UNIVERSITY OF GOTHENBURG
SCHOOL OF DESIGN AND CRAFTS

# Broken wood

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Degree work 15 higher education credits

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BA Programme in Wood Oriented Furniture Design,
first level

Bachelor of Fine Arts

**Background**

By education I am a cabinetmaker. I find huge satisfaction in well-built joinery and furniture. I have also studied decorative woodcarving which I actually love. In carving school we used wood to tell stories of one's choosing, but as I studied Wood Oriented Furniture Design at HDK at Steneby in Sweden, telling the story of wood became a quest for me.

The quality of wood that I'm concentrating my exam work on is the distinctive way it breaks. When looking for stories to tell, I came across a tree that was felled by a beaver. Wood is usually considered very friendly, but in the broken part, I found wood in a sort of uninviting form. It had such a strong character that I knew I wanted to explore it.

Wood is fascinating – timber is not a static material, it moves with the moisture in the air. It has a spirit, in a way it never dies. Many designers try to minimize this movement, but for me it offers endless inspiration and amazement. I work with it, embracing those little quirks in the material.

**Aim**

The purpose of this work was to explore wood as a material by bringing forth sides normally hidden Explore what is often considered unwanted. Within the boundaries of this project, I'm going to concentrate on breaking wood.

**Problem formulation**

What can wood do and what it can not?
How can wood be used in new ways?
How can I use wood as a storytelling instrument?
How can I use the technique of breaking wood?
How can I use it safely?
What kind of opportunities arise from it?
What kind of expression does it have?
What can it be used for?

**How?**

There are multiple ways to break wood. All of these have different characteristics and can be used in different ways. Some of them are more decorative while others enable elaborate shapes to be made.

The most natural way for me to a explore the behavior of wood is by working in the workshop. With my hands on the material, it can show me what it wants to become. When my experience in both hand- and machine-based work methods are combined with woods' endless complexity, things happen. The material gives me a glimpse of something interesting, and together we figure out how to use it in a constructive way. Above everything else it is about collaboration. I can't force the material to do what it doesn't want to – but there are many things that it allows to happen naturally.

I have always had a need to have good drawings to work from. Within this project, it has felt that the more drawings I have the more they start to dictate the outcome. Instead of me listening to the material, I try to push forward with a predefined idea. To work without a preconceived idea can be difficult at times. It feels more comforting to know what is going to happen next - but it has become very clear that the more I think about what I'm going to do,the less work actually gets done. The problem with working in this way is the overwhelming amount of ideas that are presented. Choosing one to work with can be difficult. I guess it all comes down to just choosing one, making it well and repeating ad nauseam – then selecting the succesfull objects.

**Timetable**

For the first 4 weeks, I made investigations into the material. After this, the plan was to choose which directions I want to take the work, and act accordingly.

25.2 Start testing / PM / booklet
4.3 Start raport
13.3 Mid-crit
25.3 Choose best work to continue with
9.4 Mid-crit
8.5 Send raport in
Print the book
13.5 Presentation (week 20 - Thursday)

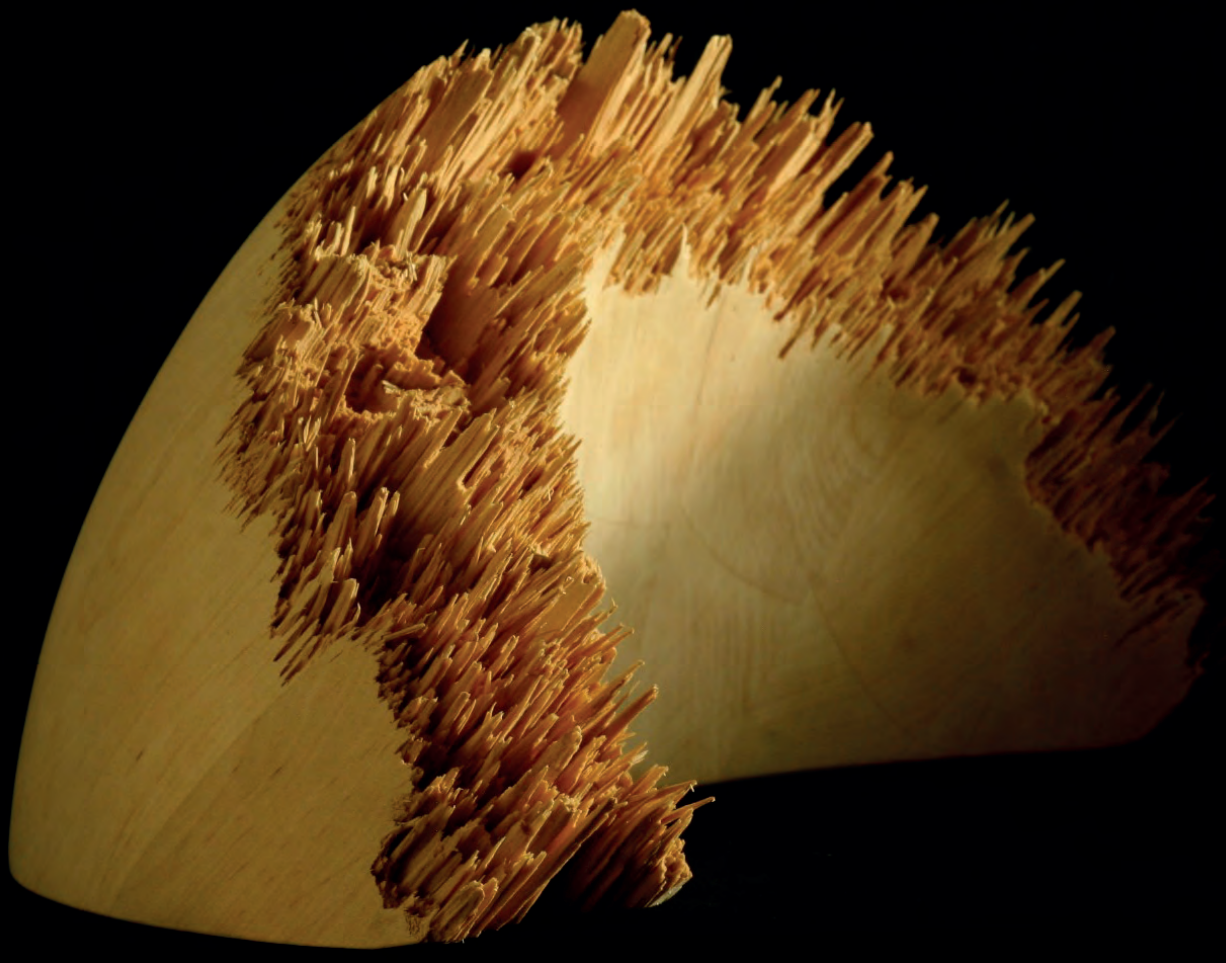
**Outcome**

In the end, the goal is to have an easily approachable exhibition. This will consist of wooden pieces, photographs, and text that ties the whole together. Text and photos should be presented in a book format.

An important object is the bench that is meant for people to sit on and contemplate what they see in other pieces. This bench is meant to be a base – sort of like an place of origin – and the other pieces gather around it.

The other pieces are going to show the different techniques and expressions that wood has to offer when broken.

Earlier investigations into breaking wood.



**Story to tell**

I have been trying to tell stories for a while now. In my search for these stories, I have gone from woodcarving to a more material based approach. What are the most suitable stories for wood to tell? How can I show the beauty of wood in a piece of furniture? After coming to Sweden as an exchange student, I got interested in working together with wood. During this process – as we have been trying to find the balance where our voices would be equal – contribution from the material has grown all the time stronger, and mine smaller.

This all started by including bark into my designs. And quickly took a twist with the introduction of shrinking of wood as it dries. This is what makes wood so difficult for humans to use. Wood is built for water - trees are full of it. Even after the tree is no more, and there is only pieces of wood, they still love water. Their cells are built to transport huge amounts of liquids between roots and leafs. This relationship between water and wood is so profound, that the material of the cell walls actually captures moisture from the air. As the relative humidity of air changes, so does the amount of water in the cell walls. When this happens these walls either expands or contracts in size, and because there are extremely many cells in a piece of wood, its dimensions change accordingly.

If movement of wood, with the changes in humidity, would be uniform in different direction it wouldn't be such a problem, but wood is not build like that. Structure of wood has adapted to handle water in a certain ways, and there is nothing we can do to change that. It is possible to predict how a piece will move, and to be right more often than not, but because wood is so complex, there is going to be pieces that seem to have a mind of their own. It is important to remember that wood isn't built for us. It is a gift.

When I saw a tree felled by a beaver, I fell in love with the part where the fibers had not yet been eaten, but ripped apart. This was something different – wood in a very natural form – raw, powerful and uncontrolled, but wood nevertheless. I wanted to find out how to work with this, and what kind of expressions this would lend to a piece. Wood is friendly, it feels warm and kind – but here we have a way to make it look uninviting, almost scary. Yet, almost every person wants to touch the ragged edge. Inviting become uninviting, while still retaining the friendliness of wood – an interesting controversy.

To understand why wood breaks in a way it does, it is important to know a little about it. However, explaining the nature of wood is difficult because of complex technical terms that has to be used. We can take wood apart in laboratory, and study the pieces, but even under intense research it holds mysteries. Only trees know how to make wood. R. Bruce Hoadley explains in his book Understanding Wood that wood is made by a microscopically thin layer of living cells, between the bark and the wood, called the cambium[1]. There is many type of cells that trees need, and these cell are built to support the tree, to transport water and minerals, and to store these.

Wood has a lot of variations, trees react to their surroundings. They grow branches, and sometimes these might die or get damaged, changing the way in which new cells are built. For example, if the ground moves tree can straighten itself. Even if it fell down it can still continue growing, this is because, as long as the cambium can grow, and there is enough unbroken fibers for the water to flow through, the tree is still alive. Wood itself is not alive – it is dead cells left behind by the cambium – for this reason, trees can grow even when rot has eaten away their heartwood.

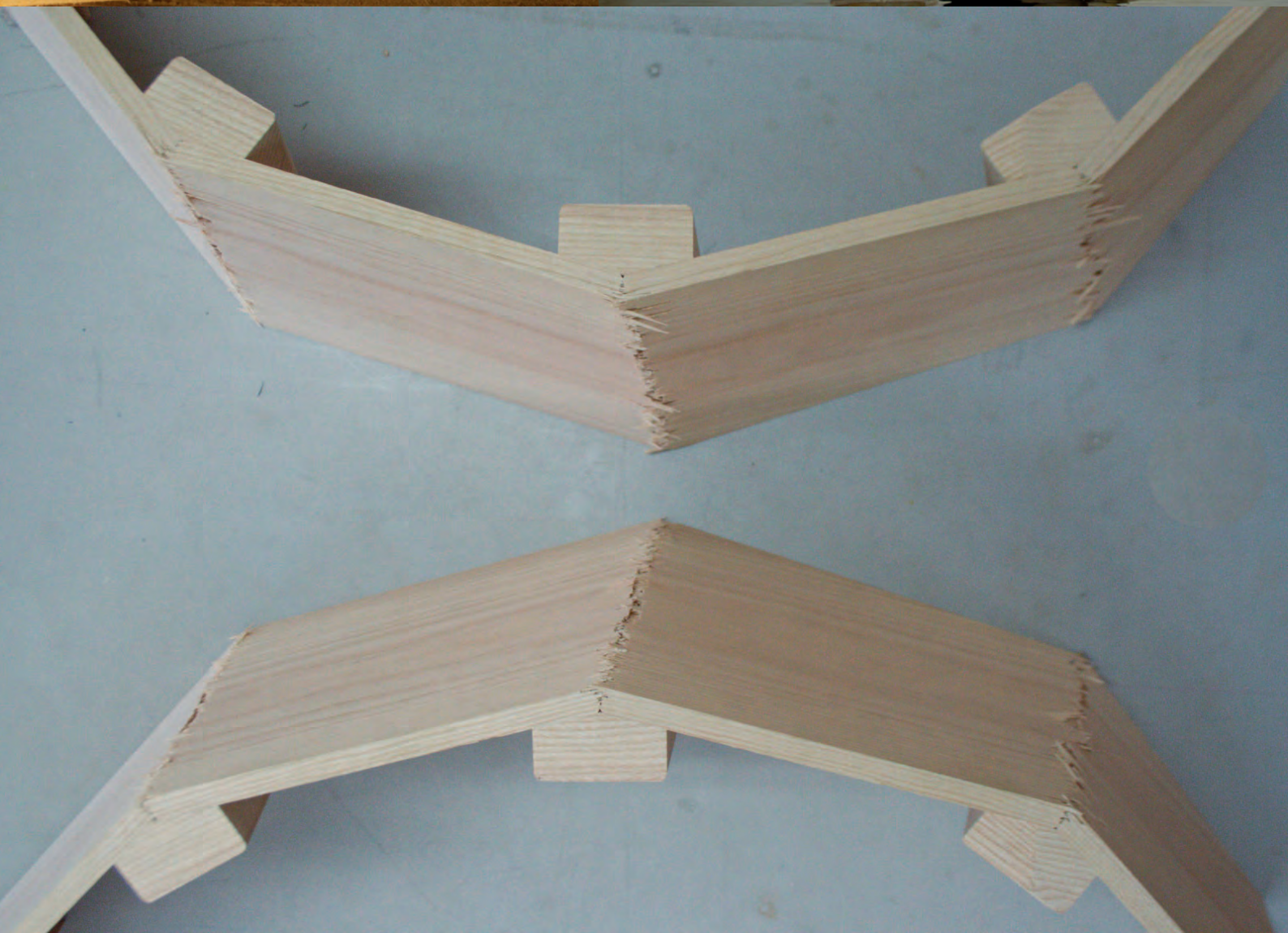
Obvious change in the material is the growth rings. These are built because when the seasons change, so does the needs that the trees have. Earlywood and latewood have different properties, sometimes making them differ visually. From these it is possible to count the age of a tree – one ring every year. According to Hoadley growht of trees in some tropical areas may continue all year round, forming wood without annual rings[2]. It would be very interesting to see how wood like this would break.

It isn't necessary for everybody to understand the cell-level structures of wood, but that is the reason why it breaks in the way it does. Every single cell is built in place for a reason – one by one – and because of this the structure becomes very complex. Cells have different strengths, and as the tension to break the piece grows over a certain limit, fibers are ripped apart. This violent happening follows the structure of the piece; finding the weak spots – wormholes and such – and going around knots and other harder places.

**What broken wood talks about?**

Obviously broken part talks about destruction, but interestingly it can be used to convey many different meanings too. I have been talking with a lot of people about what they see in it, and while spending so much

[1] R. Bruce Hoadley, *Understanding Wood*, Taunton, 2000, p. 8.
[2] Hoadley, p. 10.



time around it myself, I too have wondered the same question. There is opinions of citys, mountain ranges and forests, but to be completely honest, because my goal is to give the material an equal say in the outcome, I have to conclude that it is out of my jurisdiction to say what it represents.

In my work my goal is to set the stage, so that the material has an opportunity to be self-explanatory. Because works of art affect us in a very personal way – our preconceived ideas, unique histories and mood all contribute in our interpretation of the work – so it lays within the viewer to draw their own conclusions. Of course, I have my own prefered explanations, but there isn't really right or wrong. There is just wood doing what wood does. And for me, that feels like a step forward.

Discussions with people have led me to believe, that there is something very personal in broken surfaces – they seem to work on some deep emotional level. When something is broken, it seems to remind people how eventually everything comes to an end and fades away.

Leonard Koren talks in his book Wabi-Sabi for Artists, Designers, Poets & Philosophers about the differences between japanese philosophy of aestethics called wabi-sabi and modernism. He shows that, where modernism is absolute and believes in the control of nature, wabi-sabi is relative and believes that nature is fundamentally uncontrollable[3]. Breaking wood talks about these aspects of wabi-sabi. There is no way to control the breaking process – material has the last say in the matter.

> Things wabi-sabi are expressions of time frozen. They are made of materials that are visibly vulnerable to the effects of weathering and human treatment[4].

Wabi-sabi finds beauty in the moment of decay. It is a reminder that eventually everything that is, passes away. Because this is a universal truth, this should be seen as a way to harmonize with Universe itself. In western culture we shy away from this fact.

The view of the world in wabi-sabi is different from Western notion of beauty. As we see the beauty in the moment when a flower is blooming, wabi-sabi sees it when everything is deteoring. When there is only broken fibers of wood.

Where wabi-sabi is small and quiet, my work brings these elements into the foreground. Because of this I can't really say that what I do is wabi-sabi, but it has some of the same elements. Maybe toning this effect down a bit would bring me closer to the true spirit of wabi-sabi, but for now I feel that exploring the effect to the fullest is the way forward.

Breaking wood brings uncontrollability, element of risk into the equation. It shows the material in an honest way. By giving wood a possibility to manifest itself visibly, whole becomes more balanced.

There is an organic structure in wood, it breaks in a way that is natural for exactly that piece of wood. Broken part itself looks alien, while retaining a sense of familiarity. It is very likely that every person has seen a piece of broken wood – at least in a broken ice cream stick – but usually these surfaces are small. With the change in scale it becomes more visually appealing. The structure of wood can be seen in a more detailed way. Shown in way that grasps the imagination.

We should learn to live with nature, to let it do its things and work together. Instead we are stuck in a vicious attempt of conquest, trying to prove our supremacy. This is visible in many thing we as a race are doing, and woodworking is not an exception. Don't get me wrong – it is excellent that people work with wood – but the question that I want to raise is, why do we have such a need to show our excellence over the material? I'm not saying we should not be skilled, but why are we not encouraged to co-operate with the material? Why do we even think wood has flaws? It is up to us to figure out how to use these properties, by working together with the material.

Fine woodworking has a long history. We have done a lot, learned much, and forgot almost as much. Human history is a history of woodworking. Wood ages well. Sadly, how object will age is rarely thought anymore. People like shiny, scratchless objects – they seem to sell - but they are bound to be tied to their time. They won't retain their outlook forever, they will be dropped, used, dented, spilled on, and who-knows-what. There really isn't any other finish as good-looking as a patina built by a long use. Because of this most of my work is calm and simple. They are meant to age gracefully, even if the spikes are going to get dented and broken.

**On earlier page, different kind of effects:**

1. Breakin surfaces (oak)
2. Broken part of the bench (ash)
3. Matching pieces (oak)
4. Breaking wood to "bend" it (ash)

[3] Leonard Koren, *Wabi-Sabi for Artists, Designers, Poets & Philosophers*, Imperfect Publishing, 2008, p. 26.
[4] Koren, p. 62

**Working with breaking**

Breaking wood requires a lot of force. As the thickness of the piece grows, so does the amount of force needed to rip the fibers apart. To have control over this process, I have been using presses in the Iron & Steel–department. Earlier I have only used the press operated by hand, but for my exam I built a support jig that could be used with the big press. This was needed because to break wood, it can not be supported from underneath.

I was originally worried what kind of pieces the press could handle. Maximum pressure of the big press is 75 tons. This much weight behind a blade, with an angle of 16°, is a lot. Pressure equals 11 huge elephants and is 15 tons more than fully loaded truck with a trailer. The breaking was a breeze. It seemed that as the blade went down, the press hardly noticed even the biggest pieces of wood under it.

For the first month of this project, I did experimentations in the workshop. During this time the test pieces got more and more complicated. After arriving to the self-proclaimed one-month deadline, I evaluated pieces I had done and discussed with people about them. In the end coming to the conclusion, that next step had to be scaling things up.

One of the first experiments I made was a bench. I knew that I wanted to make this one bigger. Its structure was more complicated than necessary, as it consisted of two pieces broken in different angles, so after discussion with our teacher Franz James, I decided to go with a more simplistic route. By making the bench from one piece, it became as simple as possible. This was good, because building knowledge works just like building a house, it all stands on top of a solid foundation. To master a technique, one has to start from the simplest of things.

I needed to do a test to see if the technique works as planned. Test piece had to be approximately of same dimensions as the final piece, so I took the thickest piece of ash I had, and routet a groove in it. This was used to align the press.

Critical part when working with breaking wood is that, if the pieces come apart, it isn't possible to put them back together again. Because of this, it is important to plan well ahead. This proved to be difficult at times, especially in the case of the big bench. As the blade goes down, it lifts the ends of the piece up. Bigger piece means more weight. The piece of small stool could handle the weight of the pieces, and not fall apart as the blade was lifted, but the same could not be said for the bench. Either, more people is needed to support the pieces, or ideally some sort of pulley system could be envisioned. It is important, that the angle of the pieces won't change, because if the broken part opens up, getting the joinery to align properly gets more difficult.

There is many ways to use breaking. It is possible to have the pieces stay together, in which case the angle they are opened into affects what they can be used for. It is also possible to take them apart completely. This method really brings the structure of the wood into the spotlight.

It is difficult to have the pieces to fit together after taking them apart. I have used a lot of time coming up with ways to make the seams as invisible as possible. They can be used as an expression too, but for me not having them at all would be ideal. In my work great care has been taken, to fit the pieces together so that the seams are as unnoticeable as possible. Because of the grain structure it is impossible to have them lined up perfectly, but it is possible to put them together in a way that is not obvious. By bookmathing pieces it is possbile to widen them in a way that looks natural.

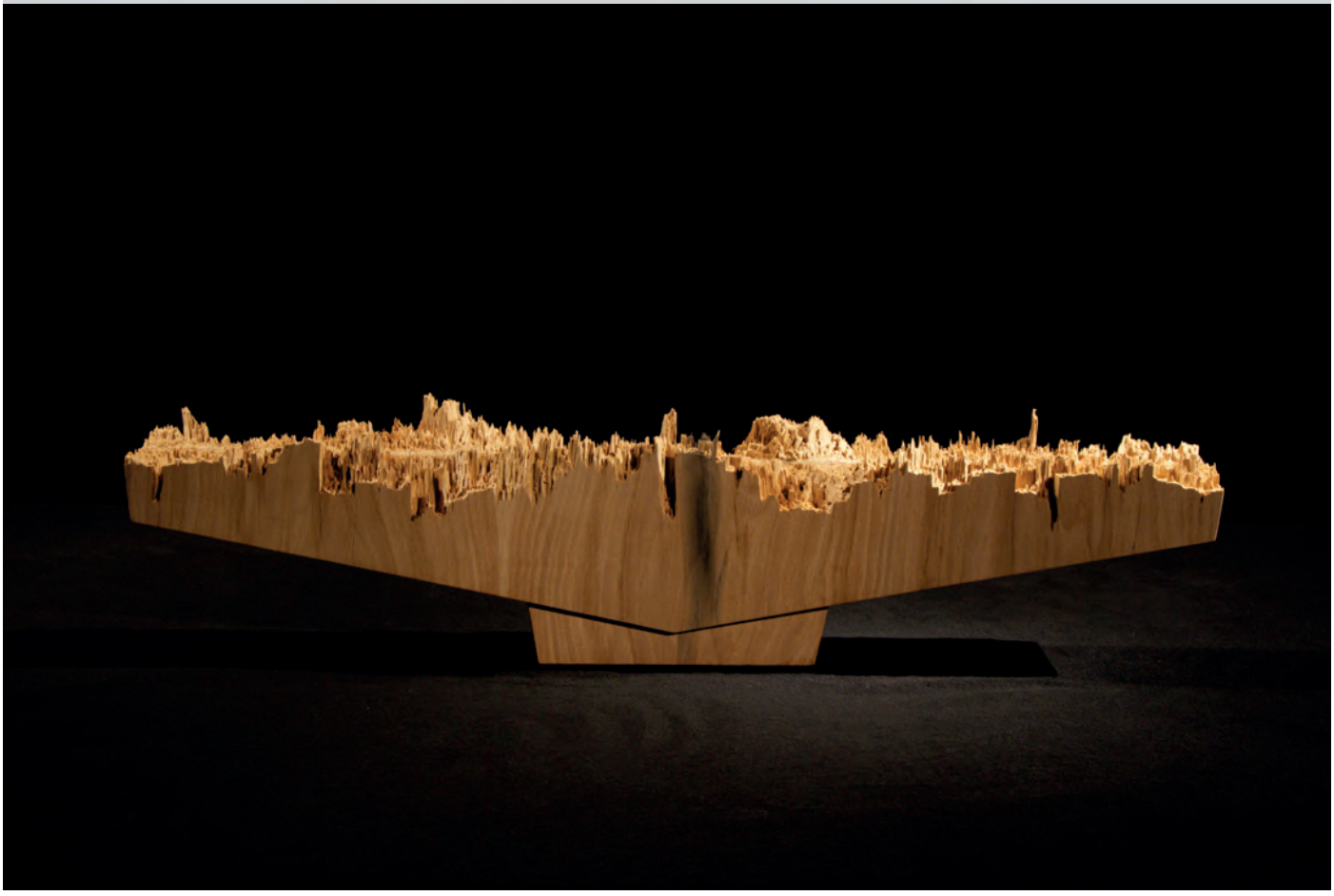
**On next page, making a bench:**

1. Sanding the beautiful ash plank
2. Routing the grooves to guide the breaking process
3. Breaking the piece
4. Making the joinery for the supporting pieces
5. Another detail of the joinery
6. Gluing the legs (in picture the test stool)
7. Planing the sides flush
8. Cutting the legs into final length.







Becnh
1350 x 340 x 420
Ash

Stool
500 x 300 x 300
Ash

Shelf
350 x 350 x 220
Oak

Journey
1050 x 250 x 120
Ash

**Different ways to break wood**

So far I have been breaking ash, alder, pine (heat treated and normal), birch and oak. Different species of wood break differently, for example ash and oak are strong, whereas pine and alder are soft. This is important factor when doing objects, because the strenght of the fibers is key factor in how much touching they can handle. If the goal is for them to retain their look over time, stronger wood should be used.

Thickness of the piece is another important quality when breaking wood. As the thickness goes up, so does the size of the spikes. I started with thinner pieces, but in the end got really enthustiastic about the thicker stuff. I might have taken it a bit overboard, by breaking so much of thick oak, but I felt it was important not to be hindered by not having enough material to work with. But the size of the broken surface is not an absolute value, what is important what it is used for.

The problem with scaling up the pieces is that the blade we have in the tool I used, is shaped in a small angle. This makes the blade to sink deep into the piece, "wasting" valuable material. This effect can be used – as is the case in the centerpiece – but I really understood this only after already cutting away most of this "waste".

Grain direction has a say in the outcome too, even thou this one is more delicate, it can be used to a great effect.

It is important to understand, that breaking wood can be done in a controlled manner. Even if the look implies uncontrollability, it is possible to make objects with exact dimensions and shapes. To achieve this requires planning and usage of grooves.

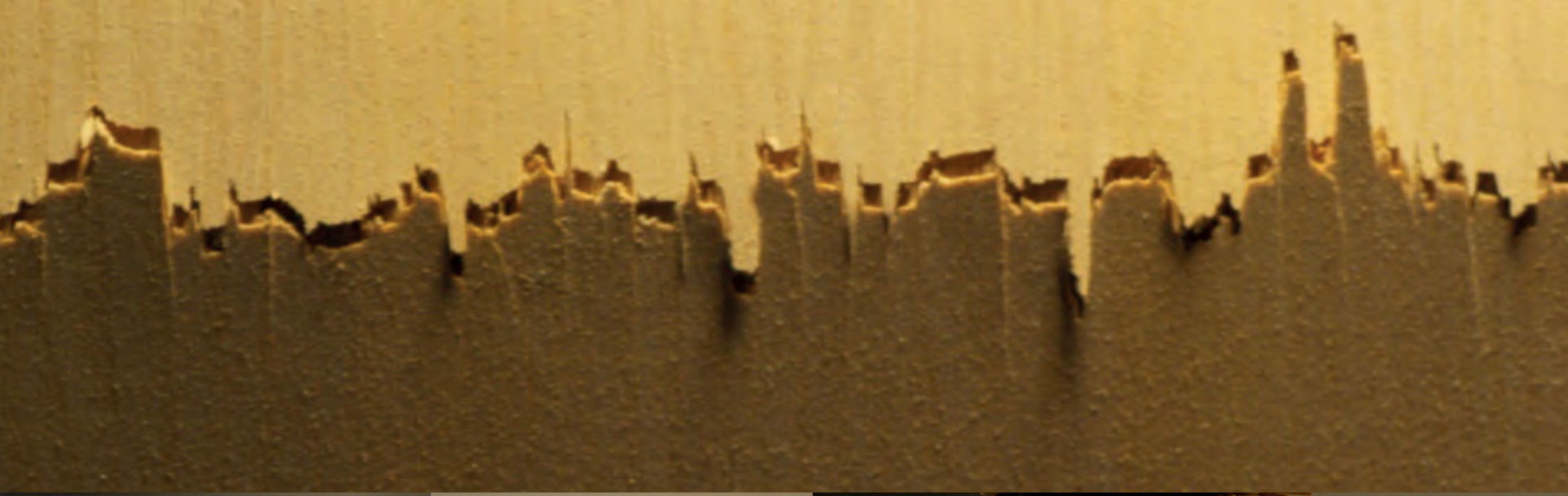
To have control over where the wood is going to break, a groove has to be made. This becomes the weak spot, and the fibers will break there. To have more control over this, another groove can be made to the other side. By alingment of these grooves different effects can be achieved. This is used in the bench, to make it more user-friendly, there is a "roof" on top of the broken part. This makes it more difficult for clothing to get stuck to it.

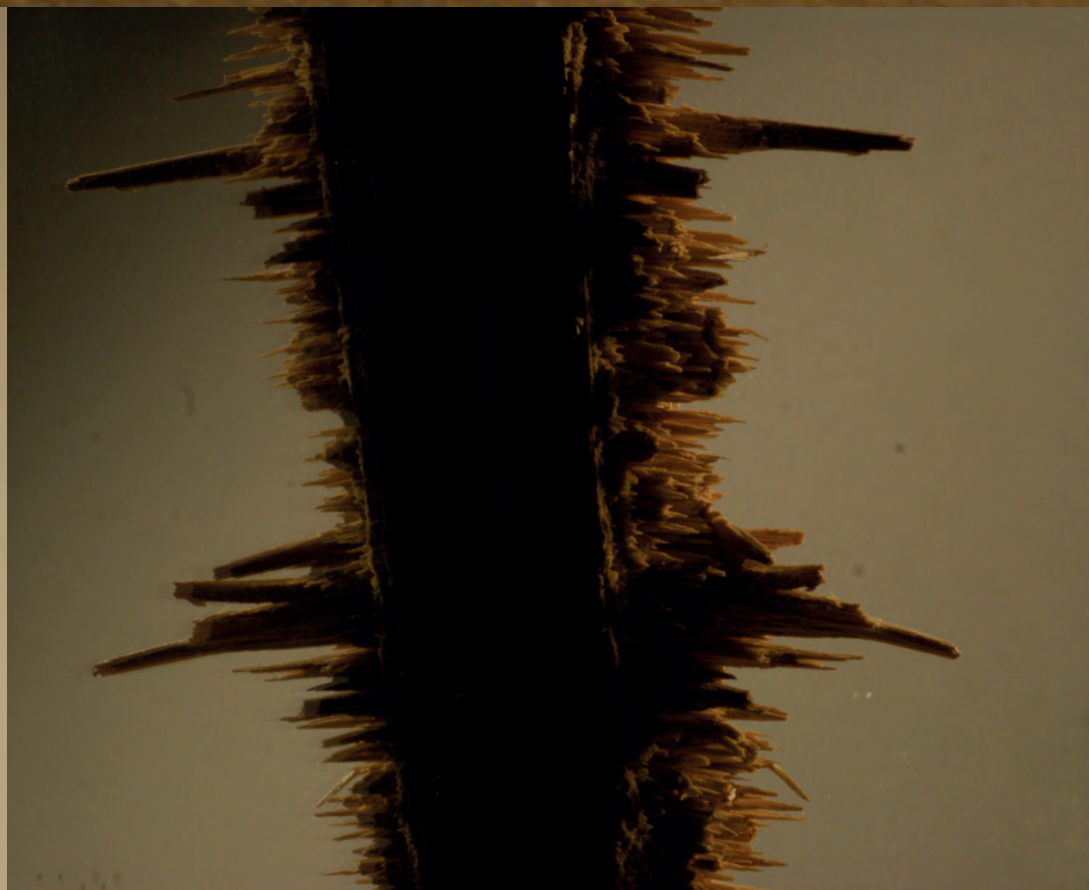
There is an option to crush wood. This one is very interesting, but I haven't looked into it enough yet. With this technique, there isn't any spikes that could be damaged – or that could hurt people – but a very distinctive texture on the surface. My limited experience, tells me that this is more nicer on ash than oak, but I have to look more into this.

As I continue my journey into wood, the amount of questions only grows. I have not yet seen the boundaries of what is possible and what is not. It feels like there is endless possibilities in front of me.

**Different kind of effects:**

1. Crushed (pine)
2. Long split (ash)
3. Fibers standing (ash)
4. Fibers standing (heat treated pine)
5. Crushed (ash)
6. Detached part from crushed piece (ash)





**Workmanship of risk**

Workmanship of risk and workmanship of certainty are concepts introduced in David Pye's book The Nature and Art of Workmanship. Workmanship of risk means "using any kind of technique or apparatus, in which the quality of the result is not predetermined, but depends on the judgment, dexterity and care which the maker exercises as he works"[6]. When studying in the carving school, I learned to handle this uncertainty, but in my furniture I have depended on having good plans.

Whole idea of working with breaking wood is in the realm of workmanship of risk. There isn't really a way to know, how the broken surface will look before it has been broken. There is ways to ask wood to break in some way, but in the end it is the piece, which deciced what is going to happen.

Making the stool was a excercise in risk taking. When going into the process, I didn't know what is going to happen, but I had to do a test of the technique into an expensive piece of wood. After succesfull test run, I decided to make a stool and needed to break other side. This is how the shape of a stool materialized. Because the support structure was not refined, I carved the underside to a more smooth shape.

I have a bad habbit of thinking too much. This is very much true in my design process. If given the change, I can sit and struggle with a problem till the end of time. When presented with a deadline and a goal, I have to give up the endless thinking and take action. When the piece is in my hands, it seems that all the problems, that seemed too big to solve on paper, dissolve into nothingness. This has happened often, and I approached my exam work with an attitude not to think so much. There were moments when I got stuck in the web of thinking, but it became clear very quickly, that this seems to be very productive way for me to work, biggest problem being the massive amount of ideas to choose from.

After reading an article about Jimmy "Doc" Bishop who lived in Bamberg, South Carolina, USA, I started to feel even more secure in working this way.

> He said he never uses plans from a book nor does he draw out his ideas. All of his designs go straight from his mind to the piece of wood he is working with. As he readies the rough-cut wood and works it with his many handmade tools, including a lathe he made himself, each piece takes shape.[7]

For me this seems to be a good way to work. Instead of using a lot of time perfecting drawings – struggling with problems on paper – having only broad outlines, and working with the material, feels better way. The need for drawings arises at occasions, when there is more complicated dimensions and angles, but otherwise only having a sketch to work from feels good. With this technique I retain my freedom to change the plans while working.

**On next page, exploring oak:**

1. Biggest oak planks we had. Both was broken.
2. One of the planks broken into pieces
3. What to do with them?
4. Gluing pieces together to make them bigger
5. Composing

[5] David Pye, *The Nature and Art of Workmanship*, A&C Black, 2007, p. 20.
[6] Minnie Miller, *Craftsman's legacy ingrained in wood,* November 28, 2011, visited May 30, 2013

**Journey into Wood**

This process has been very poetic for me. Working with the material in a very intimate way has been interesting. Wood has literally broken down in front of me, we have become quite good friends. To show this side of the journey, I made a poetic book with pictures and text. In this I tell some of the emotions evoken.

I had as a tutor a creative writing teaher from Germany. Sadly we had timetable issues in setting up meetings. After really starting this project she hasn't answered any of my email anymore. This slowed down my timetable considerably. Finished book did not arrive for the examination, but was present at the exhibitions.

Wood is alive,
it has a soul.

Built by trees to help them reach for the sky,
it is a material unlike any other.

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The body of a tree, servant of the leafs

Supports, transports water
and grows
– reacts and adapts –
triumphs under the sun.

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Forming forests,
trees conquered the world.

Growing high,
they transformed the land,
into a lush garden,
full of life.

Used by many,
lifeforms of all sorts.
They are the reason,
this world is what it is.

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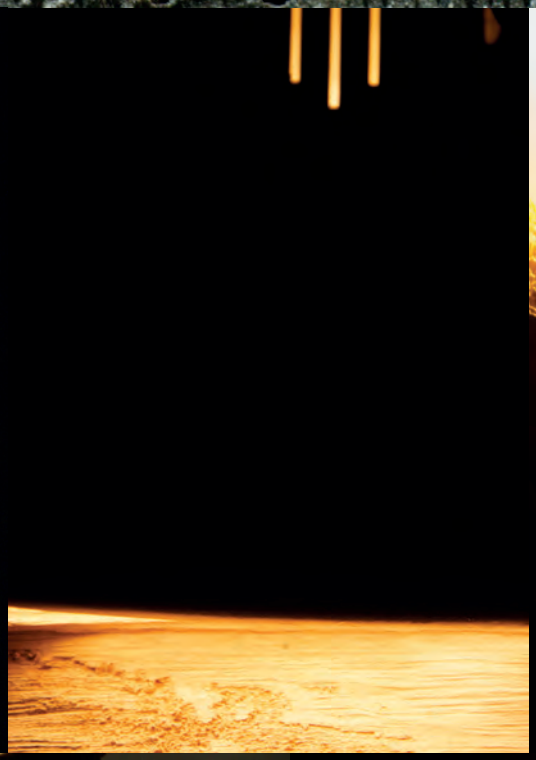
Under the bark
– by a thin layer of cells –
wood is created.

Protected from the world,
behind a barrier.

The privacy of wood
awaits.



**Relationship to a space**

Furniture can be either intependent or site specific. For now I have concentrated on making them fit any environment, but there is a lot to be investigated in making them to a specific place, for example in building stairs.

These pieces of furniture would work well in a public setting. The bench is an example of furniture that can be easily adapted to any space, providing people with a place to rest. I would love to see them in a gallery or in a museum space, as part of the interior. They could also have a lot to offer to wooden architecture, be it modern or old. These pieces would guide peoples minds towards the structural properties of the material, giving them an opportunity to experience the wood more thoroughly. Contrast between the building and timelessness of these pieces could create a fascinating dialog.

Something that I also want to try, is to take a bench outdoors. To see what happens when the space it occupies has the power to affect it. Spikes will get dull and the colours will change into a silvery gray, but as long as the bench is not directly in contact with the ground it should not decay too rapidly. The simplicity of the bench could work well in an outdoor location. In a park or garden it would provide an interesting insight into the surrounding trees. Ths could be enhances even more by making the bench from the same material as the trees around it.

Be it in a museum, gallery, lobby, hospital, church or simply at home, broken furniture can offer a new highly personal experience from an old material.

Exhibition at Steneby

**Discussion**

When a person starts to study woodworking, they learn how wood behaves. They are especially teached to discard wood that is defective – for example, it has cracked. I understand, that in the beginning of education structurally sound material should be used – there really isn't enough experience to know how material behaves – but what strucks me as weird, is that this behaviour isn't questioned as more experience is gained.

The beauty of wood lies in its inherit friendliness, it begs for a touch. However, people have forgotten that wood is rarely perfect. Huge amounts of material is wasted because it is not of high enough quality. We should design our products so that the material can have flaws, it can have a personality. Because we do not, this one-sided view distorts peoples understanding of wood. It is not meant for us to use, it is only because we have been studying it for so long that we understand how it works. Our way of using wood is actually quite unnatural. You can't find planed and cut surfaces anywhere else than in human made woodwork.

Even as we have found more materials to work with, wood has never been worked as much as today. We have countless people thinking what wood is, what it does, and how to use it. Our skills outweight those of ever before in history. It is only natural, that as we have learned how to work with wood, we have started to take pride in our accomplishment. In our mastery of the material we have learned how to control the wood to as high precision as possible. There is - of course - nothing wrong in this, but I argue that as our skills have evolved to even higher standards, we have forgotten what wood is. This has never been more true than today. You have to only see one veneered MDF product and you notice how far our wizardry of wood has evolved, but at the same time it is hard to escape the question, that is it really wood anymore that we are dealing with. Yes, it is derived from wood, but can it really be call wood?

Wood is excellent material and it could not be more environmentally friendly. Actually trees are what have made this world what it is today. Using wood in a sustainable way is the only way we have for a better tomorrow. United Nation's State of the World's Forests 2012 tells that:

> Wood products are manufactured from renewable raw material; they are reusable and biodegradable, and they continue to store carbon throughout their lifetime. These characteristics make wood an excellent alternative to many of the materials that are now widely used in construction and consumer goods, which leave a much larger "carbon footprint" and include concrete, steel, aluminium and plastic. Increasing production and consumption of wood products will therefore be part of a sustainable future.[8]

In a world where "wood and wood products will make increasingly important contributions to a greener economy and more sustainable development"[9] why is there so many properties of wood unused? Is it the difficulty in obtaining the right material? Or maybe the challenges in using these techniques industrially? Or is it us, the designers and makers, who should look in the mirror and realize that we have to get back to the basics? Do we even know what properties there is to tap into? There are many rarely used properties to explore, properties that we don't even know what to do with.

Critical part of sustainable future is that we have to use wood in a responsible way. **Teaching people to see the beauty of wood should be the foremost goal of wood-oriented design.** Making furniture that people can fall in love with, and want to keep around indefinately, goes a long way towards sustainable future.

[7] *State of Worlds Forests 2012*, Food and Agriculture Organization of the United Nations, 2012, p. 33
[8] *State of Worlds Forests 2012*, p. 33

**Conclusion**

Wood has something magical in it. It can take a long time to understand what it is, but after you do, you can not help but to wonder how beautiful it is. The soul of wood goes much deeper than veneered sheetmaterial furniture that people buy these days. Wood is everywhere around us, providing us with most of what we need. Be it firewood or material for tools or buildings, wood provides us with so much. It has shaped our culture as we have shaped it into new forms during the millenia.

There is something to be learned, in not only shaping wood to fit our needs, but to fit our needs to better reflect what wood has to offer. There is much unexplored possibilities in wood – many properties that has been forgotten or not even used yet.

I want to make objects, that make people question what wood is and how it can be used. Expression of broken wood lends itself very well to art. This is a direction that I'm going to explore more, as it makes it possible to explore the possibilities of this property widely.

Making objects that can still be used in a hundred-plus years is a dream of mine. To be able to do this requires the use of well-known techniques and materials that are able to stand the test of time. How modern materials will survive this test is a question yet without an answer. However, we do know from experience how wood is going to look in a thousand years.

I have learned that wood can be broken in many different ways. It all starts with the species of the wood, different species break differently. Grain direction plays also a big part in determening the outcome, as does possible knots and defects. Thickness of the piece plays a vital part - thicker the piece, bigger the spikes. There is a lot to be investigated in this technique. How can it be used in a easy way? In a comblicated way? How can the effect be maximazed? What can it be used for?

Breaking wood in a controlled way has not been done that much. There is still many ways to expand my knowledge, especially in how to use this as a way to bend wood.

I have barely scratched the surface of broken wood, and it makes me sad that after the school is finished I don't have as much time to just explore. However, I hope to keep spending time in the workshop with workmanship of risk. When working with it, many ideas seem to present themselfes. This seems to be a good way for me to develop new product and objects.

It would be a good idea to have more experience working for other people first, but my plan is to eventually have my own workshop. Towards this goal it is time to start searching for tools that I need for my work.

Breaking wood requires some unorthodox pieces of equipment, for a woodworkshop at least, but there is many ways to do that. Machines meant for metalwork provide enough power, but there is also machinery exclusively meant for breaking wood. These could be salvaged from universities or research institutions. Best option might be to built a machine dedicated just for this part of the process. When designed well, built with a strong enough hydraulic piston and a good supporting table, most of the problems in the process can be eliminated. Most importantly, this machine would not even be that complicated to make.

With a machine for breaking wood, producing furniture with this technique should not be that difficult. As of now my machinery needs are quite humble. This will change as the shapes get more complicated, but getting started is quite simple.

This quality of wood, used in both a decorative and functional sense, has a captivating effect for many people. In a world filled with objects, people desire objects that inspire them. Synergy between the simplicity of work and complexity of wood has a lot to offer. After talking with people in the exhibitions, the variety of things they see in the broken wood and its silhouette, has far surpassed what I could have imagined.

In this age of ultramodern – when science seems to be cracking mysteries left and right, and build things that seems to come straight from science fiction-novels – it is easy to forget that something as simple as wood holds tremendous potential. We just need to work together.

The fact that wood is built, each and every cell, one by one, with techniques we do not understand is amazing. That we think forests as wood factories, that can be chopped down for financial gain, makes me sad. Wood is not made for us. Every single piece is a gift – giving it the appreciation it deserves would make us all happier.

Wood is the most important material we have ever had. In my work I try to tell something of this excellent material.

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