

PAPER TOWN ['peɪpə taʊn]

A town that exists on the map, but does not exist in the bypasser's mind*

added to a map but doesn't exist to keep other map makers from crossing copyright laws

*Urban Dictionary describes Paper Town as "A town that is

SUMMARY

Paper town is a proposal within the course Planning & Design for Sustainable Development in a Local Context at Chalmers University of Technology, fall semester 2020. The theme was to explore Architecture of Rurban Territories in the location of Bengtsfors municipality, Dalsland, Sweden.

The project is an investigation of the local industries, its strong connection to the local identity and how it can be utilized to create meeting places- something that is lacking in Bengtsfors today. The purpose is to bring forward a new perspective on the possibilities and future of the local industry, and inspire the locals to feel pride in their hometown. It contains;

- An introducion and background based on the early stages of the course
- A deeper investigation of paper as material and identity
- A strategic proposal containing the paper concept, (possible expansions)
- A reflection on the project process and result

Happy reading!

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paper hub (main proposal) and paper municipality

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INTRODUCTION why paper town was created

Visiting Bengtsfors municipality, we noticed the strong presence of the area's tradition in the manufacturing industry, which only became clearer in our common analysis work. The industries play a big role in people's lives and contribute to the identity of the municipality, which also sets the foundation for this project.

Regarding the industry as a strength and asset, we saw the possibility to build on the already existing identity and create something close to heart for the inhabitants to be proud over, while at the same time filling some of the needs and wishes that are lacking in the municipality today.

The paper manufacturing industry is especially strong in the area, and something most inhabitants have a connection to in one way or another. Combining this, for the inhabitants, well-known material with architecture creates unexpected solutions to one of the biggest weaknesses that were found in the site analysis; the lack of common places and opportunities for people to gather, beyond work, school and home environments.

AIM

The aim with the project is to lift, develop and bring Bengtsfors to a future context, by manifesting possibilities and new usages of paper, while creating reasons and places for people to interact. By bringing the material out of the factories, the strong connection between the natural resources, the industry and the cultural heritage of the area is visualized, which can contribute to interest in the local material and awareness in relation to sustainability. The ambition is that these places can be formed, transformed and moved by the users themselves, giving the inhabitants an opportunity to influence and co-create places they can call their own.

In extension, our ambition is to create a structure and concept that utilize paper and cardboard as an architectural design material, both in construction and interior. Paper as a material has a feeling of temporarity and flexibility, which we want to incorporate and explore by making the designs possible to shape according to the user's need at the time, day, week or year. It is important to reach out to different target groups, due to today's lack of common spaces.

Hopefully, the concept of Paper town will bring forward a new perspective on the possibilities and future of paper, and inspire all generations of Bengtsfors to feel pride in the municipality they live in.



BACKGROUND & ANALYSIS

The project started with a thorough common analysis of Bengtsfors municipality within the course of Planning and Design for Sustainable Development in a Local Context, concerning different perspectives and themes. On the following pages, the most important parts of the analysis for this project is summarized.

RESOURCES, HERITAGE & ENGAGEMENT

Access to natural resources such as lumber for paper and construction. Historical and cultural values have led to competence and craftsmanship related to the municipality's forestry industry. Smaller settlements and communities can have a sense of familiarity and belonging, which is highly relevant since engagement in the local community is important to give life to places.

RURBANISATION & AWARENESS + EXISTING STRUCTURES

Growing interest in life in the countryside and our personal impact on climate change has shifted towards green solutions and lifestyles, in order to have a closer relationship with nature and utilize natural resources.

There is also great potential in already existing structures such as buildings and infrastructure.

LACK OF SERVICES, MEETING PLACES & ACITIVITIES

There needs to be things to engage in beyond work and basic responsibilities, and there are currently few opportunities for social interaction within and between groups/ generations, beyond work, school and home environments.

CENTRALIZATION & URBANIZATION

There is a social and mental urbanization regarding media topics for debate and societal discourse. This has led to people moving to bigger towns and cities and consequently also the lack of inventives for local services and activities.

STRENGTH: INDUSTRIAL TRADITION

The most prominent defined strength that is regarded in this project is the industrial tradition and heritage that still is active in the municipality.

This heritage descends from the mid 1700's when metal industries started to emerge around the area of today's Bengtsfors, and mill communities started to grow around them, supplying the workers and their families with the basic needs. The industries later shifted towards the paper industry, and the communities expanded. (bengtsfors.se) These industries still have a significant importance throughout the municipality and today several active paper industries in the area work on an international basis.

The natural resources in Dalsland was the key to the historical development. The iron ore was the prerequisite of the industrial settlement, but the area also had water, both used as a power source as well as a transport system when the canal system was built in the 1860s (vastsverige.com). The forest was at first used as a source of coal before being a product for the paper and cardboard manufactory.

Today people are less reliant on the factories but they still have a huge importance for the municipality. Not only by being a big employer but also giving a sense of pride and identity to those living here. When asking a woman living in Billingsfors for what is typical about the area she mentioned the industry. In another conversation with the municipality, they also pointed out that the industry is something the people feel a sense of pride over.

WEAKNESS: LACK OF MEETING PLACES

One of the most striking weaknesses for a life in the municipality today is the lack of meeting places. In the common analysis work in the first part of the course, it is stated that;

"I am satisfied with my childhood, this is a good place to grow up. But as a young adult there is nothing to do here."

"The parking lot or place around the entrance to the grocery store becomes a place for residents to have a chat with friends when passing by to/from the store. The same is happening around the recycling centers where residents stop for a chat when they are sorting garbage."

This problem is also shown in the anwers to a survey sent out to the students of the local high school where they were asked their favourite place in Bengtsfors is.

When speaking about meeting places, it is easy to get stuck in spaces for leisure and entertainment. Meeting places like these have existed in the municipality, for e.g. several cinemas, but have been shut down due to lack of economic incentives, even though the inhabitants of Bengtsfors still seem to lack places for interaction. In order for a meeting place to survive in Bengtsfors in a time of centralization and urbanization, the view on what a meeting place can be needs to be rethinked. By simple addings, this project could support the existing places and actors by introducing new ideas and values to create interest and engagement. An "invisible" meetingplace as the parking outside the store could quite easily be reinforced and become a place.

"THIS IS MY FAVOURITE PLACE IN BENGTSFORS"

"Gammelgården"

"No one"

"The school"

"My apartment"

"My house"

"The railways"

"The parking lot"

"My room"

"The border to Värmland"

"My home"

"The gymnasium"

"I have no favourite place"

"The cinema (closed)"

"The square"

"Kickis"

"No particular one"

DIFFICULTIES OF CREATING MEETING PLACES

One of the challenges in creating new meeting places is the economy and administration of these theoretical places - there needs to be an interest and engagement from the intended users. In order for these places to be resilient, we saw a big opportunity and interesting challenge in Planning for the unplanned, as we call it.

Furthermore, we saw the difficulty for us with an outsiders' perspective to decide on what kind of activities and businesses were lacking. This allows for an active kind of participatory design, with room for the users to change the space according to their current needs and interests.

The quote from Feminist futures of spatial practice puts words on why Planning for the unplanned, and leaving a degree of changeability and flexibility within the planned design, could be a successful practice of participatory design. It is impossible to completely understand or relate to every person in every place and project, therefore it is also naive to believe that everyone will use the places exactly the way we have designed and intended it.

By designing for changeability, not only the space but also the users can change over time, creating resilience and making the users an active design collaborator.

"In different ways /.../ the three of us intentionally make incomplete spaces, which invite others to contribute /.../ this is a quality of participatroy practice, and openness also including those with whom you do not agree and those who, due to the power relations of a particular situation, may not listen to you"

Fior, Liza., Krasny, Elke. & Da Mosto, Jane. (2017)

UTILIZING THE LOCAL STRENGTH TO LIFT THE WEAKNESS

The local paper industry is well-known for most Bengtsfors inhabitants. To create places where people can gather, the paper could play a major part - as it is something that the inhabitants have as common ground, and its properties enable interaction if wished and hopefully give a feeling of connection to these common places.

"The concept of public space unites with a concept of public time. /.../ time dedicated to public life and urban resilience. Cities, as exemplified here, not only need public spaces where the public can meet equally, but a public disposition to invest themselves and ideas and creativity into building public time and establishing common ground."

Fior, Liza., Krasny, Elke. & Da Mosto, Jane. (2017)

As quoted above, public space demands invested time. The material itself has a sense of flexibility and is guite simple to interact with light-weighted, hard yet soft, and easy to transform. This creates an opportunity to engage the user in an interactive design process to change the spaces according to the needs. This project aims to explore the diversity of common places; their sites, activities and functions, and how they work together with the paper as material. Is it possible for this to be spread to the entire municipality, and what potential is there in the paper as an architectural material in combination with common places?

SUSTAINABLE DIRECTIONS

To ensure that Bengtsfors municipality is developed towards a sustainable future, some directions were defined in the analysis.

MAKE USE OF EXISTING, PHYSICAL RESOURCES

Through use of existing resources and materials, a connection to the local history is created when existing knowledge is strengthened. Emissions are reduced thanks to shorter transports and less new production.

Our project will touch upon new creative ways to use and reuse local resources, making them more attractive today and for the future. This will also be combined with finding new uses for existing, abandoned buildings.

STRENGTHEN AND DEVELOP THE IDENTITY

A stronger identity gives the inhabitants of Bengtsfors increased self-confidence and creates opportunities for the municipality to be developed through local involvement. It also strengthens Bengtsfors for a marketing purpose and makes the municipality visible as an attractive municipality to visit and live in.

Our project will work with the preservation and strengthening of the local, cultural heritage, crafts and industry. This will by extension strengthen their identity and the view on what opportunities lie in the future.

METHOD

The process has been an iterative design, working with paper as a material in relation to traditional research and design. Trying to link paper to the identity and need of the area, the process can roughly be divided into two categories, where the understanding and designing of the project have been running parallel.

RESEARCHING FOR DESIGN

FINDING REFERENCES

Finding references of architectural paper projects that have been realised around the world, since it is a new concept in the Swedish context. As forestry and paper manufacturing is very common in Sweden, the usage of paper in architecture is an unexplored opportunity.

CONTACT WITH INDUSTRIES

Conversations with local and regional industries that work with paper production in different ways, in order to understand what products are available locally. In order to have a realistic perspective of the potential execution of the project, it was important not to regard paper only as an available raw material, but also a number of local products.

DEFINING MEETING PLACES

The need of meeting places was early identified, but because of its broad meaning it had to be defined specifically to the project. What is a meeting place? What types of places could be relevant for Bengtsfors, and where can they be located?

UNDERSTANDING BY DESIGN

PAPER AS ARCHITECTURE

To understand how paper actually works in architectural practice and how to implement it in the project, a lot of site-less sketches and physical models were made in order to freely try out different paper solutions, and understand its possibilities.

SKETCHING

Sketching and trying out different solutions, places and activities that could be relevant for the municipality, on sites that we found especially interesting.

CONTACT WITH MUNICIPALITY

Conversations with the municipality (Crister Blüme and Maria Andersson) have been very defining for the project, in order to understand the real needs of meeting places, and the background of the local identity. This, for example, led to the decision of having Billingsfors as the starting point of the project.

UNDERSTANDIG THE PROJECT

Constantly going back and forth in order to understand the project. The meeting places and paper were the two starting points. But while finalizing the project the local identity was identified as the common denominator that the project then took off from.



the proposal - the Paper Hall

Early sketch of the proposal - Paper Pavillion

CHALLENGES

PLAN FOR THE UNPLANNED

This might be one of the biggest contradictions in our project- how do we succeed and evaluate the planning of spaces that are supposed to work and develop organically without our future interference? To succeed, we strive for an inclusive design process and conversations with locals in order to understand their actual needs. This is a hard enough task without the restrictions related to covid-19.

EXECUTION

There is a challenge both in physical and social execution of the project. Due to the lack of knowledge, standards and time, we do not have the resources to try out our structures in the right conditions and to-scale. There is also the factor of marketing and reaching out to people, as well as actually managing to make the places feel like "our places".

LACK OF KNOWLEDGE & STANDARDS

Since this material is fairly untried, there is a lack of standards and information on how to solve technical aspects. There are some permanent buildings made of paper, but there seems to be very little information to be found on how these issues have been handled. Furthermore, we had the ambition to work with rest products from the local industries, but there seems to be very little information and standards about this as well.

STAKEHOLDERS & ECONOMY

There is an existing problem of activities shutting down due to lack of economic incentives and decreasing population. So, what are the arguments and driving forces for our project; who will pay for it, why will they pay for it and how is it run on a daily basis?

DELIMITATIONS

Although we do believe paper is an interesting and, in some ways, underestimated material, we realise that not all the municipality's problems can be solved with paper.

This makes for our first and foremost delimitation: our choice to explore paper as a material within architectural practice. We want to use paper as the main construction and building material as much as possible. In some situations, it might not be the optimal material of choice, but by doing this we can fully engage our time in exploring the design possibilities of paper and hopefully open up the reader's eyes to the locally produced material.

Furthermore, it is important to add that though we want to investigate paper as a material, we have not had the time to dig deeply into the production process and its true environmental impact. We acknowledge that this is crucial for our project to be a sustainable proposal, but have realised that this is an enormous field under constant development.

Likewise did the lack of time prevent us from investigating possible stake-holders for the project other than the municipality itself. We understand the importance of them but have chosen to not go further at this stage.

FURTHER ASPECTS

Since our project includes both the investigation of paper as building material, as well as its implementation in different kinds of meeting places, the time frame called for limitations in which aspects that could be fully developed and managed within our project. We have therefore identified some aspects that can be indirectly affected by our project, but do not expect to have time to focus on.

MOBILITY

There is currently insufficient infrastructure in terms of public transport, bike lanes and moving in eastern – western direction, as the lakes have become involuntary barriers for transportation. Situated at the site of a former gas station, there is an ongoing development project is a bus terminal in Billingsfors, which aims to create connections to Bengtsfors, Dals Långed and Bäckefors. (Bengtsfors kommun, 2020)

IMMIGRATION

There is already an existing problem of the big number of displaced people due to conflicts and natural disasters in the world. Living in a time where everything is changing quickly, the future is uncertain- what will for example happen if there suddenly is a big influx of people moving to the municipality?

DIGITALIZATION

The connected society opens up for tons of opportunities in regard to new kinds of meeting places, for example most recently related to covid-19 and working on a distance. This could be a relevant aspect of our project (like creating digital platforms to make the Paper Town concept more easily available), but it will not be our main focus to create places in response to digitalization.

CLIMATE CHANGE

In the past few years, the world has been shaken with natural disasters as extensive forest fires. As the temperature rises and the climate is changing, this could be a big threat to the municipality. There is a lack of resilience due to the monoculture forestry that could be at risk- something that the industries of the municipality are reliant on.

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PAPER as material & identity

INTRODUCTION

In Bengtsfors municipality nature is present everywhere. For many people living here, the landscape, forest and industries is a big part of everyday life and contributes to the identity of the area, not just because of the big forest land and the 399 lakes, but also in the life that occurred and has been developed here as a consequence of the natural resources and the manufacturing of it.

Today the forest industry has a strong hold in the municipality. There are approximately 1200 companies in Bengtsfors, and a majority of them, about 34%, are within the field of agriculture and forestry. This is unsurprising given that about 85% of the land is forest, and 69% is productive forest land. (SCB)

Paper related companies have a specially strong position, which is shown by the fact that the three biggest private employers in the municipality are within paper production; Ahlström-Munksjö AB in Billingsfors with its approximately 325 employees, followed by Rexcell Tissue and Airlaid AB in Skåpafors, and Peterson Packaging AB in Bäckefors. In 2014, 26% of the inhabitants were employed within the field of manufacturing. (Bengtsfors Kommun)

In conclusion, forestry plays a major role in Bengtsfors municipality today, in the fields of heritage, businesses and development. We hope that our project can lift the existing identity of the municipality, while showing the locals what great opportunities lie within paper and architecture. (Bengtsfors Kommun)

INDUSTRY OF BENGTSFORS

In a conversation with a resident from the area they described the towns as typical "bruksort". Further explaining that the factories usually owned a lot of buildings and took care of functions like shops, schools, healthcare and housing in the towns. With the support of the factories the communities were able to grow. Most of the people living there worked at the factory and this created a strong bond between the people and the industry but also a strong dependence on its productivity.

The industry is part of the past, the present and most likely also the future of Bengtsfors municipality.

"We are very proud of and have an ambition to position us in the forefront of the forestry industry."

> Crister Blüme, Developer at Bengtsfors municipality



Map over defined paper-related industries in the municipality

REXCELL TISSUE & AIRLAID AB, SKÅPAFORS



Туре

Napkins Disposable paper tableware Tablecloths

Location

Skåpafors, Bengtsfors

The company is today owned by Duni group, who uses the factory to produce for e.g. napkins. The business has been within the municipality since the 1800's, established in Gustavsfors but is today located in Skåpafors.

efficient.

According to their website they engage in supporting sustainable societies in the local region to help build the communities, and are also a part of the regional business network Paper Province, working with supporting the forest bio-economy.

(Duni Group)

Dunifocuses on sustainable and circular usage within the field of disposable products, such as napkins, tablecloth and tableware, working with innovations and sustainability labels for a responsible business, forestry and circular usage of material; renewable, compostable, responsibly procured and resource

AHLSTRÖM - MUNKSJÖ, BILLINGSFORS



Туре

Thin papers & foils Laminate surfaces

Location

Billingsfors, Bengtsfors

The Billingsfors-located factory has been active since the 1700's, and started off as an ironwork industry but is today a paper manufacturer. During the 1950's, a factory for corrugated cardboard production was built (mostly aiming towards packaging), but that business was shut down when the current owner, Ahlström-Munksjö, bought the factory. Today the production in Billingsfors is focused on thin papers and foils towards the metal industry, but also the laminate surface for IKEA-products. (Wikipedia, 2020)

According to their website, the wood used in production here comes from responsible forestry within circa 100 km radius from Billingsfors. Their vision is to develop innovative fiber-based solutions and qualities for different usages. (Ahlström-Munksjö)

PETERSON PACKAGING, BÄCKEFORS



Туре Costumised carboard packaging

Location Bäckefors, Bengtsfors The company is located in Bäckefors and is a part of the VPK-group, which is an international industrial group that operates in the cardboard packaging sector. Peterson produces customised, corrugated, cardboard packaging solutions in different sizes and thickness for desired material qualities. Their packaging is made out of recycled paper and rest products from wood manufacturing and produces custom made packaging for most types of goods. (VPK Group)

COREX GROUP, BÄCKEFORS



Туре

Cores & rubes Consumer packaging Edge protectors

Location

Bäckefors, Bengtsfors

Other

The dimensions are in between 76,5 mm and 300 mm in diameter and up to 8,2 m long. Corenso Bäckefors Coreplant is a facility of Corex Group which is the division of VPK Group that produces cores, tubes, consumer packaging and edge protectors. Their products are made using 100% recycled paper and are also recyclable themself after use. There are also several alternatives regarding addings to achieve desired performance, such as special liners on the surface which acts as a barrier to the inner core.

Locally produced in Bäckefors and comes in a wide range of dimensions and usages. In building design, it is also a versitile component due to its strong structural properties; it can be used both in loadbearing and decorative elements.

(Corex Group)

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EXPANSION & DEVELOPMENT

Within the forestry industry, there is a great potential of refining the production line and making the most out of the raw material, within both technical and sustainable innovation. Bengtsfors municipality is situated in a region that holds a lot of knowledge within forestry, both traditionally and today, and strives to keep their strong position in the future.

Ahlström-Munksjö in Billingsfors, Rexcell in Skåpafors, Wood Tube in Karlstad are examples of members of Paper Province, along with several municipalities and Karlstad University. Paper Province is a leading business cluster of companies within forestry, with their base in Karlstad, Sweden. Their goal is to bring forest into the future by collaborating to achieve the global sustainability goals and supporting each other in new innovations. (Paper Province)

We see that the overall development within forestry can create great opportunities for the paper-related businesses in the municipality. Widening and lengthening the production chain by utilizing as much of the raw material as possible could be very positive for the municipality's economy. Our project opens up for a new field of usage, and possibly an additional step between the trees being felled and the material being exported away from the municipality.

WOOD TUBE, KARLSTAD



Product Paper tubes in stud layer of walls

Location

Karlstad Produced in Germnay

Other

The standard dimensions are: 45x70 mm 45x95mm 45x120 mm

(Wood Tube, 2020)

An example of new innovation within paper is the company Wood Tube. It is located in Karlstad, about 100km northeast of Bengtsfors. It was founded in 2016 with the goal to develop a paper based wall stud, which aims to decrease injuries among carpenters linked to handling regular steel structures. They have patent since 2019, and during the summer of 2020 their product got approved after testing mechanic, acoustic and fire resistance qualities. Woodtube has gained interest in projects that are transformed more often, as offices for example and also among furniture design, and much is happening within the field.

The wall studs are completely biobased and recyclable. A LCA-study made at the university of Karlstad shows that the embodied carbon of the Wood Tube is 14 times lower compared to its metal equivalent.

Today, the production is located in Germany, but the company has the ambition to locally produce their product once they have a bigger market and more costumers. We see this as a great area of development and opportunity for a new usage and product out of the local material.

SUSTAINABILITY

On the topic of what a sustainable building is, Japanese architect Shigeru Ban says "If a building was built to make money that can be built temporary even in concrete, but if buildings are loved by people they can stay there forever." Referring to some of his temporary projects turning permanent due to people's attachment to them (Sveriges Radio). We believe that the cardboard can be used as a way to try out different solutions and structures in order to decide what is to be more permanent instead of investing time and money into something that might not be used.

In recent years, the importance and awareness of sustainability issues in society and politics has increased, but the discussion is often concentrated around variables that can be measured. such as carbon dioxide emissions. When plants grow, they absorb and store carbon dioxide in their structures, and when cut down, new trees can be planted as a part of a natural cycle. This makes material made from wood - such as paper seen as a sustainable material, and the demand is increasing. For example, in 2021 the European Union will forbid different plastic products (European Union, 2018), which in many cases are replaced with paper-products.

This increasing demand also means higher demand on the raw material. To reach sustainable development it is important not to impoverish the planet's resources. It is therefore important to remember the holistic view and to manage the forest with respect and understanding for the diverse values that the forest possesses, such as recreational, biodiversity and stabilising our local climate. Even though a tree in solitude is renewable, a whole forest is not.

CIRCULARITY

One way to support a sustainable usage of our forests is to minimize waste by making use of the whole tree and maximizing its potential when felled. When producing paper, most new tree fiber comes as byproducts from the wood industry, and therefore there is little felling for paper production only, and by innovation and design, new uses and techniques to enhance the utilization of the resources is developed.

In the next step of the paper's lifecycle, one can work with increasing the possibilities to use products several times, by reuse by consumers, for example packaging, but also re-make and up-cycle both products and by-products from manufacturing. After minimize the usage and production, re-use is the second most resource efficient way to enhance the lifetime of products.(Naturskyddsföreningen)

When products no longer can be used, recycling of paper products is very efficient. In Sweden approximately 73% of the paper packages is recycled. Each time the fibres are recycled, they lose some of the strength, but paper fibers can be recycled up to 7 times. The fibres that are worn out are separated from the recyclable fibres and are at last used for bio-energy and returned to the natural life cycle, often as carbon dioxide the trees bind when growing or by degradation, and returned to the plants through the soil. (FTI)



Illustration of the life-cycle of trees, and the papers part in particular.

INCREASING LIFE TIME

The life cycle of paper can also be adapted to the European Union directive concerning waste prevention and management, which aims to decrease the demand for new raw material and increase the lifetime of already existing material. (European Commission)

PREVENTION

The first step is adapting our behaviour so that we When the material has lost its structural integrity, are not using more resources than we need. This it can be burnt for energy-extraction or, more can lead to less extensive deforestation and a more specifically, biofuel. We see biofuel as a big risk efficient use of the entire trees that we do fell.

RE-USE

To make use of the efforts and resources we put extraction. into the final products, we can re-use the products or parts of them instead of throwing them away. **DEPOSITION** The by-products of production are also a big An alternative to energy extraction is returning the opportunity for extending the material's lifetime.

RE-CYCLE

re-cycling. Paper fibers are strong enough to keep its material qualities through five to seven recycles, which is applicable for both packaging and newpapers. (FTI)

ENERGY EXTRACTION

of greenwashing, since the process also emits greenhouse gases, which makes it even more important to prioritize re-cycling in favor of energy

raw material to the earth. Many forms of paper are biodegradable, and we see a future where it might be more common to let nature return the material If the product is not re-usable, the alternative is to earth instead of turning it into energy.



PROPERTIES

Paper is, compared to its brother wood, a very temporary material and one could argue that the shorter life span of paper would be a waste. Wood is, just like paper, a very local material, so why not use wood instead? We believe that paper has its own unique qualities, in addition to being a possible stage of developing the circularity of the forestry industry and being an important part of the municipality.

Paper is in itself a rather weak material. A single sheet of paper might not be much but if you fold it or roll it it shows other qualities. If you try to tear one paper compared to a pile of papers you soon realize the difference. The strength increases when combined, in the form of tubes or as honeycomb panels. It is both a question of mass and geometry. If the elements are infused with glue the structural capacity will be increased significantly.

The material has the benefit of being recyclable. Paper and cardboard can be recycled up to seven times before losing its properties. Today are many products also degradable.

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PROS

INDUSTRY

- + Shows off the existing and local businesses
- + Create new possibilities for development
- + Possibility to make use of today's waste products.

BUZZ OF THE TOWN

+ Today's climate with social media calls for something new and different, 'stand-offish'

+ Possible to do something similar with other building material, but would not have the same visual effect

CHARACTER

- + The material has its own 'feel', a softness and 'roughness' compared to other building materials
- + Light weight
- + Changeable and flexible

IDENTITY

+ Uses the local recources and gives it positive attention- something to be proud of

- + Paper industries are a big part of the society
- + Using paper could create something to have as "their own"

CONS

INDUSTRY CHARACTER - Large international companies own and have - Can be percieved as a fragile material big influence on the industry - The life span is not as long as some other - Risk of extensive deforestation in order to materials, if used in for example furniture it would create the final products probably wear quite quickly TECHNICAL ASPECTS MANUFACTURING

- The material is at risk of moisture damages
- Needs to be treated with fire retardan
- Can be problematic for creating acoustically pleasant environments
- Chemicals that can be harmful to nature and animals are used during production
- The process of producing the final products can be energy-intensive

PAPER & ARCHITECTURE

SHIGERU BAN

Paper architecture is not that common but certainly not a completely new concept. Japanese architect Shigeru Ban has made his name in that area and designed his first project with a paper tube construction back in 1989. Since then he has designed numerous projects using the unique tubes, everything from churches and pavilions to refugee shelters.

Before and during Ban's projects numerous tests have been made on the structural qualities proving its possibilities to carry heavy loads.

When dismantling Shigeru Ban's paper tube construction for the World expo in Japan 1989 the strength of the tubes were tested. Despite the harsh outdoor conditions the structure had to stand through during the six month of the expo the tubes showed an increase in its compressive strength. This was a result of the glue hardening over time and the moderate exposure to ultraviolet rays.

(Shigeru Ban Architects, McQuaid)

INTERIOR QUALITIES

The character of paper is a great opportunity when it comes to interior architectural qualities. In addition to being lightweight, it has a 'roughness', it does not feel so permanent and expensive. This makes it very interesting when working with semi-permanent solutions and flexible environments.

Paper and cardboard furniture are not completely new, something that for example famous architect Frank Gehry cardboard furniture from the 80's, or the traditional, Japanese Shoji walls of thin, transparant paper. The variety of paper products can be implemented to create different characters and qualities.

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PAPER CHURCH/DOME, JAPAN/TAIWAN





Paper Church in Kobe Japan was built in 1995 and The interior consists of paper tubes placed in an designed by architect Shigeru Ban. The city had oval shape to counteract the orthogonal exterior. 58 suffered from a severe earthquake, resulting in the paper tubes make up the oval space that can host old church being destroyed in a fire. The architect up to 80 people. After the town decided to build a proposed a cheap, easy and quick to assemble more permanent church the material was shipped designen for a temporary church and community to Taiwan where the building was reassembled and center. The church has a rectangular base and a stands till this day, now called Paper Dome. The skin made of translucent polycarbonate panels. The easy structural concept of placing the tubes around entire front and half of each side of the rectangle a wooden joint could be the key to an easy de- and can be opened providing ventilation and extra space. reassembly. (Shigeru Ban Architects and McQuaid)

WHAT WE LEARNT

- Paper tubes as the load-bearing system
- It is possible to make permanent buildings of paper
- Building with paper tubes is not a new phenomenon, but has been practiced for 25 years •
- Transparancy in the protective layer can create beautiful light effects

REFERENCES

Though building with paper seems quite experimental in our Swedish context, there is a number of successful projects around the world.

An important part of the design process was to gather references of realised architectural projects with paper as material. The following are some of our key references which have inspired our project in different ways.

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PAPER HOUSE, JAPAN





Paper house by architect Shigeru Ban, built in 1995, was the first project in which paper tubes were authorized for the use as a structural basis in a permanent building. Designs explicit of introducing tubes bear the lateral forces. the tubes in the Japanese building regulations Ban created a dramatic showcase where the horizontal roofline and vertical columns are underscoring the house's structural purity.

110 paper tubes (2.7m high, 275mm in diameter and 148mm thick) standing in an S-shape creating different spaces on the 10x10 floor plan. Standing with a small gap between them to let light trough.

The tubes are screwed into a cross shaped wooden joint which is fixed into the fondation. Ten of the tubes support the vertical load and the eighty interior

A smaller circular room, partly interior, partly exterior encloses a small garden and interior bathing area. The larger circle is hosting the living area, which with sliding doors and movable closets can divide the space into smaller rooms. The living area can be expanded by opening the sliding glass doors on its perimeter, connecting the space to its outdoor terraces. (Shigeru Ban Architects, McQuaid)

WHAT WE LEARNT

- Paper tubes as the load-bearing system
- It is possible to make permanent buildings of paper
- Building with paper tubes is not a new phenomenon, but has been practiced for 25 years
- Connecting paper tubes to a foundation
- The playfulness of inside vs outside









"The use of the 'No screw, no glue' technique on this An interior project from 2009, designed by architects Joost van Bleiswijk and Alrik Koudenburg and is built scale was never explored before. The strong lines, entirely with cardboard. The client was Amsterdamallowed Joost to apply both details, volumes and furniture. Using over 500m2 of the most 'Nothingbased entrepreneurial agency Nothing that "delivers innovation and commercial creativity for local and building material' we could find - reinforced cardboard. It was CNC cut and left the team with international clients out of a cardboard box. Literally." 1500 element that they slot together without the need of either screws or glue." (Kiki and Joost)

WHAT WE LEARNT

- The wide range of interior usages for corrugated cardboard •
- Used correctly, flat carboard sheets can be very durable
- The possibilities of self-assembly without glue or screws

NOTHING OFFICE, NETHERLANDS







SHOJI, JAPAN

The concept of Shojis was born in China but was imported to Japan around 600-700 years A.D. Originally, it referred to all room partitions made of a fixed panel and paper/fabric. Today, it most commonly refers to japanese, wooden sliding doors with translucent paper attached. The semitransparent properties gives it a special character as it can act as a physical divider of spaces, while still letting through light and shadows.

The systems usually consist of top rails which run along the load-bearing beams and connect to the pillars, and bottom rails which lie in the floor. Between the pillars, the Shojis can be moved according to the current needs. In traditional Japanese houses where this technique is used, there can therefore be very few permanent interior walls. The Shoji system allows for a flexible floor plan in an extremely lightweight and surprisingly durable material. (eShoji)









WHAT WE LEARNT

- Paper has been used as complementary building material for centuries
- As a building material, paper already has cultural and historical values
- The possibility of transparancy creates interesting play with light and shadows
- The light weight character of the paper makes built-in-flexibility possible

REFERENCES

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THE PROPOSAL paper concept

DESCRIPTION

Our proposal aims to make use of and develop the already existing identity of the region, while creating places where people can gather and meet each other - something that is missing in the municipality today. We see that shared spaces not only give the physical conditions for people to meet under a roof, but can also strengthen the community feeling and pride of the local identity.

We have identified Billingsfors as a special area of interest, as they have a strong connection to the paper industry, while being in especially big need and want of places to meet.

The concept can be implemented around the entire municipality, as the need and identity is present in the other towns as well. Due to the trend of decreasing population and centralization, there are a lot of abandoned and empty buildings and facilities around the municipality. Using the existing technical structures of these places, there are possibilities of both permanent solution and temporary spaces, since the paper allows for easy and lightweight construction. This opens up the opportunity of testing what kind of activities and businesses could be appropriate and appreciated in the specific site, providing possibility for new life and usages.

PROJECT OVERVIEW

Paper Town was created to let the municipalitys existing strength and identity become a possible solution to the lack of meeting places, in a sustainable and affordable way. The versatility in the paper solutions creates opportunities for implementation wherever, by whoever and to whatever. This is the main idea in the Paper Concept.

The proposal of Paper Town is both a concept which can be implemented throughout the municipality, and a proposed design, showing how the concept can be realized, and consists of two major parts: The Paper Hub as the core and starting point, and The Paper Municipality as its extension.

PAPER HUB

Billingsfors town centre is the starting point for Paper Town and becomes the Paper Hub in the municipality. Here are an opportunity to create something eye-catching that really shows off the paper material, and works as a means off communication to the by-passer. This takes form as the Paper Pavilion, situated at the existing parking lot next to the main road and the grocery shop.

The second part of the Hub is The Paper hall that is located across the road to the pavilion, which becomes the first interior paper project, and possibly, a main storage for the Paper Towns solutions.

PAPER MUNICIPALITY

With the hub as an established starting point, the project could in the future expand to more places in the municipality. The last part of the project shows possible locations for expansion, and examples of how it could be executed.

MIND MAP

With our analysis as base, we made a mind map to understand the kind of places that could be relevant for our project. What activities they could include, how they feel for the users and visitors, what businesses that could be tenants, and what the site is like.

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DO WHAT?

Clothing exchange days
Shows & Performances
Gaming hall
Meeting & Gathering
Arts & crafts
Learning something new

HOW IS THE ATMOSPHERE?

Safety	"Our place"
Company	Exploring
Open minded	Durable
Playful & creative	Co-creating
Belonging	Community

WHAT BUSINESSES?

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tore

.....

WHAT IS THE SITE LIKE?

Outside	
Inside	Flexib
Strong identity	Cre
Non-permanence	0
Outdoor during summer	

Adaptable to needs ibility in existing shell reate your own space Organically changing

.....

51

THE PROPOSAL paper hub

BILLINGSFORS

This project starts off in Billingsfors, or more specifically its center. The area is closely connected to the paper industry which makes itself present where it stands close to the water just at the northern outskirts of the town.

The center of Billingsfors is seperated by Stenebyvägen, one of the most heavily trafficked roads in the whole of Dalsland. The big flow of cars through is especially noticeable during the summer when people are moving towards the coast for vacation. Few are making a stop and currently there is close to no economic return or profit of all these people, we learnt during a conversation with the municipality.

In these conversations with Crister Blüme and Maria Andersson from the municipality we found that Billingsfors centre is the perfect location for a changeable place-making project. The common connection to the identity and paper industry is especially strong here, and there is a publically common longing for meeting places.

Paper town is a project that includes the entire municipality, but with Billingsfors town centre as the starting point and hub.

"The characteristics of Billingsfors is a small town built around our paper mill, where most inhabitants have a connection to the company."

> Solveig Nettelbo, resident in Billingsfors

BILLINGSFORS



- Paper manufacturing Ahlström-Munksjö
- 2 Billingsfors Town Centre



BILLINGSFORS CENTRE 1:1 000



- 1 Former grocery store, site for The Paper Hall
- 2 Local pizza restaurant
- 3 Current grocery store
- 4 Summer café & info, driven by local association
- 5 Food store
- 6 Parking lot, site for Paper Pavilion
- Bus stop

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PAPER PAVILION



The Paper Pavilion is the part of the Paper Hub which communicates the most to the by-passer and visitor. Its eye-catching design works as a invitation to people that passes by to stop. It also articulates the local connection between the natural resources, the manufacturing and the materials potential.

The scale of the structure falls into the surrounding height, and the dimesions of the existing parking windows. The idea is to not take up too much space from the parking lot, which is needed under the summer, but it also makes it possible to use the parking lot for other temporary usages.

STAY FOR THE PAPER - WE DID!

THE PARKING LOT



The parking lot is located in the town center, opposite to the main grocery store. The municipality is currently planning a common park at its south side, having plans on bringing the locals into the design and decision making process. On its north side, there is a newly renovated summer cafe attracting many during the warmer months. In addition, there is work on an information point about Billingsfors in connection to Stenebyvägen as a way to attract the people driving through.

Making an eye-catching stop could catch all these bypasser's attention and spread knowledge and awareness of the geographics and culture of Billingsfors. Implementing paper in this would be perfect due to its strong anchor in the town, and provides potential of creating a landmark which attracts tourists who usually only pass by.

SITE PLAN

1:400



PLACEMENT



Placing the pavilion in the northwestern corner of the existing parking lot makes it visible for bypassers in both northern and southern directions, while utilizing the existing asphalt ground. It also creates a connection to the existing information/café cottage while being close to the grocery store, the former Konsum facilities, the bus stops and the upcoming park south of the parking lot. In temporary usages the pavilion can be used as a base for an outdoor cinema, autumn market, gathering spot for exercising or trips for example.

INTERIOR PERSPECTIVE



FUNCTION

The idea is for the pavilion to act as an extension of find information about the municipality, the paper the existing information centre. The current tourist industry, the industrial heritage, and sustainability information is located in the red cottage just north connected to paper and forestry. There is also of the parking lot, together with a summer café. information about the Paper Hub, connecting the The municipality has recently renovated it but is pavilion to the Paper Hall. People can walk around already out of space during the summer months, inside, sit down to share a conversation or just which is when the pavilion can act as a buffer area use it as protection from the weather. During the and extension when necessary. Inside the pavilion, darker hours of the day and year the pavilion is lit among the forest-inspired paper trunks, one can up spreading light to the parking lot.

EXTERIOR PERSPECTIVE



THE DESIGN

By using paper tubes as the load bearing structure for the pavilion we wanted to bring attention to the material that has a strong connection to the area and give a uniqueness to the pavilion.

The tubes are protected by a glass facade, shielding them from the, sometimes, harsh outdoor conditions. Though the walls do not cover all the way around, leaving a permanent opening to keep that public and inviting feeling. In one half of the pavilion the tubes are standing close to the walls enfolding the space.On the other half the tubes are standing in a random formation to mimic how trees are standing in a forest.

The tubes are standing on a wooden deck and the roof is a simple wood construction. The idea is that it should be easy to build and does not need any special competence.

The wooden deck is surrounding the whole of the pavilion creating space to sit on. On the north side, facing the summer cafe, the deck is wider, stretching towards the grass area creating a common space between the two functions.

FLOOR PLAN



0 SKAL



SECTION

1:50

0	
0	0
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		5
_A 1:50		[m]

1:50



FOREST AS REFERENCE





The forest has been an important reference to us in designing the pavillon. We want the forestry to feel present in the project, connecting the paper construction with its raw material, by mimicing the feeling of irregularly placed "trees" and letting them cast atmospheric shadows on its interior and surroundings.

FLOOR CONNECTION 1:5



The tubes are placed on a circular wooden base to create separation between the tubes and the floor. The cross-shaped part of the wooden joint goes inside the tube to stabilise and fix them to the foundation. A similar approach can be used for the roof connection.

THE PAPER HALL



The Paper Hall makes use of an already existing building to create changeable and flexible spaces primary for the inhabitants of the area. The building is separated into two distinct parts, the former grocery store that will be used as a central storage for all the paper solutions and the store facilities where the different paper solutions will be implemented to create a flexible space, while showcasing the opportunities they bring.

FORMER GROCERY STORE

North of the current grocery store, there is a store built in the 1930's with the typical functionalist style with a shop on the ground floor and housing above. The house is mapped out as a building with historically cultural value by the municipality, and has over the years contained different shops and the grocery store Konsum in its extension from the 1970's, but has now been standing without tenants for many years.

The building is also located close to the parking lot, the part of the proposal of a hub for Paper Town. We see that there is more than a physical connection between these, where the hub catches attention and shows off the local material, while the indoor facilities in this building can be a practical example of the paper's wide range of uses and its flexible qualities when creating indoor-spaces.

The ground floor has a lot of potential to become a meeting place for the inhabitants of Billingsfors, since this is lacking today. Interviews from the first part of the course have shown that the only place where you can meet different people is in the grocery store, the building next door. There is also a lack of a bigger venue for parties and gatherings, since the previous one was bought by a private investor.



EXISTING FLOOR PLAN

1:200

The bottom floor has been divided into three parts;

- The former grocery store to the right
- A smaller store facility closest to the road
- Storage, staff spaces, fridge, etc. inbetween

The connection between the two facilities will make it easy to change the arrangement and fetch extra products. The storage will also host solutions that can be applied in other parts of the municipality.



The store facility is used to create a flexible indoor space where the interior qualities of paper are tried and shown off

for Konsum can be used as storage area for the Paper Town products and the starting point for new expansions



The program for the store facility is not set; The big open space could serve as a base and instead it can act as many different things the walls can be altered and furnitures added dependent on the demand. While trying to depending on the needs. There is a potential make as few permanent changes as possible for a function to become permanent if there is two walls have been removed in order to interest from an investor. Otherwise, the space open the space up. These have been replaced can be used by the public and changeable over by foldable paper-walls so that the size of a time. It could also be rented for private events room can change depending on the activity. In and parties. addition, a simple wall has been added between the storage and the kitchen area, connecting it more to the space and thereby increasing its usage.

EXAMPLE 2: ATELIER & SHOP

1:150











EXAMPLE 4: LIBRARY & CLASSES

1:150



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PRODUCT LIBRARY

Here we have collected different kinds of design solutions related to paper, mostly for interior projects. These will be an example of products that either already exist, or could be developed within the municipality and then spread throughout the Paper Town. These solutions could be permanently stored in the former grocery store facilities, from which residents and planners of Bengtsfors can rent or buy local products for a special occasion or new projects, for example.



MOLO SOFT WALL



These freestanding space partitions are produced by the Canadian company *Molo Design*. They can be shaped into any curved or linear formation, and the honeycomb geometry allows for easy expansion and compressed storage. They are made of FSC certified resources, coated with non-toxic fire retardant and come in various heighs (153,5 cm, 183cm or 244 cm). Fully epanded, they are 450 cm, and can become as thin as 23,5 cm when compressed. (Molo Design)

FOLDABLE SHELF



The shelves were created by design company "Inspired by the open pages of a book, sheets of Campaign, and where a part of a temporary installation cardboard 4.7m x 2.2m and 10mm thick are folded during the London Festival of Architecture. They and pleated into a concertina along all four interior were constructed entirely of cardboard and were walls. Lengths of cardboard inserted horizontally recycled at the end of the festival. create sturdy shelving to house a variety of *publications."* (Campaign)



BOOKSHELF



The modular bookshelf is made of corrugated cardboard and comes in five different components; three different horizontal parts and two veritcal. The vertical parts are used to create either short or high shelves, while the horizontal parts create deep, shallow and short shelves.



A combination of optimizing a rectangular sheet of corrugated cardboard and the traditional park bench with horizonal planks.

The supporting pieces can be cut out without making any unusable, small cardboard parts. Gluing these together creates a stable support for the horizontal planks which are changed from wood to the locally produced paper tubes. Extra supports and longer tubes can be added to create a longer seat – making the chair a bench.



FOLDABLE CHAIR



This chair is made completely from sheets of corrugated cardboard, consisting of two side pieces and two foldable sheets. The side pieces have cut outs where the foldable parts will connect and secure the construction.

The "V" shape of the chair makes it easy to stack them on top of each other, taking up little space when not in use.

FLEXIBLE TABLE



A system of three different sizes on table-tops made of cardboard, and three different lengths of legs made from paper tubes, enables various combinations of table solutions for the users needs, such as; lounge table, exhibition tables and bar counters.



THE CUBE



The cube is a foldable module which can be used to create smaller spaces within a bigger room. It is made of a long sheet of cardboard and can be folded and stacked. The cubes can stand by themselves and also be added next to each other to create several och longer "rooms" within the bigger room.

TENT STRUCTURE



The module is similar to a classic party tent, where tubes are joined in nodes, and stay in place with weights in the bottom. The structure allows for easy assemble and dis-assemble, which is further simplified with the light weight paper tubes, and can be combined to create both small and big structures. A cloth can then be draped over the construction to protect it from weather and rain.







THE PROPOSAL paper municipality

GUSTAVSFORS



- OLD SHIPYARD BUILDING 1
- 2 ICA OPTIMISTEN
- 3 ELECTRIC LIGHT TRAILS

BENGTSFORS



- PLACES BY WATER 1
- 2 INDUSTRIAL BUILDING
- 3 YOUTH LEISURE CENTER
- STONE PARK 4



To make the project richer and relevant for the entire municipality, we mapped out some other potential sites that could be a part of the Paper Town. These are sites that we see have potential in serving, mainly, some kind of social function. For some of the sites, we have also started to design and sketch on schematic proposals on how the paper could be implemented on the specific site.

OTHER SITES





SKÅPAFORS



- THE ICE RINK 1
- FOLKETS HUS 2

BÄCKEFORS



- MUNICIPALITY BUILDING & 1 SQUARE BY BÄCKEGÅRDEN
- TRAIN/BUS STATION 2
- GROUND-FLOOR EMPTY 3 FACILITIES

DALS LÅNGED



REQUESTED SQUARE AREA 1 FORMER RAILWAY HOUSE 2



YOUTH CENTER

We see big potential in the building in Bengtsfors, which has suffered an extensive fire. The municipality also plans on keeping and transforming the building for some kind of activity. There is a strong, possible connection to the schools in the area, and we think that changing the traffic situation (especially in regard of the area between the school and the building) could open up a lot of potential; both in physical spaces and connections as well as possible collaborations.

Inside the building the paper could be used as a compliment in the rooms. It could serve as furniture, storage and walls. The light weight of paper walls could be used when reentering the building as a way to try to figure out rooms and activities over time instead of deciding beforehand.

EXISTING FLOOR PLANS



YOUTH CENTER

1:200



PLAN ÖVERVÅNING

RANI Bla 15.1 × 9.3 = 140.4 + Plan II Bla 15.1×9.3 = 140.4 + Plan II Bla 15.1×9.3: Bra 14.7×B.9=130.0 + 3m. H4×B.5 = 122.4 + Bra 14.7×B.9

= SUMMA Bba 421,2 m^e Bra 384 m^e

			CENTRALBACKEN 8 STG 4730
SKALA	DATUM	RITAD AV	
1:100	B)1019	EG	

FLOOR PLAN SKETCHES



Entrance floor



Entrance floor

WORKSHOP WC STORAGE \bigcirc \bigcirc KITCHEN C ٦

Upper floor



Upper floor

INTERIOR SKETCHES













INDUSTRIAL BUILDING

The existing plans for this building is renovating it and turning it into a residential building. As we well know, these decision and designing processes can take quite some time, and we saw the potential of putting up some kind of temporary structures which could serve as meeting places while waiting for the bureaucracy to work out.

We saw this as a great opportunity for trying a flexible meeting place with the feeling of temporarity, with the help of the leightweight and changeable material. This could act as a gapfiller during the process of transforming the building, as well as a practical way of testing other potential usages of the building.





FLEXIBLE WALL SYSTEM

The load-bearing construction of the building is simple and easy-to-read, with load bearing outer walls and horizonal pillars. This made it easy to identify a simple grid pattern which, within which aditional cardboard pillars were placed.

One of the first references we had were the Molo Paper Softwalls- portable folding walls made of honey comb-patterned paper. Combining these foldable walls with the pillars and grid system allowed for a great flexibility in both size and amount of roomswhich opened up for multiple purposes which can easily be changed over the day, week or month.



PLAN 1









REFLECTION how did it go?

THE PROCESS

We started out with a very broad plan, working on many different things simultaneously. Initially sketching a lot without a specific place or function in mind in order to formulate various ideas before narrowing it down to the final product. This way, our project became very rich and broad over time and gave us a holistic perspective on paper, sustainability, architecture, meeting places and identity. This made the project very complicated and hard to grasp, even for us.

During the process, we had good conversations with the municipality, which helped us a lot in formulating our program and mapping out the most relevant location for our project. The conversations also helped us find relevant functions and connect our ideas to the context of Billingsfors, and though the interactions were short, they were crucial in order to sort out and find the key aspects in our project.

IF WE WERE TO CONTINUE WORKING WITH PAPER TOWN, WE WOULD

RESEARCH

We would dig deeper into the industry and production of paper and other relevant products. The forestry industry is complex and plays a big role in the biodiversity and ecological climate of the region. As mentioned in the delimitations, having concrete and correct knowledge on its environmental impact is important for the project to be tenable. Both the overall production line and specific information on how the local industries could contribute with by-products and extended production could give a lot of credibility to the project.

Another aspect that we would research further is meeting places and active participatory design. At the beginning of the project, this was one of the focus points, but has become a smaller part of the project due to lack of time. The combination with paper as a flexible material could be a very interesting development, maybe interactively in a workshop with inhabitants.

DESIGN

The next step would be to dive a bit deeper in the technical details surrounding paper. For the Paper Pavilion it would be interesting to look closer into the connections, the roof and the floor construction, as well as understanding how the tubes need to be processed in order to persist water and fire. Furthermore, the site around the pavilion could be developed to strengthen the connection to the existing summer café/ tourist information, and the planned park on the opposite side of the parking lot.

For the paper hall it would be interesting to physically build some of the furnitured to get a better understanding on how much material is needed, how many layers and what thickness of the sheets is to be used. This would also give better insight in how easy or hard it is to assemble and disassemble the products.

THE RESULT

CONTEXT OF BENGTSFORS

The overall project of Paper town gives a background and overview on how the existing strengths and opportunities of the municipality could be used to achieve development in a sustainable way. The project shows an area of development which could help the local resources stay in the municipality for a bigger part of the life-span, causing positive effect in both environmental and economic sustainability. Making the most out of the material locally can give shorter transportation chains, utilizing the raw material as much as possible and keeping the money-flow in the local economy.

Our hope is for the pavilion to make people stop in Billingsfors instead of just driving by - something that the municipality has addressed as a wish. The ambition with the paper hall is to become a place for the inhabitants to use and meet as their own, something that right now is lacking. The hub could together create a place of community and pride, while showing and teaching people about paper, forestry and its connection to sustainability and circularity.

PAPER AS MATERIAL

It has been interesting to work with and test different possibilities and usages of paper, and informative to learn about paper and see how the industry is developing today. Something we realised was that paper might not be the ideal material for something that is bound to stand for a longer time. Instead, its sibling material wood might be preferable as it is well tested, its qualities are studied and people know what to expect from it. Paper on the other hand, is more unknown territory. There are examples of working structures, but these are fewer and have not been tried in the scandinavian weather conditions.

For us it was important to really try out the paper to its full extent, to push the limits of what is possible to show its potential. There is also a point in using the paper as a testing material, before creating something permanent. This could be implemented in trying out a wall or construction to see if it works well and is liked by the people enough to reconstruct permanently.

The paper also has a feeling of originality to it, as it is not commonly used. Something built in paper would awaken people's curiosity and hopefully also spread the word of it. The same structures made in wood can have similar architectural and functional qualities, but would not bring the same 'buzz of the town'-effect.

SUSTAINABLE DIRECTIONS

MAKE USE OF EXISTING RESOURCES

We used paper as it is an existing resource in the municipality. Though it was hard to get an exact understanding on what is produced, to what extent and most importantly what the by-products are. The ideal way of using the raw material, from an environmental and resource-efficiency-perspective, would be to target the by-products and already existing products, rather than expand a new type of production.

The existing, empty buildings made it possible for us to show off the paper's qualities in different ways, and allowed us to try out temporary installation while waiting for something else, more permanent, to be constructed. Our idea was for the functions to grow and develop over time and use the paper in these empty spaces to see which functions have the potential to turn permanent, giving the unutilized facilities an opportunity for new life instead of being overlooked when planning for new activities.

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STRENGTHEN AND DEVELOP THE IDENTITY

The idea with paper was to make use of something local that many people living in the area is familiar to. By bringing the material out of the factories and into daily life for people to interact with, that connection could be strengthened. Possibly, this could also give the inhabitants of all generations a physical manifestation of their heritage, and showing them the opportunities and future that may lie ahead within the industry.

Whether or not this was a successful way to strengthen the identity is impossible to say before it has been implemented, since it is dependent on how people interact with and use the paper.

CONCLUSION

The aim with the project has been to lift, develop and bring Bengtsfors to a future context, by manifesting possibilities and new usages of paper, while creating reasons and places for people to interact. Looking back at the project, we think we have worked well towards this aim. It has been a very educational experience, both in the way of work and the material we focused on. This project would not have been the same without conversations with the municipality. They gave us such important insight into the community that would be impossible to understand without them. It really showed the importance of being invested in the site of each project in order to truly plan sustainably.

"The great vaiety in the history, morphology and economy of small towns /.../ means that generalizations about lessons learned must be treated with caution"

Knox, Paul. & Mayer, Heike, 2009

The project really shows how working sustainably in a small town can have a ripple-down-effect, as it is possible to work towards changing the inhabitants' attitude and view on sustainability and spread to other, affected parts of the region. Since each of these small communities have their own characteristics, it is especially important to make use of their existing qualities in small towns.



"Small towns can be extraordinary places - towns that have their own identity and sociable and enjoyable way of life for their inhabitants"

Knox, Paul. & Mayer, Heike, 2009

CONCLUSION



REFERENCES

WEBSITES

Ahlström-Munksjö. Virkesinköp. https://www.ahlstrom-munksjo.com/sv/om-oss/virkesinkop/ (retrieved 2020-12-02)

Bengtsfors Kommun. www.bengtsfors.se

- Bruksmuseum i Gustavsfors. https://www.bengtsfors.se/arkiv/nyhetsarkiv/nyheter/2018-07-16-bruksmuseum-igustavsfors.html (retrieved 2020-12-10)
- Näringslivet i Bengtsfors Kommun.

https://www.bengtsfors.se/sidor/naringsliv-och-arbete/naringslivet-i-bengtsfors-kommun. html (retrieved 2020-12-02)

Ny bussterminal i Billingsfors för säker trafikmiljö, 2020 https://www.bengtsfors.se/arkiv/nyhetsarkiv/nyheter/2019-10-14-ny-bussterminal-ibillingsfors-for-saker-trafikmiljo.html (retrieved 2020-12-07)

Corex Group. www.corexgroup.com/en/

- About us. https://www.corexgroup.com/en/About_us/ (retrieved 2020-12-02)
- Vision and mission. https://www.corexgroup.com/en/About_us/Vision_&_mission/ (retrieved 2020-12-02)
- Special liner on the outer surface. https://www.corexgroup.com/en/Special_finishes/Special_liner_on_the_outer_surface/ (retrieved 2020-12-03)

Duni Group. www.duni.com/sv/

- Om oss, Rexcell. https://www.duni.com/sv/om-oss/rexcell/ (retrieved 2020-11-05)
- ecoecho. https://www.duni.com/sv/produkter/ecoecho/ (retrieved 2020-12-10)

eShoji. www.eshoji.com

- What is Shoji. https://www.eshoji.com/what-is-shoji.html (retrieved 2020-12-01)
- How do Shoji Screens Work? https://www.eshoji.com/how-do-shoji-screens-work.html (retrieved 2020-12-01)

European Commission. Waste prevention and management. https://ec.europa.eu/environment/green-growth/waste-prevention-and-management/index_ en.htm (retrieved 2020-12-11)

FTI, Förpacknings & tidningsinsamlingen. www.ftiab.se

- Återvinningsprocessen. https://www.ftiab.se/182.html (retrieved 2020-12-09)
- Återvinningsstatistik. https://www.ftiab.se/180.html (retrieved 2020-12-11)

Kiki and Joost. Nothing Office. https://kikiandjoost.com/joost/portfolio_page/nothing-office/ (retrieved 2020-12-01)

Naturskyddsföreningen. Faktablad: Avfallstrappan.

https://www.naturskyddsforeningen.se/skola/energifallet/faktablad-avfallstrappan (retrieved 2020-12-11)

Paper Province. About Paper Province.

https://paperprovince.com/en/about-paper-province/ (retrieved 2020-12-11)

SCB. Kommuner i siffror - tabeller och fördjupning. https://www.scb.se/hitta-statistik/sverige-i-siffror/kommuner-i-siffror/#?region1=1460®ion2= (retrieved 2020-12-02)

Shigeru Ban architects. www.shigerubanarchitects.com

- Paper Church/ Dome, Kobe Japan and Nantou County Taiwan http://www.shigerubanarchitects.com/works/2008_paper-dome-taiwan/index.html (retrieved 2020-11-16) http://www.shigerubanarchitects.com/works/1995_paper-church/index.html (Retrieved 2020-11-16)
- Paper House, Yamanakako Village http://www.shigerubanarchitects.com/works/1995_paper_house/index.html (retrieved 2020-12-01)

Skogsstyrelsen. Granbarkborrens roll i skogens ekosystem. https://www.skogsstyrelsen.se/bruka-skog/skogsskador/insekter/granbarkborre/ granbarkborrens-roll-i-skogens-ekosystem/ (retrieved 2020-12-11)

SLU. 2011. Tillståndet i skogen – rödlistade arter i ett nordiskt perspektiv. Uppsala: ArtDatabanken SLU. https://www.artdatabanken.se/globalassets/ew/subw/artd/2.-varverksamhet/publikationer/6.tillstandet-i-skogen/rapport_tillstandet_skogen.pdf (retrieved 2020-12-11)

Sveaskog. Jakten på den moderna förpackningen.

https://www.sveaskog.se/press-och-nyheter/nyheter-och-pressmeddelanden/2019/jakten-pa-denmoderna-forpackningen/ (retrieved 2020-12-11)

Sveriges radio. P1 Kultur: Arkitektur och Hållbarhet - Del 4. https://sverigesradio.se/avsnitt/1614989 (retrieved 2020-12-14)

VPK Group. VPK Bäckefors. https://www.vpkgroup.com/no-en/plant-overview/vpk-backefors (retrieved 2020-11-05)

Västsverige. Dalslands Kanal. https://www.vastsverige.com/dalsland/artiklar/dalslands-kanal (retrieved 2020-12-10)

Wikipedia. 2020. Billingsfors bruk. https://sv.wikipedia.org/wiki/Billingsfors_bruk (retrieved 2020-11-05)

Wood Tube Sweden AB. 2020. https://www.woodtube.se/ (retrieved 2020-11-20)

BOOKS

Fior, Liza., Krasny Elke & Da Mosto, Jane. 2017. Making time for conversations of resistance. Schalk, Meike., Kristiansson, Thérèse. & Mazé, Ramia (red). Feminist Futures of Spatial Practice: Materialisms, Activisms, Dialogues, Pedagogies, Projections. Schpurbuchverlag, 159-168.

Knox, Paul. & Mayer, Heike. 2009. Small Town Sustainability. Basel: Birkhäuser Verlag AG.

McQuaid Matilda. 2003. Shigeru Ban. London: Phaidon Press Limited.

PERSONAL COMMUNICATIONS

Blüme, Crister; Employee Bengtsfors municipality. 2020. Conversation 19 November. Conversation 2 December.

Andersson, Maria; Employee Bengtsfors municipality. 2020. Conversation 19 November. Conversation 2 December.

Nettelbo, Solveig; Resident in Billingsfors. 2020. Interview 29 September. E-mail 7 November.

Andersson, May-Lis; Resident in Bäckefors. 2020. Interview 29 September

IMAGES

PAPER



Wood Tube Photo: Wood Tube Sweden AB

https://paperprovince.com/app/ uploads/2020/02/regel-i-hand. ong



Rexcell Tissue & Airlad Photo: Duni Group

https://www.duni.com/ globalassets/startpage/rexcel duni-rexcell3-570x420.jpg



Ahlström-Munksjö Photo: Student in Local Context studio



Peterson Packaging Photo: VPK Group

https://www.vpkgroup.com/ no-en/products/packaging/ standard-boxes

Corex group Photo: Corex group

https://www.corexgroup. com/media/img/pics/_ original/Cores-and-tubes. jpg?type=resize&w=780

Paper Church (1) Photo: Shigeru Ban Arch.



http://www. shigerubanarchitects.com/ works/1995_paper-church/ KobeChurch_ext1.jpg

Paper Church (2) Photo: Shigeru Ban Arch.

http://www. shiqerubanarchitects.com/ works/1995_paper-church/ church_int1.jpg

Paper Dome (1)

http://www.

Photo: Shigeru Ban Arch.

shigerubanarchitects.com/

works/2008_paper-dome-

Photo: Shigeru Ban Arch.

shigerubanarchitects.com/

taiwan/PDT_03.jpg

Paper Dome (2)

http://www.











http://www. shigerubanarchitects.com/ works/1995_paper_house/PH-Int-04.jpg

Paper House (2) Photo: Shigeru Ban Arch.

http://www. shigerubanarchitects.com/ works/1995_paper_house/PH-04.jpg





Nothing Office (1) Photo: Joachim Baan https://inhabitat.com/incredibleamsterdam-office-createdentirely-from-cardboard/ oost-van-bleiswijk-nothingcardboard-office-16/

Nothing Office (2) Photo: Joachim Baan

https://officesnapshots.com/ photos/13449/





Nothing Office (3) Photo: Joachim Baan

https://inhabitat.com/incredibleamsterdam-office-createdentirely-from-cardboard/ joost-van-bleiswijk-nothingcardboard-office-11/



Nothing Office (4) Photo: Joachim Baan

https://officesnapshots.com/ photos/13453/



Nothing Office (5) Photo: Joachim Baan https://inhabitat.com/incredibleamsterdam-office-createdentirely-from-cardboard/ oost-van-bleiswijk-nothing-



Nothing Office (6) Photo: Joachim Baan

cardboard-office-6/

https://officesnapshots.com/ photos/13447/



View of temple garden Photo: Masaaki Komori

https://unsplash.com/photos/ gwPSnBvdhtl



Shoji during night Photo: Julian Caruso

https://pixabay.com/photos/ shoji-screen-evening-japanjapanese-1841683/



Shoji Lattice Photo: M Murakami

https://www.flickr.com/photos/ acqua8/14103639488

THE PROPOSAL







https://www.duni.com/



Former Konsum building (1) Photo: Student in Local Context Studio



Former Konsum Building (2) Photo: Student in Local Context Studio



Former Konsum Building (3) Photo: Student in Local Context Studio

https://molodesign.com/app/

uploads/2013/06/21-papersoftwall-image-text.jpg

Molo Soft Wall





Forest (1) Photo: Johan Sundelin

globalassets/startpage/aboutus/corporate-responsibility/ ohansundelin-duni-ceo-570x420.jpg



Foldable Shelf (2) Photo: Paul Greenleaf



Foldable Shelf (3) Photo: Paul Greenleaf



Gustavsfors Image: Google Earth

https://www.google.com/earth/



Bengtsfors Image: Google Earth

https://www.google.com/earth/



Skåpafors Image: Google Earth

https://www.google.com/earth



Bäckefors Image: Google Earth

https://www.google.com/earth/



Dals Långed Image: Google Earth

https://www.google.com/earth/







Industrial Building (2) Photo: Student in Local Context studio



PAPER TOWN ['peipə taun]

A town built of paper, that never leaves the bypasser's mind