold the tool and the hot piece at the same time, but as the forging progresses, the piece starts to curl up and tilt upwards more as the top tool presses down since the piece is no longer flat. This would have caused the hot piece to hit the piston of the press and it would have been pressed downwards against the tool.
I forged this half by myself, and once again realised how difficult it is to hold a massive piece of steel by one hand and try to get it into a desired position. I rolled the edges in first, because it would have been a lot harder to do it when the piece is not flat, as holding the steel would have become nigh on impossible due to the angle of how you would have to hold it.
After I had forged the edges roughly, I started on the centre part to give the entire piece more shape. At the widest point of the section, I wanted a big round bump upwards, so the tooling was changed to a big and long tapered cylindrical tool and a high and hollow bottom tool. This allowed the top tool to move material downwards effectively and the material had a place to move to, but still restricted enough so it would not move where I did not want it to. The same tool was used towards the neck to create roundness to the piece.

Figures 40a, 40b. Press tools, Halkosaari, 2020

Moving material at the centre line of the piece also rolled the edges in more as planned. To fine-tune the shape in the neck, I switched to the U-shaped tool which I had used on the previous pieces and with a long round tool, I pressed the neck part against the tool to give it an even roundness. All of this was done to give the piece a rough shape which was then refined by a sledgehammer afterwards.

Moving material with 20mm sheet is easier when it is flat and you have a big machine do it for you, but it gets difficult when the shapes become more complex and you have to start moving material by hand to get to the desired shape. The hydraulic press is a great tool, but it has its restrictions on how you can work with it: the force always comes in from a set direction and you cannot move material in the way as you would when it comes to smaller work. Also, the round shape of the hot steel might cause tools to slip away from under the press, which can lead to dangerous situations as the tool or the whole piece itself suddenly slips off and moves quickly into an uncontrollable direction.

Thus, a lot of hand forging was needed. The edges had to be rolled in by attaching the piece to a bench vice which is attached to our big steel table, so it stays still while hammering. The edges on one side were rolled inwards and on the other side they were given some curves and the edge ended flat for easier connection with the second half.

Figure 41. Top half after forging, Halkosaari, 2020

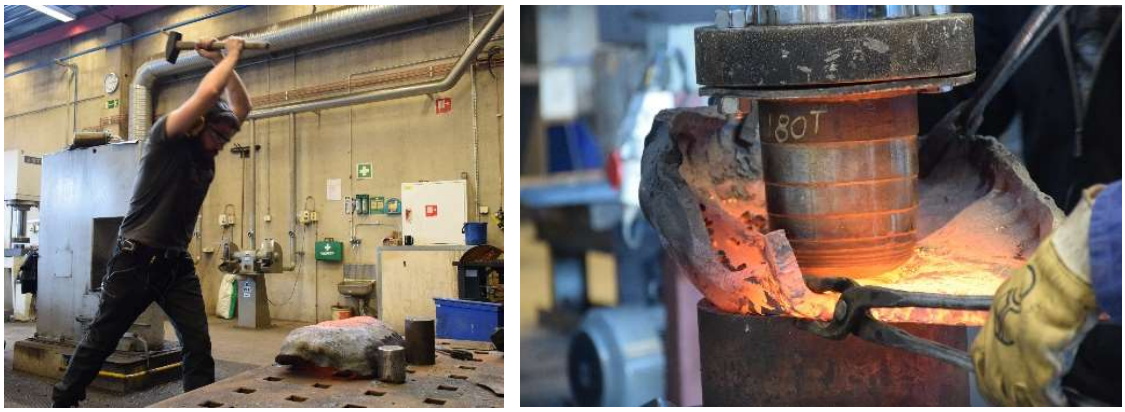
As the first half was more or less done, I started working with the top curve to match the first completed half. Measuring at 400x270x20mm, this was the smallest part, but it still weighted 14.5kg. As with the previous piece, an additional 30mm was added to the edges to counter the material shrinking. All the steps of working were done in the same way as the previous piece: start with the hydraulic press and then move to hand forging with the sledge. This part was never finished as I only spent a short time with this before starting to work with the bigger centre half. The issue with something this 'small' is the bending of the edge in the inside curve with material this thick, as it does not have enough space to move properly into the desired direction.

Figures 42a, 42b. Cut-out of a part, Halkosaari, 2020

The biggest part was something that would have been impossible to do alone due to the sheer size and weight of it. Weighing almost 38kg and measuring 560x490x20mm, I would have not been able to hold it under the press with one hand and have a tool in the other, so I had a colleague help me for a day to get the rough forging part done.

Figure 43. Template of the bottom half, Halkosaari, 2020

Using the template of the first half, I traced the new wider outlines of the second half on the 20mm sheet, with 30-40mm extra in width depending on the part. At the widest point, an extra ~10mm was added to ensure a good inwards curve and having too much material there would not be an issue later on, since everything excess can be cut off easily. Adding extra material elsewhere was not really required, as this half became quite tall and looked too big when combined with the other half. This issue was fixed by cutting off some extra material at the edges.



Figures 44a, 44b. Forging of the bottom half, Halkosaari, Galon, 2020

The forging was done in the same manner as the first half, just more work was required due to its size. Starting with the edges while the sheet is flat by following the marked line and afterwards work with the centre.
Due to the size of the piece, it was difficult to handle under the press even with a helper, so more hand forging was required to achieve the desired shape. Heating up sections of the piece and forging it with a sledgehammer to shape was a time consuming and physically demanding process, but in the end the rough shape of the bottom piece was completed and was ready to be textured with the plasma cutter.

Figure 45. Roughly forged bottom half, Halkosaari, 2020

To see the shape more clearly, I used angle grinders on both halves to smooth out the surfaces and highlight some of the shapes and curves. This made it easier for me to see what kind of shape I was working with, and how it would roughly look when finished.

At this point the workshops got closed due to the coronavirus, and I had to stop working for some weeks. The workshop was opened for the exam students again later, but with time restrictions. Due to the limited amount of time I was given, I knew that I will not get the piece done in time but wanted to get it as far as possible to show what it could have been. In the end, I only got the two biggest parts forged and partly textured the top.

After grinding, cutting the excess material off and fitting the two halves together, I started to texture the smaller half with the plasma cutter. Rather than doing a similar texturing as in the other two, I wanted to give it a different kind of surface. Instead of long grooves, I went for a rougher and pitted surface. When you remove material this way, the overall shape does not diminish, since you do not remove that much from the surface.

Figure 46a, 46b. Textured top half, Halkosaari, 2020

Due to the limited working hours after re-opening of the workshop, I unfortunately never got to finish working, and this is as far as the third piece of the series got.

Figure 47. Third piece in its final state, Halkosaari, 2020

Figure 48. Third piece in its final state, Halkosaari, 2020

Discussion and Reflection

I believe in the exam the opponents were satisfied with my presentation and they brought up some good questions and views. Their feedback helped me to think about some things that I have not thought of before and hearing more comments about my work from outside the University environment was valuable. Sadly, the opponents and the audience were not able to be in contact with my work as the exams were virtual.

A question was raised by one of our opponents, Sebastian Schildt, if I use plasma cutting to create my pieces or has the technique taken control of my way of creating, and who controls who. This was something that I have not thought about before, as I have been so focused on using the technique and adapting it to various projects.
My way of thinking and working might restrict the possibilities of the outcome, as I narrow down the approaches to just one technique and shape. Everything that I have done has been planned on the basis that it will be plasma cut after shaping it. I develop the shapes just as a shape and find ways to incorporate plasma cutting into it. In the back of my mind, I think that the shape I am working with is supposed to have plasma cut sections in it and I try to find a good balance between the shape and the texture. I believe that the plasma cutting is a great technique, it creates interesting results and I am proud of what I have made, but if I had not centred everything around plasma cutting, I wonder how different the end result would have been. I have made this technique my own way of working, but whilst being so focused on making my work look a certain way, I limited myself.
The technique itself is fundamentally the same in every piece that I have made, as it is only meant to remove material to create textures. The overall look of the textures that I have worked with are similar to each other with varying depth, width and length. My approach to the texturing has been to create it in a way that it follows the same direction the material is moving, mostly lengthwise. The challenge is to find new ways of using the gouging process to move forwards and create new types of textures and ways to incorporate it into my future work.
The forms that I have used have been very controlled, as they have a clear sides, top, bottom and ends. The shapes that I made are something that looks just right to me, and I am still satisfied with them. But in the future, I will hopefully learn to go way out of my comfort zone to create something that is no longer so controllable and even more abstract. I want to find something in the future that elevates the technique even more and brings out new approaches and views to my technique.

I use mild steel for all of my work and forge it to shape. This is a simple and cheapest way to produce the shapes that I use. During the exam, I was asked on couple occasions if I would use other materials than mild steel, for example cast iron, stainless or brass/bronze. These would pose some issues. If I were to do a mould of a sculpture in wax and ceramic shell cast it, I believe the texturing would be drastically different even if I tried to imitate the plasma cut textures the best I can. There is a certain randomness in the plasma cut textures, as there are so many variables when it comes to the end result. I believe it would not have the same expression if you do it into wax with different tools. Also, the cost of making such a mould would be too high and I don’t think I could

justify spending that much money on casting. If there was a need to make one by casting, I probably would make the surface normally with steel and texture it, take a negative mould of that surface and then create the real mould by using the texturing from the negative. This would make serial production a possibility, but the texturing would be the same in all of them and that is not something I wish to do. I don't see this being a reality though.

With cast iron, the shape would be easier to make as a sand cast. This then could be textured with the plasma cutter to save time in the forging process. The forging is the fastest part of the production, so I don't really see the need to try to do that in a different way. I believe cast iron would break under the constant temperature changes plasma cutting creates and would not suit my needs. I have also tried gouging stainless steel in smaller try outs, but it is such a high alloy steel that the steel does not melt into a liquid stream, unlike mild steel which does. Instead, it crumbles together into lumps and is not suitable for my working style. Stainless versions of my work would be great for outdoors, but sadly this won't be a possibility.

I was also asked about how I plan my work and if I see the forms in my mind or what influences my planning.
In my projects, I tend to imagine the rough shape in my mind and look at it from the craft perspective. I try to imagine how I would make such a form by forging and visualise the making process in my mind to have an idea of how the ready product very roughly would look like. During this planning, I also look for references and try to find shapes that might fit the idea and take inspiration from them and change them to fit my idea and personal taste better. As mentioned earlier, I usually go for shapes with more movement and freedom than strict geometrical forms. Drawing is something that has never been my preferred style of sketching, as I cannot take the ideas from my head and turn them into a drawing. This is why I have to do it the slower way by using 3d sketching with paper and cardboard or try outs with the material itself. My drawings are usually limited to a very rough shape and maybe desired size.

For the 'Carving Steel', I made templates out of paper to act as a guide as I was cutting the shape out of sheet steel. In all of my pieces, I changed the dimensions, shapes and curves once I had the sheet cut to shape and I began to forge and plasma cut them. Everything starts as a very rough and slightly oversized template, so I have the possibility to alter them without having to worry too much about material loss.

By doing material sketches, I am able to change them during the making process as I see fit. This is a stage where I do try outs of the idea that I have in my head, and by gut feeling start to turn it into something that I personally approve. Sometimes this style does not work, and the end result is not what I wanted, but from these failures I take the parts that I am happy with, maybe just a curve or a small section, and try to work out with that more in the next one.
When I have found the shape, I start to think how to incorporate the plasma cutting into it. For the final year I have used it as a detail, so it doesn't take over the shape itself. With this mindset I try to visualise again how the ready piece should look like and how it should feel as well, and as the texturing goes on, I work until it feels right to me.

As I think how to make the piece, I also start to think what type of material and how much of it I should use. Since I forge the shapes, I always try to go for recycled materials from scrapyards as the surface and damage in the steel doesn't matter and I can buy in bigger quantities cheaper to keep the cost of production down. My way of working sadly creates a lot of material loss, and using recycled materials helps with environmental sustainability even just a little bit as I use materials that someone else already discarded.
When thinking about the dimensions and trying to keep them in a manageable size for working, I also try to keep the forging part in mind. During 'Carving Steel' I worked with sizes this big for the first time and I had to plan how to heat up the material as well. Luckily, we got a new gas forge for the workshop, and I was able to heat up the smaller parts completely with one heat. This saved time and I did not have to use coal forges; it was more convenient since the forge is movable and using propane is cleaner than coal.

Questions and Answers

The size of my work has varied from project to project, but what has been the same is that people want to interact with my pieces. The size also changes how people behave with the objects. When the pieces are smaller, people tend to pick them up and hold it in their hands and more freely touch and explore what they are holding. This was well seen in the 'Nox' series, as they were also meant to be held in your hand, but people more instinctively just took them without asking if it is okay. The interaction between the work and the viewer was freer and almost automatic. I believe that the 'optimal' size for a casual and quick interaction with the viewer is something that you can pick up easily and hold in your hand comfortably. If it fulfils those two, the step to pick up and touch the object lowers significantly.
Although, with my earlier work when I made jewellery, people did not want to interact with my work almost at all and I had to urge the viewers to touch them. The size of the work was so small that it was not really made for your hands, and I also believe as it was jewellery, people thought it is not appropriate to touch them.

Picking up the object and holding it in your hands for a while is something that is not seen any more in 'Carving Steel'. Of course, due to the size, you cannot pick them up so easily, but also people are more cautious when approaching the objects. Almost as if they are worried or slightly afraid about if it is okay to come closer or touch them. When people have wanted to interact with my work, most of the time I am asked if it is okay to take a look and touching is quite cautious, as if they were worried that they might harm the object, even though I have told people that the pieces are solid steel. It might be a sign of respect as well, as the work gets bigger. But when people interact with my work, they tend to go through the smooth surfaces and really feel the grooves and spend time with it rather than just give it a quick touch.

I think people assume that it is more valuable and precious when it is big, and the size changes the feeling of how you think you are supposed to act when around it. Also, the way people interact with

my work might change when there is a bigger audience, as the exploring is not so intimate and personal anymore with more people around you.
As we did not have a proper exam show, I was not able to study how a crowd of people not from a school environment behave around my work. This is hopefully something I get to look into more if my work gets shown in exhibitions later.

As a person who comes from a more traditional blacksmithing world, this project and the whole process that lead to it, have shown me a new type of approach to my own metalwork. In the classical blacksmith work the shapes often have to be made to measure and take the clients views into account as well. This project has opened my eyes to the freedom of creating and how everything doesn't always have to according to drawings or hard-set plans. It has shown me the possibilities of what I can personally do.
'Carving Steel' is not a classical blacksmith series even though it contains a lot of forging, and that is completely fine for me. The result also reflects self-growth, as I learned to follow my own gut feeling with my work, and not rely on given parameters to create my own style of artwork. This project came with its own share of various issues that needed to be solved in order to continue, and these challenges are the most important moments for learning and becoming better at my work.

Texturing steel as much as I do is not a common phenomenon in the blacksmithing world as people tend to want to stick to the more classical ideas, shapes and ways of working. Of course, texturing your material is nothing new, but using something this radical to remove great quantities of material and still keeping a clean forged surface on the other side in a way connects the old with the new. The result of my process is something that is quite unique in the metalworking world, as something like my work has not been seen before. Creating a way of working that I can call my own might not get the attention it needs within this closed studying environment. Having something that you can continue, be comfortable with and have worked with for a while is incredibly valuable so you have the methods you are confident about and can proudly say that you made it.

Someone more unaware of the art and craft metalworking world might see steel just as this cold and hard material and may think it more as a construction material or as a part of everyday appliances. I wanted to give the viewer a new kind of experience with steel by combining different surfaces to show something that they have not experienced from this material before, something that makes them question their own views of metalwork. I do not want to say to people that this is what metalwork should be but give them an alternative from the norms that surround the typical idea what steel is and how it feels like. I have talked about being able to touch the work a lot, and I completely stand by the idea of being able to provide a tactile experience to people, especially if they are not familiar with craft.

Both of my finished pieces are still solid, heavy and hard steel, there is no questioning that, but at the same time they provide a different approach to that hardness by the use of forging and turning that hard material into a soft and malleable medium. The plasma cutting then turns the steel into liquid to create the patterns and this hard material is suddenly like soft butter under a hot carving knife. Showing these qualities, techniques and results to people might help them understand more

about the various possibilities of working with steel and how diverse the material itself is. With my work and the textures, I have shown one way of how to make hard materials look and feel soft.

Conclusion and Result

I created a series of tactile sculptures, which combined my personal plasma cutting style with forged forms. This series was made to showcase what this technique can do, give the viewer a physical experience when exploring my work and let their view of the world, imagination and memories create an idea in their head what the objects means to them. They were made to be touched by the viewer and provide them an experience with more senses than just visual and provide an alternative view to the generic way of seeing the material.

Having touch important in your work is something that you cannot find everywhere. Usually you are not allowed to interact with sculptures being exhibited, other than visually, and I believe this restricts the experience of the viewer exploring your work.

Making the pieces bigger has shown me that this working style suits larger and thicker objects quite well, as you can show more details in your work. This way the details become more visible and interesting for the viewer. Although, size becomes an issue at some point. The size of my work is still withing a manageable margin and making something even bigger would pose new difficulties and extra costs. Making bigger work is not out of the question though.

As an artist and a craftsman, it is important to keep trying to find new methods of working and constantly improve yourself. Exploring the possibilities of these new techniques is what makes metalwork interesting. There are a lot of textures in the world of forging, but I believe my style is something out of the ordinary. You can combine old and traditional working methods with more contemporary and advanced innovations.

This series has been a conclusion to a long working process of trying to find myself in the art and craft scene. It has shown me the importance of tactility in my work and has kept me intrigued and challenged for a long time. Eventually, working with this style is something I wish to return to. When and where that happens, I do not know yet. My goal for studying at HDK was to find my own thing within my field, and I believe I have found it.
In a way, in my work I see a year and a half of me, materialised in steel.

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