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ABSTRACT

TITLE PAGE

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This master's thesis presents the design proposal for a centre for Danish Brewing culture - Bryggekulturens Hus - situated in the city of Thisted, Northern Jutland. This includes a transformation of a historical malt building and an overall aim to make the Danish brewing industry more transparent to the public, ultimately promote a more taste-oriented perception on beer. Here focusses on sustainable-tectonic relations to transformation and perception of local history and identity ultimately set the framework for designing. Furthermore, with an overall integrated and interdisciplinary approach to dealing with a complex design process, architectur-

READING GUIDE

The report consists of two overall parts, starting off with the design process and concludes in the design presentation. These parts are furthermore divided into chapters, addressing analyses, registrations, and studies, all progressing into the presentation capturing the essence of the design proposal, concluding in a conclusion and reflection, as well as an added appendix. During the different chapters, a preliminary text will highlight the possible use of methods or tools in the specific situation. The sources utilised within the thesis is referenced through the Harvard method and collected in the end of the report in a literature- and illustration list.

al notion of aesthetics and space were informed by technical and urban aspects of indoor climate and landscaping to heighten the quality of the design proposal.

Through a series of experiences addressing senses of seeing and tasting as well as the notion of actively trying and learning, Bryggekulturens Hus provide conditions for a wide user group, ultimately creating possibilities for social interactions and an activation of both the region and the otherwise introverted part of the city.

Acknowledgement

During the project, serval study trips has provided knowledge within the brewing industry. Here, a special thanks to the administering director of Thisted Bryghus, Aage Svenningsen, for showing us around in the malt building as well as the facilities of the brewery, providing knowledge and framework for the development of the project. Furthermore, a thanks to the brew master of Indslev Bryggeri, Torben Steenholdt for showing us around in the facilities. Lastly, a thanks to Lars Brorson Fich and Jesper Thøger Christensen for providing supervision and guidance for this thesis.

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Intro Structural optimization Joints window detailing Ventilation Urban space detailing

Design presentation

Concept Site plan Site plan The spatial distribution Facades and sections Snit/facader + interventioner Details Social sustainability Materials and construction Indoor environment

Epilog Conclusion

Reflection Literature list Illustration list Appendix



Ill. 2 The malt building

THE FRAMEWORK

Introduction

Problem

Beer brewing refers almost 10.000 years back in time. In a Nordic relation, the first beer-like product was found together with the Danish Egtvedpigen, dated back to year 1370 b.cr. Since then, and especially during the Middle Ages, the Danish beer culture has continued to rise, and has always been seen as a prominent part of Danish culture and socialization (Slagelse Bryghus, 2019).

However, this has also resulted in a large consumage of beer and alcohol in Denmark. Especially in terms of so-called binge-drinking, where people drink 6 or more units in one time, Denmark has the European record (Jensen, 2018). This could ultimately have big consequences for health and wellbeing.

Potentials

To reduce the amount of binge-drinking and large consumage of alcohol, The Danish brewer's assosiation (from here referred to as: Bryggeriforeningen) has put up a series of goals for changing the habits of beer drinking in Denmark (Bryggeriforeningen,

n.d.). As they state, beer can easily be an integrated part in a healthy lifestyle. Their overall goals for 2030 is:

Reduce the number of adults drinking more than 10 units per week with min. 50%

Reduce the number of young people binge-drinking with min. 50 %

Platform

In relation to the alcohol consumage problematics, a potential to change the habits of danish drinking culture is needed. This by changing the view on beer as a tasting experience rather than an intoxicant. Therefore, this thesis contributes to the rebranding of the Danish perception of beer, by ultimately making the brewing processes more transparent and accessible to the public. This will be exemplified in an overall vision from Bryggeriforeningen about the creation of Bryggekulturens hus, where a transformation of a historical malt building in the city of Thisted creates a learning centre for the public.

"Øl er kommet for at blive i Danmark. Det er vores store kulturdrik. Fyraftensøl og flytteøl binder danskere sammen. Og det vil det også gøre i fremtiden. Hele det danske køkken passer også til øl. Man kan jo ikke drikke vin til frikadeller." - Daniel Øhrstrøm, Kristeligt dagblad, 2014

THE FRAMEWORK

Danish brewing culture

Preliminary

Following section introduces the prospect of danish beer and brewing traditions, to create a framework for the thesis. In relation to that, nordic cuisine and the relation between beer and food is examined, to support the desire for changing the traditional vision on beer.

Denmark has always had a great beer tradition, but since the year 2000, the number of breweries has risen from 12 to 228, encouraged by a more experimenting way of dealing with beer brewing. Therefore, a lot of the newly started breweries are characterized as microbreweries, which is typically placed in smaller communities, contributing to growth and jobs in the local areas (Bryggeriforeningen, n.d.). The microbreweries are characterized with their limited production line, compared to the national brewing companies. Instead, a lot of the microbreweries is also a synonym for craftmanship, as well as producing beers containing unique flavours, hence a more innovative based industry that creates a bigger variation of beers on the market (Bryggeriforeningen, n.d.).

Danish brewing traditions

The Danish brewing traditions originates way back, but the first big change in the prospect of brewing happened in 1847, when J. C. Jacobsen founded the Carlsberg Brewery in Copenhagen. He took the otherwise craft-based and local brewing traditions and turned it into an industry. Thereby he was able to keep a more stable quality in the produced beers, and a new Danish tradition appeared (Slagelse Bryghus, 2021).

During the time from the founding of Carlsberg until now, the creation of beer has changed. As a base, beer consists of malt, water and yeast (Bryggeriforeningen, n.d.). However, as the development of the brewing industry in Denmark started to rise during the start of the 21st century, a big wish to develop new types of beers appeared. This has re-

Design background

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sulted in a series of new ingredients, all adding to the taste of the beer. For a long time, the taste of the beer was decided by the inclusion of hops, which created a big variety of products on the marked. Depending on the type of hops, these is transported from various parts of the world, eg. Northern america. However, because of a bigger focus on sustainability within the brewing industry as well as a recent search for local alternative ingredients for hops, new traditions have occurred (Uddannelsesog forskningsministeriet, 2020). This ultimately refers to the time before the foundation of Carlsberg, where the processes and the ingredients were much more dependent on what was available. This has resulted in beers containing eg. Pine or myrica gale, brewed by Thisted Bryghus (Thisted Bryghus, n.d.).

Beer and food in a nordic context

Food around the world is generally characterized by local traditions, processes and ingredients. When looking at the production of food in a Nordic context, this prospect is very apparent. In Nordic cuisine the use of fresh and local ingredients is immense, as well as create gastronomic experiences based on what the nature has to offer in the different seasons. Furthermore, this cuisine is also associated with experimenting with forgotten ingredients, and in general to go back to the roots of Nordic production of ingredients (Norden.org, n.d.).

As stated earlier, a similar tendency is apparent in the modern brewing era. Therefore, the link between food and beer in a Nordic context are quite close, and because of the country's large consumage of beers, a focus on combining and supplementing each other could be beneficial to create a combined experience. This combination is already apparent in terms of wine and food, but the inclusion of beer in a similar relation could ultimately progress the habits into a more taste-oriented vision on the Danish beer culture.

Continuing, producing and eating food might also be a social matter. According to Madkulturen - a knowledge and improvement organization included in the ministry of foods, agriculture and fisheries of



Ill. 3 The brewing process in the creation of Thy Pilsner from Thisted Bryghu.

Denmark - creating and eating food together with others could eventually be a social event, which can create new communities, friendships and memories across cultures, generations and social statuses (Madkulturen, n.d.). This is already apparent in the beer culture, where beer functions as a catalysis for social interactions. This highlights another corporation between beer and food culture, which could ultimately benefit the local communities with bigger societal engagement.

THE FRAMEWORK

The region of Thy

Preliminary

Following introduces the geographical setting for this thesis, and issues possible challenges appearing in the municipality of Thisted. This to set a base for the contextual boundaries for Bryggekulturens Hus.

This project is situated in the city of Thisted, placed in the municipality of Thisted in the region of Thy. Thy is recognised by rich nature and animal life and has since 2007 been characterized as a National Park (Nationalparkthy.dk n.d.).

Regional challenges

The municipality of Thisted has experienced a depopulation within the last 15 years, which has seen the population fallen from over 46.000 people in 2005, to around 43.000 in 2020 as registered by COWI. Concurrently with the depopulation, the demographical development in the municipality also shows, that the age composition is rising, meaning that there are more elderly and less young people living in the municipality (COWI, 2021). This development forces the municipality into rethinking their strategy, to change this tendency. Together with the municipality of Thisted, Realdania has made a registration of the future strategy of the municipality. This includes a heightened focus on tourism, with point of departure in the unique natural and landscape settings in the region, as well as local ingrediencies and products (Realdania, n.d.). The focus on the region has since risen, which is further highlighted by the recent mentioning of the region in New York Times' "52 places for a changed world" (New York Times, 2022). Furthermore, the possibility of engaging a series of different tourists with serval attractions within the region, all reaching out to different target groups, is beneficial to develop the tourist strategy of Thisted. This can also be seen in the vast development of serval attractions, eg. The Thy Nationalpark center, Cold Hawaii and the upcoming Statens Museum for kunst, Dueodde, all targeted for tourists (Ramstad, 2021). By adding Bryggekulturens hus to the series of attractions, the municipality will cater for a diverse and multicultural sets of tourists.



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Design background

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"If Denmark has a final frontier, it's Thy. Silent dunes, tangled forests and... not to be missed is the sprawling Thy National Park, rippling with dunes, meadows, marshes and lakes. The Thy wilderness is also folded into food and drink: Enjoy beer spiced with bog myrtle from Thisted Bryghus" - New York Times, 2022









Ill. 5 Collage of illustrations capturing the setting of Thy







THE FRAMEWORK

Summary

To summarize, serval factors could ultimately progress the danish beer culture into another direction. Therefore, the general role for Bryggekulturens Hus will be to promote Danish brewing traditions through all of the breweries which are a member of Bryggeriforeningen, but also promote the innovative way of brewing that is widely recognized in Denmark in recent years. Furthermore, Bryggekulturens Hus will be placed in a historical malt building, formerly owned by Thisted Bryghus. Thisted Bryghus have a strong engagement in the local area, which has resulted in a series of products with the inclusion of ingredients from the Thy national park. Therefore, by placing Bryggekulturens Hus in Thisted, it will be possible to promote how to benefit from a rich natural "backyard" in terms of using local ingredients in beer production, but also as a central part of the nordic cuisine, ultimately combining the two to change the perception of beer and support social interactions.

Initial problem statement

"How to transform a historical malt building into a public centre for Danish brewing culture, that actively disseminates and facilitates the Danish traditions as well as innovations in beer brewing?"

Intro to transformation

Preliminary

This thesis adressed the topic of transformation in architecture, as a the processes of reusing existing buildings for new functional purposes. To understand the methods and language for critical discussion on transformation and ultimately be able to register the potentials of exisiting buildings, Christoffer Haarlang's methods of approach to transformation is described in the following (Haarlang, 2015). The main methods applied in this thesis is described in the following and the remaining methods are described in appendix 1.

Skin – Meat – Bone

A method to perceive and understand the 'whole' and tectonic intentions of a building. Skin concerns the membrane dividing outside from inside - often the façade - and its expressivity and cultural acceptance through time, which defines the buildings accepted lifespan. Meat concerns the volume, the spatial configuration within the volume, and the atmosphere of the spaces. Bone concerns the structural aspects that both influences the atmosphere within the construction and the firmness of the construction itself. The attention to these elements enables the design solutions to contain the aspect of time and therefore extending the lifespan of the building. Skin is the opportunities for maintenance, meat is the flexibility of the interior, and bone is durability of the construction and the opportunities for future transformations.

Subtraction – Reconstruction – Repair – Reshape – Addition

Describes a method to understand the architectural interventions when transforming architecture. Subtraction and reconstruction concern the re-establishment of something that has been, repair and reshape concerns the change of something existing, and addition concerns the introduction of something new in the context of something existing.

Technical - Historical - Phenomenology

A method to register, analyse, and evaluate existing structures in a phenomenological perspective in all project phases. Here, the existing structure is perceived intellectual and emotional. The technical aspect is concerned with the understanding of materials and detailing of construction elements, as well as the condition of these elements. The historical aspect concerns the current situation in relation to architectural and cultural history (Haarlang, 2015).

Phenomenology in architecture is the concept of architecture as being experienced and not being a measurable unit. Christian Norberg-Schulz, the most prominent architectural theorists inspired by phenomenology, described in his essay Intentions in Architecture from 1960 architecture as a phenomenon between object and subject (Nygaard, 2011). The method of transformation recognises phenomenology as a fundamental aspect of architecture and reflects its importance when analysing existing architecture.

THE THEORETICAL POSITION

Transformational analysis of malt building

Preliminary

To form an understanding of the historical malt building from 1899, this is analysed based on the transformation method of Skin – Meat – Bone. Additionally, a phenomenological analysis is included, all to form the foundation to assess the validity of design proposals regarding the malt building.

The skin - façade

The skin of the malt building is the fair-faced brick facades, acting as both the closing membrane with a discretely ornamented 'face' of the Danish National Romanticism as a cultural heritage and simultaneously a sturdy loadbearing element. This dual function of the 'Skin' possesses some challenges as the possibilities to diminish the boundary between indoors and outdoors are limited to the loadbearing capabilities of both the expression and construction capabilities. The limited number of openings and the scale of the façade also results in a high degree of massiveness of the building. Furthermore, the malt building has a partially use of cornice separating the floors, as the ground floor and first floor lacks this expression of separation in the façade, rendering the building – along with the use of arched lintels - as monumental and emphasises the exceeded scale in relation to the context. The essence of the architectural style is influenced by the discrete ornamentation of national romanticism, whereas the intended expression in the façade details and materials is a prominent aspect of phenomenology within the building and must be acknowledged and emphasised in the design proposal.

The meat - interior and atmosphere

The meat of the building is the spatial composition of separated floors – only connected through the staircase 'core' behind the risalit - possess some challenges when forming a multifunctional room programme where functions interplay. Furthermore, because of the limited ceiling heights, one gets a feeling of intimacy. Adding to this, the building appears very dark which results in a feeling of distant from the outside world, and furthermore insinuate that it is a quite heavy building.

The building also reveals different materials and surfaces when moving around, and therefore, it is like a tactile journey through eg. wood, exposed bricks, plastered bricks, concrete. These materials also impacted the sense of smell, and the different floors almost had a characteristic smell attached to it. The variation in materials suggests a series of post-added interventions since the original state in 1899.

The atmosphere of the multiple raw materials and presence of the industrial history within the building is an important aspect to preserve and incorporate in the design solutions. However, by confronting the building with a new functionality, several elements will be added to the 'meat' of the building. This will be an important part of the transformation of the building and must be considered.

The bone - structure

The Bone of the malt building is a system of beams and columns working in tandem with the load bearing masonry 'skin'. This system reflects the history of industrial architecture in the beginning of the 19th century and must be delicately approached to avoid diminishing its intentions and purposes when forming new structural concepts.

Tectonics

1899 20











Ill. 6 Collage of illu ns capturing the contextural setting of the malt building

Sub-conclusion

To summarize, serval parameters need to be considered when transforming the malt building. This includes keeping the character and historical references of the materials and textures. Furthermore, serval parts of the theory on transformation are addressing tectonic and phenomenology means. To progress the understanding of how to deal with transformation, the notion on tectonics must therefore be included.

Preliminary

To form a deeper understanding on how to synthesise the structures with the phenomenological aspects of sensing and experiencing, theory on tectonics has been elaborated.

Context

Tectonics, as a manifestation of architecture and engineering as interdisciplinary is the immediate recognised understanding. The first documented relation between architecture and engineering was described as utilitas - utility -, firmitas - firmness -, and venustas - beauty - by Marcus Vitruvius (70-80 BC), a roman architect and engineer. Vitruvius described these aspects as essentials of good architecture (Nygaard, 2011).

Semper

Similar to Vitruvius, Gottfried Semper divides architecture into fundamental elements, as he would describe Die vier Elemente der Baukunst. Semper divided architecture into "four basic elements: (1) the earth work, (2) the hearth, (3) the framework/ roof, and (4) the lightweight closing membrane" and made the distinction between lightweight construction and heavyweight construction - as the tectonics and the stereotomics - and put significance



Ill. 7 Architecture according to Vitruvius

to the processing of materials and handcraft as a cultural expression (Frampton, 1995).

Sekler

The significance of construction and structure was later emphasised in tectonics by Eduard Sekler, who described tectonic as "a certain expressivity arising from the statical resistance of constructional form" and argued that this expressivity could not be described solely through construction and structure alone, as similar systems of construction and structure still had variations in expression. Sekler best described this tendency through atectonic, a counter-concept of tectonic, and described by Sekler as "a manner in which the expressive interaction of load and support in architecture is visually neglected or obscured..." (Frampton, 1995, p. 20). Sekler's notion on tectonic is concerned with the architectural articulation of the interplay between construction and structure.





Design background

Frascari

Like Sekler, Marco Frascari recognises the expressivity deriving from structure, as he reflects in his essay from 1981 The Tell-The-Tale Detail a condensed critical view based on the architectural detail where the user and the architecture - or the building - is connected through visual representations. Frascari's notion of the architectural detail is the union of construction - the joint - and through mathematics it depicts both the construction and construing of architecture. Mathematics in architecture is a technique to describe the built world as a conceptual framework in which empirical experiences can be fitted by the designer, builder, and user. This mathematic framework "allows the classifying of the visual signs and the understanding in a creative way of the functions of buildings." (Foged and Hvejsel, 2018, p. 89).

Frampton

In an attempt to relate tectonics to temporary architecture, Kenneth Frampton endows tectonics with an emphasis on typology – the meaning – and topology – the site. Frampton argues the cultural and social aspects – the typos – and the static reality of context – the topos - as a significant part of architecture with tectonics as the medium to physically manifest architecture. He uses the term to describe the poetics of construction as the essence of architecture comes from the people, history and culture (Frampton, 1995).

Beim

As a result of the environmental crisis a more contemporary notion of the term is by Anne Beim described through the relation between environmental sustainability and tectonics as Radical Tectonics. Here, Beim describes sustainability as an additional layer to tectonics which provides new potentials and qualities to the term and derives from circular thinking (Beim, 2019). Beim's Principles of Radical Tectonics includes the following:

- To minimize material amounts and variation

- To use pure materials instead of materials of excessive processing

- To reduce waste in production
- To design for disassembly





Sub-conclusion

The position on tectonics within this thesis takes departure in Beim's Radical Tectonics, as the objective of sustainable architecture is universal in contemporary architecture and must be visually represented in the architectural articulation at Bryggekulturens Hus. Therefore, a recognition of Sekler and Frascari's notion is true, as the expressivity and metaphysical intention of sustainable architecture derives from tectonics. However, the importance of physical context and societal values from Frampton's notion is recognised as fundamentals to sustainable architecture. However, in order to further understand and conform to the notions of tectonics and especially radical tectonics, the sustainable aspects of architecture must be further elaborated.



Sustainability

Preliminary

The definition of sustainability and its relation to architecture, tectonics and transformation is described to define our position on sustainability in this project.

Context

The construction and building sector are responsible for 36% of the energy consumption and 39% of the CO2 emissions globally. Within EU – where the efficiency of construction is high – a 25-30% of the total waste is produced by the construction sector (Beim, 2019). To mitigate the problems posed by this excessive consumption of resources and production of emissions, the building sector must participate in the global goals of e.g., the Paris Agreement to limit the rise in global temperature to 1.5 °C in relation to pre-industrial measures (Beim, 2019).

Definition

In the pivotal Brundtland Report from 1987, sustainability was originally described as the ability "to make development sustainable to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987). Sustainability is a consortium of environmental, social, and economic sustainability, where each aspect could be related to architecture.

Environmental sustainability

An environmental conscious architecture demonstrates a desire and ability to immediately reduce the usage of non-renewable resources within the

totality of its lifespan. The ability to implement both passive and active strategies for energy reduction is rooted in technical tools of engineering and represents the traditional solution. However, the increasing demands for energy optimization has resulted in the needs of rethinking the framework of sustainable architecture and shift the focus towards embedded energy. Anne Beim describes a principle of sustainable architecture as taking departure in circular economy, as "the building must be seen as an "active resource" in larger cycles of natural resources and values" (Beim, 2019). One of the main principles of circular economy is to view both raw and processed materials, products, and waste as 'closed hoops', as a method to retain and fully utilize the embedded energy in existing resources.

Social Sustainability

Social sustainability in architecture concerns the wellbeing of its occupants. The immediate effect on health that good indoor climate provides is an example of how architecture provides wellbeing. An architectural setting also influences the social interactions between the occupants. The connection between architecture, urban areas and institutions and people defines the social wellbeing. Architecture can change the behaviour of occupants and influence behaviours on societal level. The direct influence of architecture is rooted in the intentions and planning of cultural systems for each project. The effects on social sustainability should also be reflected in the local and regional scale. The acknowledgement of site-specific architectural proposals also reflects a desire to provide social sustainability (Lendager, n.d.).

Economic Sustainability

Self-sustaining systems of economics must be systemized when developing sustainable architecture, as sustainable solutions of architecture can only be sustained if the economic system can sustain. The design must recognise the possibility for future needs and reflect a degree of adaptability (Lendager, n.d.).



Ill. 12 The topics of sustainability

Synthesis

Regarding sustainability, this thesis concerns the handling of historical architecture and cultural heritage of Thisted city and must be conscious of the environmental, social, and economic consequences and potentials. Our sustainable ambitions derive from circular economy and concerns the social aspect of sustainability, as the handling and development of cultural values in Thisted is the primary concern and is critically reflected upon throughout the design process. Environmental sustainability is directly involved as the consequences of materials and energy strategies is evaluated throughout the design process.





Ill. 13







Ill. 15 Maltfabrikken - Praksis Subtraction - Repair - Reshape - Addition



Nordkraft - CUBO / Arkitektfirmaet Nord Ill. 14 Subtraction - Reconstruct - Repair - Addition





Ill. 16 Koldinghus - Inger & Johannes Exner Reconstruction - Addition

Preliminary

With the gained knowledge on the multiple aspects of transformation including, tectonics, phenomenology and sustainability and to form a theoretical position for this thesis, serval reference and case studies on the notion of transformation has been conducted. This to ultimately form a framework for the design process.

Haarlang's thoughts on transformation demonstrates a complexity in transformation as he emphasises the importance to have a nuanced view upon the existing building mass and being able to dissect it into its fundamental architectural intentions. The application of these methods is investigated in a catalogue of architectural cases where a noticeable transformation has been performed. The investigation in based on the immediate perceived interventions of Subtraction - Reconstruction - Repair - Reshape - Addition, to demonstrate the architectural consequence of each intervention and to ultimatly define a position on transformation for this thesis (Haarlang, 2015). Here, the immediate perceived interventions are highlighted and compared to the original state before the transformation.

Sub-conclusion

The works of Tadao Ando, Sverre Fehn and MAP Architects depicts the interventions as temporary, as they ensure a possibility to remove the additions of architectural elements without compromising the existing architecture. However, the interventions seen at Maltfabrikken, Fængslet and Nordkraft displays a comprehensive intervention to ensure both functionality and architectural coherency. The case of Maltfabrikken inspires a further analysis, as it concerns variation in existing architecture.

Transformation: Case study - Maltfabrikken

Preliminary

A case study on Maltfabrikken in relation to transformation is conducted, to analysis the methods applied to transform a historical factory into a culture house. Serving both as a demonstration of our practical understanding of the methods and a inspiration to our own position on transformation.

Information

Project: Maltfabrikken, Ebeltoft, DK Architects: Praksis Finished: 2020 Typology: Multicultural building Gross area: appr. 5.000 m²

Context

Founded in 1857 by merchant S.B. Lundberg, the original building was used to produce malt until the end of the 1990's. Since 2020, Maltfabrikken has housed functions such as creative workshops, library, music venue, café, artist residency, brewery pub, youth club, skatepark, and common facilities.

Transformation

Originally, the malt factory was characterized by the diversity in building characteristics, as the buildings has been developed in several stages - as a common characteristic for industrial architecture in Denmark. This change of architectural character is especially reflected in the façade and structural systems - the skin and bone of the buildings. Load-bearing masonry walls suggests the very first stages of the factory's history, whereas a system of concrete beams and columns depicts the later phases. The structural systems dictates the spatial organization - the meat - where the beam and column system form a gride-like rational and verticality of stacked floor slabs and the masonry system is function-based and clearly depicts the historical function of each room. Alterations to the spatial organization - as demolition of floor slabs - ensures usability for the new functions and visually demonstrates this evolution in functionality.

tact. The addition of new building mass – functioning as an entrance building – is made possible by a
steel structure – as a contrast to the heavy systems of the existing building mass – without interfering with the existing systems as it retracts itself.
The raw and worn materiality of the existing materials is dominating the interior, where minimal repairs express an integrity necessary to facilitate proper indoor climate.

The architectural interventions at Maltfabrikken reflects a minimal but comprehensive approach to transformation that ensures functionality but also preserves historical references. Interventions as addition of new building mass demonstrates a comprehensive intervention to ensure coherency in the architectural articulation and functionality, without obscuring the historical references as the building mass retract itself from existing expressions. Our position in transformation is based on the comprehensive approach, where the "boldness" of interventions reflects an ambition to provide functionality and coherency while still preserving the historical references.

The addition of an impartial shape – not favouring either of the existing building systems - with a large

opening at ground floor renders the whole building

more extroverted and reflects the demands of the

new functions without the deconstruction or de-

molishing of the existing façade - the skin seems in-















Ill. 17 Collage capturing Maltfabrikken













Design background

Initial design manifest

Preliminary

The fundamental values for this master's thesis, regarding the interplay between tectonics and sustainability, is stated in the following manifest.

		1
	- Support and develop the local area through preserving histor-	
	ical aesthetic and cultural references in existing architecture	
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i I	- Ensura reversibility when introducing never architectural el-	
' I		
	ements	
l		· · · · · · · · · · · · · · · · · · ·
I	- Ensure adaptation for future cycles	L.
		L.
I	- Ensuring minimal interference with the skin of the malt	L.
I	building	l I
I	0	I.
	- Added elements must distinguish from the existing	l.
	Ensure functionality in the statial distribution by breaking	
	-Ensure functionality in the spatial distribution by breaking	
	the horizontal plan organization	
I I	- Ensure fitting indoor environment based on the functionality	1
' I	of the individual spaces as part of a sustainable approach	
I		Theoretical position manifest
		ricoreticar position mannest

THE THEORETICAL POSITION

Possible transformational interventions

Preliminary

To convert the gained knowledge and experience regarding transformation, registrations of plausible interventions on the building will be examined. This is done by utilizing the interdisciplinary knowledge of the architect/engineer, to ultimately form a brainstorm of interventions. In relation to that, the intended degree of intervention is being stated. This ultimately forms the basis for investigating possible design solutions.









Ill. 18 Study on facade interventions

Facade interventions

Description: The skin of the malt building reflects a strong relation its historical background. Therefore, this part of the building must be carefully intervened, to ensure the possible future use of the building.

Degree of intervention: Minimal





Placement of new elements

Description: The unavoidable situation of adding elements to the malt building raise the question of how this will corporate with the existing. To progress the reusable thought, the elements must distinguish from the existing, to highlight the historical differences.

Degree of intervention: Medium



Plan interventions

Description: The floors of the malt building consist of a rational and horizontally structure in five plans, only connected by the resalit. Therefore, to ensure a high quality of the distribution of spaces, this horizontal structure must be broken. However, this must be done in respect of the existing structure, to preserve the historical references.

Degree of intervention: Large



f



Ill. 21 Study on indoor environment

Indoor environment

Description: Because of the possible use of the building, the indoor environment must be considered. However, in order to preserve the aesthetic stature of the exterior, the prospect of including a technical core within the building is appealing. However, with the low ceiling heights, the ducts must be carefully placed, to ensure the functionality of the spaces.

Degree of intervention: Medium



Energy renovation

Ill. 22

Description: In continuation of the indoor environment aspect, the prospect of energy optimizing the building is unavoidable. This to ensure a pleasant indoor climate for the functions. However, this must be carefully placed. To still ensure a degree of freedom in the distribution of the functions, as well as preserving the historical references in the materiality, the insulation must be placed carefully and strategically.

Study on energy optimization

Degree of intervention: Large

Approach

Preliminary

In relation to the previous notion on tectonics and sustainability, the general focus on the interdisciplinary correlations between architecture and engineering is immense to consider when designing. Therefore, to guide this thesis in an interdisciplinary and integrated way, The Integrated Design Process formulated by Mary-Ann Knudstrup has been elaborated (Knudstrup, 2004).

The Integrated Design Process is embedded in the ity, tectonics and transformation, The Integrated structure of the Architecture & design education at Aalborg University and is an interdisciplinary and iterative way of thinking an architectural process. The process consists of five overall phases, all leading towards the design proposal: Problem, Analysis, Sketching, Synthesis and Presentation. However, this does not necessarily ensure a great aesthetic or technical result, and therefore, this thesis uses this as a platform for structuring the design process. Thereby, combined with the notion of sustainabil-

Design Process can be further specified to conform to the topics of this thesis. This includes thinking the transformation of the building as a part of a circular process, where the past and the future must be considered. Furthermore, the notions of tectonics and sustainability must be included in all stages of the process, to register and conform to the existing elements on the site. This leads to the overall approach for this thesis, including the theoretical position.





IDP framework





Design background

THE PLACE

The city

Preliminary

To gain an understanding of the development of the city of Thisted, as well as the history of Thisted Bryghus, following section is made. This, together with the subsequent mappings of the city, inspired by the Agency of Mapping by James Corner ultimately progresses the understanding of the structure and organization of the city (Corner, 2014).

The city of Thisted is the capital of the region of Thy and is placed towards the Limfjord. Thisted has been functioning as a market town in the period after the Middle Ages (1500) and up to the 1850'ies. During that period, the city centre was established as a series of market town houses, which is still apparent today (Dansk Center for Byhistorie, Den Digitale Byport, 2012). Following the establishment of the harbour of Thisted in the 1840'ies, better sailing connections from Limfjorden to the North Sea, the establishment of railways from the city in the 1880'ies, as well as the openings of industries, the city progressed into an industrialization. This also meant that the population of the city grew slowly which continued through the 20th century (Aarhus universitet, n.d.).

Concurrently with the industrialization, Thisted Bryghus appeared in 1902, with base in a malt building. This was created by a group of local investors, which is still a significant part of their overall strategy. Therefore, the brewery has had a big impact in the development of the city, which is also apparent in their history. When a lot of the bigger breweries around in Denmark were bought up by even bigger breweries (Eg. Carlsberg), Thisted Bryghus resisted. This highlights the importance of the brewery for the locals, and its attachment to the city of Thisted (Thisted Bryghus n.d.).

Today, the city is still categorized as an industrial city, where around 25% of the population have jobs within the industry business. (Dansk Center for By-historie, Den Digitale Byport, 2012).



Ill. 25 Collage of the city of Thisted









Design background







36 Design background

Ill. 27 Mapping of the city - distances

а

Design background 37

Ill. 26 Mapping of the city - development and structure

1 2 3 4 5 6 7 8



b С

Intended flow

Ill. 30 Mapping of the city - registered and intented flow

Ill. 28 Mapping of the city - parks and squares





Registred flow

1 2 3 4 5 6 7 8



Design background

THE PLACE

The site

Preliminary

To set the base for the design of Bryggekulturens Hus, the near contextual setting is analysed through observations and different methods and tools, including mappings of the close context, understanding of macroclimatic issues, serial visions influenced by Gordon Cullen and a description of the atmosphere of the place inspired by Gernot Böhme (Cullen, 2012) (Böhme, 2017). All to set the geographical and sensual conditions for designing.

The site is situated close to the city centre of Thisted. In this project, the site consists of the malt building, the newly built production building towards east as well as the 3.900 m2 area in front and in between the buildings.

The malt building was established in 1899 and has therefore played an important role in the history of the Thisted Bryghus. However, because of expansion of production the company decided to move the entire production line into the newly built production building in 2019, afterwards donated to Bryggeriforeningen. This set the base for a new function of the malt building, possibly be a centre for experimentation of beer. Thereby, the lifespan of the building continues.

Preservations and protections

In terms of preservations or protections of buildings, the malt building has not been addressed (Slots- og kulturstyrelsen, n.d.). However, even though the building is not protected, it still appears as a strong historical and cultural reference for the city of Thisted.













1 2 3 4



Ill. 32 The site conditions

b

Local plans and regulations

When looking into local plans for the area, serval versions has been conducted. A local plan for the entire Thisted bryghus were made in 2006 and consists of serval regulations for the site. Here, the main aspects are in terms of materiality and aesthetics, where any new building must contain similar materials as the malt building. Lastly, the local plan already highlights possible footprints for new buildings (Thisted kommune, 2006).

When looking at the new local plan for the establishment of the production building, the otherwise strict regulations has not been followed (Thisted kommune, 2019). Therefore, the strict regulations can be seen more as an overall guideline for future architects to respect and underlay the characteristic historical references, when establishing new buildings. This is also immense to consider when designing the Bryggekulturens hus.

Collage capturing the site Ill. 31



1 2 3 4 5 6 7 8

Ill. 33 Macroclimate - Sun path





42 Design background

Jan	Feb	Mar	Apr	may	Jun
_	~			>	

Ill. 35 1 2 3 Macroclimate - wind general directions



Ill. 36 Macroclimate - windrose January



Ill. 37 Macroclimate - windrose July





Design background 43

Macroclimatic study

In order to utilize and conform to the macroclimatic conditions on the site, serval studies on how possible interventions or additions to the site could ultimately create beneficial conditions in the outdoor area.







Ill. 38 Macroclimate - study on solar conditions



Ill. 39 Macroclimate - study on wind conditions







Ill. 40 Macroclimate - study on noise conditions

Sub-conclusion

In order to take advantage of the macroclimatic conditions, a building mass towards south must be considered, to prevent the noise from the trains as well as the frequent winds. Furthermore, to provide maximal conditions for solar access to the site, a





low building must be considered. However, because of the monumental malt building, the prospect of having a sun-lit outdoor space during the afternoon and evening hours are minimal. Therefore, other considerations must be elaborated.

Serial vision - from city to site

This serial vision is based on the theories of Gordon Cullen and is split into two paths: one from the city centre to the site, and the other from the train station towards the site (Cullen, 2012).

Because of the monumental scale of the malt building, it is registered quite early, when moving from the train station. Here, it appears from the front and as one move along the road, more and more of the building appears, meaning that the experience of the building changes when moving. All along the path, the building almost forms an ending wall, which creates a more intimidating experience, compared to the scale of buildings one move along until then.

When focussing on the second path, one does not meet the site or the building until the very last. Here, one follows the down-scaled buildings of the older part of the city, until turning the corner. When turning, one meets the malt building from the gable, and is thereby not getting the full experience of the character of the building. As one move along, the similar monumental experience appears, but one is first getting the full experience of the building, when standing beside it.

Sub-conclusion

As registered, the experience of the arrival to the site are quite different, depending on the path. Therefore, the appearance of the building from the arrival roads must be considered when designing, to attract both people arriving to Thisted as well as the ones already experiencing the city centre.



Ill. 41 Map serial vision routes



Ill. 42 Route 1: from train station to site



Ill. 43Route 2: from city centre to site46Design background







Investigation on volume and mass

Connection

The minimal connection between the existing buildings provides possible seight towards the trees and fiord. However, this iteration does not catch the interest of the visitors, because of the minimal stature.

Volume

By adding a larger volume, the possible interest of the visitors and by-passers could appear to a larger degree compared to the minimal connection. However, the height and mass of the added building must be considered when designing further, to prevent the building from detaching the visitor from the visual connection to the natural setting behind.

Forground

By moving the added volume towards the foreground, a large attention to this volume will appear. This could ultimately form a battle between the buildings, in a situation where the malt building might have the biggest interest.

Background

By withdrawing the volume, the intended hierarchy between the buildings appears to a larger degree than before, and here, the malt building remains the as the dominant visual attraction



Ill. 47 Background

Sense of place

To understand the sensual conditions of the site, an atmospheric description has been developed on behalf of a site visit in relation to Gernot Böhmes theory (Bohme, Thibaud, 2017).

When arriving to the site, one is met by the monumental and intimidating malt building, and the general feeling is that the site is placed in a niche between the city and the fjord. Furthermore, the sloping terrain from the city towards the site leads one towards the site. The meeting with the intimidating malt building makes one feel small, but the other elements around the building results in the building not appearing solemn. However, the building is very introverted and only limited windows and doors reveals a very limited experience of what happens inside.

When entering the site, one is never sensing a quiet moment, and especially the arrhythmic flow of vehicles from the nearby road results in a constant disturbance from enjoying the place. On the other

hand, the otherwise feared railroad close to the site is only rarely noisy. However, the constant fear of a train passing by and adding to the noisy setting is appearing. Adding to the chaotic experience, the feeling of being exposed is appearing when entering the site, because of the houses being placed close to the factory.

Sub-conclusion

To conclude, serval conditions on the site needs to be considered, together with the monumental status of the malt building. Currently, the space in front of the malt building seems exposed and dismissive, where concrete, asphalt and bricks are dominating. However, a small reference to the natural setting towards the fjord could potentially be a central element in attracting the public to the site. In terms of the malt building, the sensual experiences created by the composition of materials and finishes reflects the building's history and is therefore immense to preserve. However, to progress into a new function, possible interventions might be needed.















Investigation on volume and mass

Horisontal

By implementing a horizontal element in front of the malt building, the otherwise unique scale of the building will be broken down. Furthermore, the prospect of having a continuation of the façade vertically in some places proves important for how to understand and register the building. Therefore, horizontal elements must be carefully placed, and must not take over the primary part of the façade.

Vertical

By adding vertical elements one can still register the monumental scale of the malt building. However, the prospect of interfere so largely with the façade of the malt building poses a desire for minimizing the elements touching the façade.

Spots

The spots provide the building with a lower degree of interference and furthermore, the overall volume of the malt building is still apparent, compared to the others. However, any interventions in the façade must be carefully organized, to preserve as many historical references as possible.

Fragment

The fragmentation of the volume placements provides a harmony as well as a clear hierarchy of the masses. However, by adding elements in relation to each other which composes multiple heights, the balance of the elements could easily break. Therefore, this must be considered in the continuous design exploration.

Design background 48





Ill. 50 Vertical





Local regeneration

Preliminary

This chapter confronts the prospect of heighten social sustainability in the city through an understanding of how to relate to the local area and how the programming of the city develops urban regeneration. This ultimately elaborates one of this thesis' main definitions of social sustainability, which is furthermore exemplified in a case study.

Local identity

As the modernization of the world has moved along, a more universal civilization has started to appear. This can eg. be seen in the implementation of chain shops or fast-food chains in almost every city around the world, and thereby, the cities become more of a homogene structure, rather than having local attachment (Schnell, Reese 2003).

The importance of local attachment can be seen in the modern society, where people tend to escape the universal and crave for the local and the unique. This tendency is stated as neolocalism, and builds on interests in local production, events or history, in general a place to reconnect with the local, the personal and the unique (Schnell, Reese 2003). When arriving to a place, anchored in the local environment containing eg. elements of historical relevance for the area or local city legends, you get an attachment to the place, and the local feeling of pride is discovered. This is seen in a Danish context, where the tendency of serval stalls along the roadsides, creates a need for buy local ingrediencies directly from the farmer, rather than in a supermarket. This affects the overall experience of buying and eating the product, with a direct reference to the local farmer.

Critical regionalism

As stated, the local identity is immense for creating attention to a place. According to Kenneth Frampton, who reflects upon the relation between the universal civilization and the local cultures, the societies must restrain themselves to a local attachment, while still following the modern society. This, however, might be contradicting each other, and the architecture's role is immense in making this transition. Because how can you both engage with the local and the universal civilization?

The role of the critical regionalism is overall to ensure these relations and implementing a mixture of local traditions and universal values into the architecture. Frampton sets up a series of criteria for how to address the critical regionalism in architecture. In general, it is important to for the architecture to follow and conform to the place and its characteristics. Furthermore, the architects must conform local traditions but especially also to foreign impacts. Lastly, the architecture should not only be addressing the sense of sights but instead addressing all senses, and especially the tactility of the materials is immense (Frampton, 2007). Overall, the critical regionalism works best when escaping the homogeneity of the universal civilization, and instead conform to the local characteristics.

The fundamental of critical regionalism is apparent in the works of many architects around the world and especially in a Nordic context. Here, the likes of Jørn Utzon were guided and inspired by universal or foreign techniques, primarily from Asia. This, combined with a strong engagement in local traditions is especially apparent in the design of Bagsværd Church close to Copenhagen. Here, the universal techniques of prefabricated concrete elements were combined with an in-situ shell vault, unique for the site. Furthermore, the use and processing of wooden elements in the interior of the building strongly referred to Asian techniques, whereas the exterior barn-like form and materiality ultimately fills the visitors with local recognizability (Frampton, 2007). Thereby the combination between the unique and the universal is ideal in changing the directions of the homogenised cities into creating more attachment to the area, to not lose the unique and local identity that the society are craving for.

Local identity and microbreweries

When identifying local attachment and identity, the microbreweries have a big role to play. Microbrewing is often equal to craftmanship and are therefore contrasting the mass productional systems seen almost everywhere. Translated into a societal prospect, craftmanship could be equal to local produced products or ingrediencies, while mass production could reflect the universal modernization into the globalized civilization. Thereby, the microbreweries can be a driver into retaining local identity.

An investigation of American microbreweries shows that the attachments to the local areas were seen in the way the breweries were branding themselves. Here, the name of the company, the names of the beers as well as the labels on the beers tells a unique history of the specific area. This is also apparent in a Danish context with the likes of the "Limfjordsporter", the "Thy pilsner" and the "Cold Hawaii beer" (Thisted Bryghus, n.d.). Other than that, the craftmanship of the microbreweries also resulted in more unique flavours of beer, that is not seen from the big breweries. All together, these aspects create base for a unique experience (Schnell, Reese 2003).

Urban regeneration and social sustainability

To benefit from the crave for local attachments, and

because of the recent change in strategy for Thisted municipality into a more tourist-based experience, the state of the city must follow. Therefore, urban regeneration is examined with a general focus on contributing to creating a higher degree of social interaction and social public places in the part of the city that is currently occupied by industry in the form of Thisted Bryghus.

Every city has a series of unused or unappealing places, or so-called "urban voids", where people are not feeling welcome or attracted to. These are limiting the liveability in the region, and ultimately also the productivity and the overall image of the city (Leete, 2022). Along with a series of new strategical plans for a lot of cities to progress from industry to the modernity (seen in Denmark with Aalborg harbour front and Aarhus Ø), the term urban regeneration is more apparent than ever.

Urban regeneration is ultimately a series of parameters with the overall goal of improving specific regions of a city in terms of eg. economic, social and cultural growth. During this chapter, the focus will be on the social effects of urban regeneration in terms of developing the cities.

To generate growth and creating a base for new social interactions, it is important to understand how people meet and how the role of the city is in the creation of social relations.

In the cities one finds a various of public places, where social interaction could happen. This differs from parks and squares to restaurants and culture institutions, all with the overall goal of generate life and meetings between the users. These places are also characterized as appropriate public places or "third-places" as described by Karen A. Franck, an

Local regeneration - Case study: Nordkraft

environmental psychologist and architectural theorist. This is a place where people can linger and socialise, as an alternative to home and work. A place that generates a sense of community and opportunities for political discourse (Fisker and Olsen, 2008).

According to Jan Gehl's urban theories, the improvement of public social places in the city is highly dependent on the amount of people occupying a specific area, and the duration of time in which they are staying at the place (Suenson, 2012). This is apparent because people are attracted to people, and therefore, highly occupied spaces will be more attractive. However, for social interactions to happen, the places of the city must be attractive for the residents, and here the role of the architecture and urban spaces starts to appear (Suenson, 2012). When speaking of urban regeneration, it is therefore also a question of transforming "urban voids" into more comfortable places for people to be in, before social interactions can happen.

These tendencies are apparent in a Danish context, with the change of the strategies in a series of cities meaning that industry is moved to other countries. This opens for transforming otherwise closed

or dead parts of the city from heavy industry into public places, new residential areas, cultural institutions and restaurants. Here, otherwise introverted places are transformed into extroverted functions that gives something back to the city, and ultimately support social interactions.

Especially the integration of cultural institutions within a region of the city is one of the key aspects into develop social interactions. These often functions as a gathering place for the local area, and because of their, often, multiple functions the building will be used in serval periods of the day. Furthermore, by having a series of different functions incorporated within the building, the basis for social interactions between diverse user groups is made, which is also a central parameter of urban regeneration (Suenson, 2012).

Sub-conclusion

Therefore, to summarise, in order to create growth in an attractive, former industrial area like Thisted Bryghus, a change of scenery into a more extroverted functionality must happen. Furthermore, the prospect of adding serval functions to the site will attract a more diverse user group.

Preliminary

To follow up on the theories and ultimately generate practical experiences about the effects of urban regeneration, as well as the importance of local attachment, a case study of Nordkraft has been conducted.

Information

Project: Nordkraft, Aalborg, DK Architects: CUBO arkitekter, Arkitektfirmaet Nord Finished: 2009 Typology: Multi-cultural building Gross area: 30.250 m²

Nordkraft is a former CHP plant placed in Aalborg. From 1947 to 1999 it was an integrated part of industrial area on the harbour front of the city. After closing the CHP plant in 1999, a long period of planning followed and in 2005, plans of a new multicultural gathering place close to the city centre emerged, in close relation to the strategic plan of regenerate the entire harbour front into a place with serval social, cultural and educational offers, ultimately one of the larges regenerations in the city of Aalborg (Nordkraft historien, n.d.).

This resulted in a multi-cultural building, where sport and culture merges into a place where people are meant to gather, and thereby highlights a change from an introverted factory into an extroverted building, facilitating and creating social, economic and political growth in the area. Furthermore, this regeneration attempts to form a connection with the city centre, and ultimately con-





Ill. 53 Collage of Nordkraft

nects with the end of the pedestrian street to form a "city within the city", where the functions seem like a part of the urban space. The diverse functions also open for a longer span of use of the building, which create constant life in the building, similar to the role of the city.

When creating Nordkraft, an important aspect was within reusing the existing building (Projekt - Nordkraft Aalborg, n.d.). This has ultimately created a historical reference in the city, and furthermore creates a narrative and identity to the culture house. As stated earlier, people hunger for local experiences, and even though the building consists of a series of different functions that can be found everywhere in Denmark, the composed narrative helps collect these otherwise very distinct functions into a wholeness. This is furthermore highlighted with the reuse of central elements of the former CHP plant, such as eg. the kettle and tanks, all of which adds to the experience of visiting the building.

These aspects have ultimately created a building that respects and highlighting its historical use, while giving something back to the city as a landmark for culture and sport.





Design background

Sub-conclusion

To conclude, local attachments are immense for attracting people that hunger for unique experiences. However, as Frampton states, the balance between the history and the modern society and techniques must be considered, also in the case of Bryggekulturens hus, to progress into a new function. Thisted Bryghus and the malt building has been an important part of the development of the city, which means that a high degree of local attachment is already apparent. This is similar to the case of Nordkraft, and the change from industry to public urban space creates demands for the functions included in the Bryggekulturens hus, where a diversity of functions ultimately attracts diverse users, concluding in a higher degree of social interactions. However, like Nordkraft, the narrative of the area and the building is immense for gaining a local attachment to the place. Because of the already existing malt building on the site, the base for a unique narrative of the site is already there, and therefore the malt building could be an ideal setting for promoting local production and ingredients.

Design background 55

Dissemination architecture - Case study: Kornets hus

Preliminary

To understand the typology of a centre for dissemination, a case-study of an architectural project accommodating functions as exhibition, workshops, and café with the intention to convey the cultural- and historical aspects of grains is conducted.

Information

Project: Kornets Hus, Hjørring, DK Architects: Reiulf Ramstad arkitekter Finished: 2020 Typology: Dissemination Centre Gross area: 520 m²

Kornets Hus is a centre for sensory experiences, inspiration, and dissemination of a historical and important commodity for mankind – grain. The centre invites tourists, public associations, and the general public into the facilities and provides activities for both amateurs and professionals within the field food preparation with organic grains as the main ingredient.

The intention of the project was to provide new opportunities for tourism, gastro culture, and dissemination of cultural values in the local community around Hjørring and what they can offer. All, within the theme of grain as a commodity of great importance – both historical and in modern day - as the awareness of healthy and organic foods is keen in a sustainable future (Reiulf Ramstad Arkitekter, 2022). Activity based learning is reflected in the plan design, as workshop areas merges with the public spaces of restaurant and exhibition. The building opens towards the fields in west and pushes secondary functions to the back of the building. The entrance is through the back of the building and the experience of a room that opens as one enters, is strengthened by the compact vestibule.

Overall, the project depicts a sensory approach to both interior and exterior, as the smooth light surface of the cross laminated wooden boards in the interior invites for touch and emphasizes the variation in spatiality – from the open spaces of workshop and restaurant to the compact rooms for dissemination – while the exterior cladding of burned tile to be perceived as harsh and uninvited for touch but mimics the dynamics and nuances of the landscape.

Similar, a connection between guest and the topic of brewing culture in Denmark is an important part of the vision for Bryggekulturens Hus. Here, the architecture is to emphasize the industrial-, national and local history and traditions of brewing in Denmark and in Thisted.







Ill. 55 Exterior - Kornets hus







Ill. 56 Interior - Kornets hus















Dissemination architecture

Preliminary

In order to convey the subject of brewing culture in Denmark, a meaningful connection between occupant and the subject must derive from the architecture at Bryggekulturens Hus.

Functions

As in Kornets Hus, a new centre for dissemination of the Danish brewing industry must first and foremost accommodate functions of exhibition and learning, but also convey the experience as a wholistic gastro experience. The exhibition disseminates the cultural- and historical aspects of brewing in Denmark, while activity-based learning - through workshops and lectures - gives a handson understanding of the brewing process for both the amateur, enthusiast, and professional. These functions constitute the formal knowledge of brewing in Denmark, while gastro experiences provide a meaningful connection between formal knowledge and bodily experience.

Atmosphere

The role of the architecture must exceed its physical manifestation of functions and instead be perceived as an interpretation of cultural context - or phenomenon. To evoke a feeling of affiliation for the brewing culture in Denmark, the intended atmosphere at Bryggekulturens Hus must form clear references to the industrial history of the brewing industry. These references are first and foremost established through the transformation of the historical malt building at the site, but also in the narrative of the city, region, and functions of the new dissemination centre.

One of the main facilities in creating deeper understanding of the brewing culture is trying. Similar to Kornets Hus, the functionality of trying must address the sake of learning actively, including practical experiences with brewing and preparation of food. Like Kornets Hus, a high degree of flexibility in this functionality could ultimately form optimal boundaries for both amateurs and professionals, contributing to a more diverse set of users.

The functionality of learning is seen as a more passive experience, compared to trying. Here, dissemination of both historical and traditional perspectives of brewing, as well as sharing of knowledge and experiences within the brewing industry could appear. Therefore, this must address both the public and the professionals, all to progress the general knowledge of brewing

The functionality of tasting could include various sensing experiences of taste, smell and possibly even listening, all adding to the general knowledge of ingredients and traditions. This could ultimately include tasting experiences for both food and beer, where professional beer brands as well as one's own brewed beer can be experienced. Furthermore, these functions could also serve as a gathering place in the city, resulting in social interactions.

Taste

See

The functionality of seeing/watching is prepared in the already existing production building. Here, the visitor can experience the procedures and machinery behind a professional brewing setup, as well as watching the different stages of the brewing process. This, combined with the other experiences will ultimately form a larger understanding of the big diversity and tastes of beers.









Summary - revisiting manifest

Preliminary

To progress from the notions of the theoretical studies, and benefitting from the newly perceived knowledge, an update and addition to the theoretical manifest has been conducted. This to further qualify the base for the continuous process.

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1
Theoretical position manifest

60 Design background Design background 61

THE USER

Possible visitors

Preliminary

To further qualify the function of the building, the possible users are analysed. This is done in terms of their interest of coming to the Bryggekulturens hus, as well as their expected behaviour when visiting the building. Lastly smaller stories of the expected stays are conducted, overall to support a high degree of user involvement during the design creation.









The tourists consist of a core family, containing a mother, a father and two children. They live in the outskirts of Copenhagen, and generally have a strong interest in Danish traditions, meaning they crave for local experiences. The tourists visit Bryggekulturens Hus with the purpose of experience local attractions to ultimately gain a greater knowledge about the region of Thy. Furthermore, this ultimately sparks a desire for discovering and buying local products and ingredients to a larger degree in their everyday life.



The enthusiast consists of a person very interested in beers, and who considers brewing oneself. The person lives in Aalborg and seeking a community of amateur and professional brewers to network with. The enthusiast visits Bryggekulturens Hus with the intention to socialize and experience how to start up brewing. This includes gaining historical knowledge of the brewing industry as well as sharing personal experiences. Because the brewing process takes serval weeks, the enthusiast visits Bryggekulturens Hus multiple times. After starting to brew oneself, the enthusiast visits Bryggekulturens Hus and continuing the networking.



Design background

The professional 4 - 8hMiddle of the day (10-17) Workdays Sometime evening (Weekends) (17-21) Duration of stay Time of the day Time of the year Possible interest Easy accessibility → Centred circulation core Minimal disturbance → Closed workshop facilities Professional equipment → Flexible workshop facilities Promotion of beers → Flexible showroom Social brewing networking - Dissemination room for sharing knowledge Storvline Buy tickets Å Meets up with a group Buys tickets to Registering at the reception of other profe courses onlin

Lunchtime (11-13) Weekends Evening (16-00) Workdays (evening) Duration of stay Time of the day Time of the year Possible interest Quick visits → Individual entrances for tasting experience Clear navigation \rightarrow Guided plan solution Social interaction with locals - Open and inspiring tasting experiences M ÅŶ

The professional consists of a brew master from a microbrewery on Fyn. He oversees the daily brew production and therefore, has a big knowledge within this segment resulting in a constant desire for developing. The intentions of visiting Bryggekulturens Hus for the professional is therefore the prospect of continue the development of production methods, discovering new ingredients, as well as inspire enthusiasts engaging in the industry. Lastly, the professional has a great desire in promoting and sharing brewing experiences, to contribute to an overall development of the industry.



The local consists of a couple, that lives in Thisted. They have recently moved to the city and is therefore seeking local experiences and especially social gatherings with other locals. The local visits Bryggekulturens Hus with the purpose of meeting other people and socialize. Furthermore, they are seeking a place with multiple experiences all rooted in the local area.



Sub-conclusion

To conclude, the prospect of having a series of different target groups visiting Bryggekulturens Hus, all with different reasons to visit, will ultimately heighten the attention on the city of Thisted and the region of Thy. Furthermore, this set the ultimate base for securing social interactions as stated earlier. Therefore, the distribution of spaces and functions must provide a pleasant experience, in order for the visitors to revisit Bryggekulturens Hus again. Lastly, to be able to attract these large segments of users could ultimately create the intended attention to the brewing and beer industry, help progressing the culture into a more taste-oriented vision on beer.

The local



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Ill. 61 The malt building

ROOM PROGRAM

The spaces

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Production line	-	-	-	-
Gastro restaurant				
Dining area	100 - 140	1	Natural/artificial	-
Toilets (restaurant)	2	2 (inkl. 1 anteroom)	Artificial	-
HC toilet (restaurant)	7	1	Artificial	-
Gastro kitchen	50 - 60	1	Natural/artificial	-
Food storage	6	3	Artificial	-
Depot (+delivery room)	15 - 20	1	Artificial	-
Staff room (incl. toilet)	25 - 30	1	Natural/artificial	-
Brewpub				
Seating area + bar desk	80 - 120	1	Natural/artificial	-
Toilets	2	2 (incl. 1 anteroom)		-
Storage	-	-	-	-
Staff room (incl. toilet)	-	-	-	-
Brew shop				
Shop area (incl. desk)	80 - 90	1	Natural/artificial	-
Goods storage	20 - 30	1	Artificial	-
Goods delivery room	-	-	-	-
Museum				
Exhibision area	350 - 450	1	Primarily artificial	-
Toilets	2	2 (incl. 1 anteroom)	Artificial	-
HC toilet	7	1	Artificial	-
Storage	70 - 80	1	Artificial	-
Lecture				
Lecture room (6 pers.)	8 - 12	1	Natural/artificial	-
Lecture room (12 pers.)	12 - 16	1	Natural/artificial	-
Toilets	2	2 (incl. 1 anteroom)	Artificial	-
Fynerimentarium				
Brew workshop	40 - 50	1	Natural/artificial	30/0
Food workshop	30 - 40	1	Natural/artificial	3%
Toilete	9	2 (incl. 1 antercom)	Artificial	570
HC toilet	7	2 (mei, 1 ameroom)	Artificial	-
Storage	4-6&1-3	2	Artificial	-
	1-001-0	2	. a uncar	-
Entrance				
Windbreaker	5 - 10	1	Natural/artificial	-
Lounge/foyer	15 - 25	1	Natural/artificial	-
Cloakroom	10 - 15	1	Natural/artificial	-
Reception	8 - 12	1	Natural/artificial	-
Toilets	2	3 (incl. 1 anteroom)	Artificial	-
HC toilet	7	1	Artificial	-
Storage	5 - 8	1	Artificial	-
Other	5 0	0	A	
			the second se	

Ventilation strategy	Activity level	Requirements	Notes
-	-	-	Production building.
TT 1 · 1	Ţ		
Hyprid	LOW	Relation to outside	-
Mechanical exhaust	-	-	-
	- M 1	-	-
пурпа	Medium	-	- 1 European 1 Emileo & 1 Decortores
-	-	- Polation to outside	I Freezer, I Fridge & I Dry storag
- Urbuid	- Loru	Relation to outside	-
пурпа	LOW	-	-
Hybrid	Low	Relation to outside	-
Mechanical exhaust	1011	-	_
-	_	_	Shared with gastro
_	-		Shared with gastro
-	-	-	Shared with gastro
Hybrid	Low	Display window towards outside	-
-	-	-	-
-	-	Relation to outside	Incl. in goods storage
	-		
Primarily mechanical	Low	-	-
Mechanical exhaust	-	-	-
Mechanical exhaust	-	-	-
-	-	-	-
Mechanical/hybrid	Low		
Mechanical/hybrid	Low	-	-
Mechanical avhaust	LOW	-	-
	-	-	-
Habrid	Low/modium	Visual connection from outside	
	Low/medium	Visual connection from outside	-
Hyprid Mashaniaal aukawat	Low/medium	Visual connection from outside	-
Mechanical exhaust	-	-	-
Mechanical exhaust	-	-	-
-	-	-	-
Hybrid	-	-	-
Hyprid	Low	-	-
Hybrid	-	-	-
Hybrid	Low	Easy to spot (central placement)	-
Mechanical exhaust	-	-	-
Mechanical exhaust	-	-	-
-	-	-	-
-	-	-	Distributed where needed

68 Design basis

Distributed where needed

Design basis 69

FUNCTIONAL DISTRIBUTION

FUNCTIONAL DIAGRAM

Study

Preliminary

In order to form the optimal connections and placements of the appointed functions of Bryggekulturens hus, a functional distribution study has been conducted.



Ill. 62 Functional distribution study

Sub conclusion

Regarding placement of the functions, a general desire of utilizing the malt building for the primary functions is appealing, to transform the otherwise historical brewing building into an experimental and dissemination centre, contributing to a meaningful utilization of the building. Furthermore, to form a relation to the city, functions that ultimately contributing to social interactions between the local will be placed in ground level, including the brewpub and the gastro experience. Lastly, because of the unique and expressive boundaries of the top floor of the malt building, a functionality oriented towards experiencing the space must be placed here. This opens for placing the museum here, while more focussed spaces like workshop and lecture rooms can be placed in other settings. These reflections ultimately result in the creation of the following functional diagram, where the relations between the functions are further elaborated.

Introverted Lecture 12 pers. Lecture ▲ 6 pers. Brew workshop -÷ Food workshop Production Extroverted towards outside Foyer/entrance Brew shop Ill. 63 Functional diagram

The connections



Design basis
VISION

Bryggekulturens hus

The aim of this thesis is to design a centre for Danish brewing culture in the city of Thisted, Bryggekulturens Hus, one of the landmarks for experimental brewing in Denmark. This will be developed through a sustainable-tectonic approach to the design process, ultimately reflecting the interdisciplinary background of the Architecture & design education. In the creation of this thesis, following four part-visions will be apparent:

Change the perception of beer

One of the larger issues currently in Denmark is the large consumage of alcohol and especially binge-drinking is problematic. Therefore, the aim of Bryggekulturens Hus is to promote and teach the public about the processes behind brewing, the difference in the ingredients and tastes and the variety of beer types on the market. All of this to promote the beer drinking as a natural part of a healthy lifestyle, to ultimately progress the Danish drinking culture into a more taste-oriented vision on beer.

Sharing knowledge to continue the development of the industry

The brewing industry has developed vastly in the last 25 years. To continue or possibly expanding the development of the industry, the aim for Bryggekulturens Hus is to form a gathering point for brewers in Denmark, where knowledge and skills could be exchanged.

Contribution to the tourist industry of Thy

The municipality of Thisted has recently changed its focus and starting to cater for tourist. Therefore, the aim of Bryggekulturens Hus is to contribute to a more diverse set of tourists in the region of Thy. Furthermore, with the placement in Thisted, the aim is to point focus to not only Thy but also Thisted as a tourist attraction.

Create value for the city of Thisted

The Thisted Bryghus has in its entire history been an important part of the identity of the city. Therefore, the aim of Bryggekulturens Hus is to regenerate an otherwise "dead edge" of the city, creating a multi-cultural gathering point for professionals, locals, enthusiasts and tourists, to ultimately contributing to the social sustainability of the city.

Problem statement

"How to transform and add to an otherwise introverted iconic brewery building in Thisted, excluded from the citizens, into an extroverted learning centre for Danish brewing culture, that highlights Thisted Bryghus's strong local engagement by promoting local products and ingredients, to form a synergy for both tourists, enthusiasts and the locals to meet around the creation of craft beer and ultimately progress into a more taste-oriented perception on the beer and alcohol culture in Denmark?"



Intro

Refe

INTRO

Concept finding

Preliminary

In the continuation of the design process the focus is shifted more towards experimenting and investigating rather than analysing and exploring. In the following chapter the overall architectural language for the project will be discovered, as well as finding overall strategies to solve circulation and the floor distribution. During this phase, the design iterations were simultaneously developed, all informing each other. This ultimately leads to the distribution as seen on the following diagram.



Ill. 65 Concept finding process diagram

76 Concept finding

REFERENCE STUDY

Mies van der Rohe - creating space from planes

Preliminary

Serving as an initial inspiration to the architectural language of this project, a reference study of Neu Nationalgallerie and the works of Ludwig Mies van der Rohe is described in the following.

Project: Neu Nationalgallerie, Berlin, GER

Architect: Ludwig Mies van der Rohe Finished: 1968 Typology: Gallery Gross area: 10.135 m²

Mies van der Rohe's last completed project, a national gallery in berlin, displays a modernist architecture highly concerned with traditional values of light, materiality, and spatial composition (Nygaard, 2011). The plane as an element to compose spatiality, as it functions as walls, roof, and floor is used along with pillars to enable a light and open composition. The use of modern techniques and ma-



Neu Nationalgallerie by Mies van der Rohe Ill. 66

terials enables the expression and intentions of the spatial compositions, as the steel roof spans vastly, enabling the thin membrane of the glass façade, diminishing the boundaries of the interior and exterior.

The expression deriving from this architectural langue, as a contrary to the heavy masonry structures of the past and modern concrete elements, provides an opportunity to differentiate the introduced architectural interventions at Bryggekulturens Hus against the existing architecture of the malt building and the new production building.

Concept finding

FROM VOLUMES TO PLANES

Initial plane study

Preliminary

Informed and inspired by the works of Mies Van Der Rohe and the more abstract way of dealing with creating spaces, the focus will shift towards seeing the added elements as planes, rather than volumes (as earlier investigated).

The change in strategy ultimately contributes to the vision of contrasting the registered mass of the existing buildings, and instead create a higher degree of transparency. This is beneficial to create a relation to the natural setting towards south.

Overall, this study focusses on three possible placements and strategies of adding to the malt building; as a connecting building towards the production building, as a lantern on the arriving corner side of the building, and as smaller "view-boxes" added to the facades. Furthermore, the shape and distribution of the planes is examined.

Sub-conclusion

Overall, the low and flat typology creates harmony with the existing buildings and following the overall lines, contributing to recognition rather than disturbance. Furthermore, with the minimal height, the degree of interference with the existing buildings could ultimately be lowered. Lastly, as shown in the macroclimate section, a low building contributes to maximal solar access to the possible square in front of the building. However, to further qualify these studies, the prospect of circulation within the entrance building and the malt building must be further examined.



Preliminary

ined. This resulted in a series of model studies, giving a spatial experience of the provided iterations. Here, the prospect of adding boxes and planes from the study before, continued.

Ill. 70 Iteration 1 - all circulation in malt building

Ill. 71 Iteration 2

Ill. 72 Iteration 3 - all circulation in entrance building

Ill. 73 Iteration 4 - all circulation in malt building



Sub-conclusion

The prospect of establishing a clear overview of the different functions for the visitors as well as guide them through specific functions resulted in a wish for including an atrium in the malt building. This could ultimately create an experiential journey end-

In relation to the study before, the overall distribution of the floor plans in the malt building must be exam-

Initial investigation





FLOOR DISTRIBUTION

ing in the large and overwhelming space, sensing the different spaces, materialities and tactilities in the malt building. However, in order to conclude on a specific proposal, the circulation and the interference with the malt building must be further explored. 79

CIRCULATION

Initial study

Preliminary

To continue from the previous studies, iterations on the possible interference with the malt building, as well as the possible space created by the entrance building will be examined. This is divided into three groups, referring to a low, medium and tall entrance building.



SUMMARY

The architectural language

The overall architectural language of this project is the use of planes and boxes, all to contribute to an unique spatial experience when moving through the buildings, as well as providing a higher degree of transparency and lightness to the added structures. Therefore, this strategy must be a central element in designing the entrance building as well as the transformation of the malt building. Furthermore, as stated before, minimal interference in the façade

Sub-conclusion:

When transforming the malt building, a general strategy from earlier was to interfere the façade to a minimum degree. Therefore, smaller openings, all respecting the existing windows and ornamentation ultimately creates a possibility for a future use of the building, where the interventions might not be needed.

80 Concept finding

must be provided. However, in terms of the floors of the malt building, one must consider breaking up the otherwise very rational existing structure to create a higher degree of coherence and relations between the floors. This must be done in respect of the existing structural systems, to be able to preserve the old steel structures. Thereby, the focus will be on developing the floor plans from a functional perspective.



Malt building

INTRO

Design development

Preliminary

During this phase, a continuation of developing the overall concept will appear, to further specify the functionality, structure and materialiality of the added structures as well as the malt building. As in the previous phase, a series of investigations is done simultaneously, all informing each other, to provide an integrated design.



Ill. 84 Design development process diagram

84 Design development

PLAN STUDY

Malt building

Preliminary

To continue from the earlier studies of distributing and placing the functions, serval iterations on the individual function will progress the vision on the function into actual spaces. This includes public and private relations, internal distributions as well as a vision of a collected experience.

Initial sketches of the different floors have been conducted, where different focus points have appeared in the design process. This is exemplified in the design of the museum, where a focus on flow and creation of shifting spaces and experiences ultimately adds to the dissemination of Danish brewing culture.

These studies lead to an initial distribution of the floor plans, where a high focus on accessibility, shift-



Ill. 85 Iterations on distribution of functions

ing experiences and functionality is apparent. This is created with a general guidance of the circulation to ensure an overall and whole experience when visiting Bryggekulturens Hus. Furthermore, included in the guided circulation, revealing views towards the more enclosed functions like the workshops provides an extended experience to the visitors that will not attending any courses.



Design development



Ill. 86 Initial plan ground floor 1:200



Ill. 87 Initial plan 1st floor 1:200



Ill. 88 Initial plan 2nd floor 1:200



Ill. 89 Initial plan 3rd floor 1:200



Ill. 90 Initial plan 4th floor 1:200

86 Design development



Design development 87

DAYLIGHT AND FACADE

Malt building

Preliminary

In relation to the distribution and design of the floor plans, general regulations on daylight levels in certain functions create a need to open the otherwise enclosed façade membrane. Here, only smaller windows provide a minimal of light into the floors. Because of the function of the workshops as a work- and learning space, the need for 3% daylight on the worktables is inevitably. Therefore, a study on possible openings in the façade for both workshop spaces is conducted, where a relation between the daylight distribution and the interventions in the façade are compared. Additional iterations are found in appendix 2.











Sub-conclusion

3

DF%

To summarise, the large windows create proper daylight conditions for the spaces. However, when looking at the effect on the expression of the façade, some of the proposals are breaking up the otherwise registered façade structure of space and connections around every window element. To continue this, the possible placements of a larger window element must respect and provide space for



the brick façade to follow around. Lastly, the prospect of highlighting and utilizing the dimensioning of the spaces in the placement of the windows is appealing, where the wide workshop space towards south-west and the double-heigh space towards east create possibilities to guide the light further into the spaces. Therefore, the wide window in the south-western workshop as well as the tall window towards east will be further elaborated.

DAYLIGHT ATRIUM

Malt building

DAYLIGHT MUSEUM

Malt building

Preliminary

To continue the search for possible placements of larger window openings, a series of atmospheric studies of the desired light in different spaces has been conducted. In relation to this, the possible interventions in the façade in the different iterations is shown.



Ill. 97 Existing case



Small skylight window Ill. 98



Ill. 99 Large skylight window



Large skylight window + large opening in south facade Ill. 100

90 Design development



⊞

Ill. 101 Consequences on east and south facade



Ill. 102 Consequenses on east and south facade



Ill. 103 Consequenses on east and south facade



Ill. 104 Consequenses on east and south facade

Evenly distributed openings through the museum





Focussed openings towards double heigh space



Ill. 108 3rd floor



Sub-conclusion

To conclude, the fainted light provided by the skylight windows in both the museum and the atrium results in a mild and almost heavenly distribution of light. When including larger openings in the façade, the functionality and atmosphere provided by the skylight disappears mildly, and other problems such as blinding appears. Furthermore, with



the desire to intervein the façade minimally, providing skylight is preferred. However, as registered, the replacement of the existing windows with almost equal sized new windows does not provide a larger amount of light. Therefore, the interventions of the façade in terms of window openings will be kept in the needed spaces.

Ill. 111 Part of east facade

Ill. 112 Part of west facade

FACADE AND OPENINGS

Malt building

Preliminary

To conclude on the interventions on the façade of the malt building, serval studies on placements of added volumes as well as windows has been conducted. This is done to ultimately create a balance between the interventions and collecting the previous studies. Furthermore, a more detailed study on how the added window openings must conform to the existing lines and openings in the façade has been elaborated in two overall concepts.



Ill. 113 Two boxes with equal height, big entrance opening



Ill. 114 Two boxes with different heights, big entrance opening



Ill. 115 Only corner box, large opening in brewpub, small entrance opening



Ill. 116 Only corner box, opening in brewpub, extension of window into entrance opening

Sub-conclusion

To conclude on the overall distribution of added volumes and windows in the façade, a desire to form a harmony in the heights and the number of added volumes ultimately results in the use of the fourth proposal, only having added volumes in the corners of the malt building. This to not break up the monumental scale of the building in every place along the façade, but still have a large degree of surface area. Furthermore, in relation to the window size study, a desire to not conform directly to all the existing lines in the façade, but instead break some of the lines ultimately helps distinguish the new interventions from the existing.

Concept 1: following two lines from existing windows



Ill. 117 Concept 1 drawing



Ill. 119 East facade concept 1



Ill. 121 West facade concept 1



Ill. 123 South facade concept 1



Concept 2: following all lines of existing windows



Ill. 120 East facade concept 2



Ill. 122 West facade concept 2



Ill. 124 South facade concept 2

Design development

PLAN STUDY

Entrance building

Preliminary

Moving the focus to the added entrance building, initial sketches has been conducted based on intended flow, placement of functions as well as an overall wish to form an overview for the visitor when entering the building. Furthermore, the prospect of extending the experience of Bryggekulturens Hus into the production building, forms an extension to the intended circulation, which is elaborated. Lastly, the "line of payment" as experienced in similar museums and attractions has been studied.



Sub-conclusion

In relation to the intended circulation in the malt building, the distribution of the entrance building has been done with the intention to provide an inviting space, not disturbed by the line of payment. This is reflected in the placement of the brew shop and the entrance, which preserves a distance from the reception. Furthermore, the prospect of adding smaller zones to this otherwise large space by possibly utilizing the use of construction elements is appealing. This is all reflected in the plan as seen, which will be further optimized.

94Design development



Ill. 126 Initial plan study entrance building 1:200

Design development

STRUCTURAL SYSTEM

Entrance building

Preliminary

As reflected previously, the prospect of utilizing the construction as a part of the spatial experience of the entrance building is appealing. To embrace that, an initial study on structural systems and the provided spatial experience has been conducted. This ultimately results in three overall concepts of construction, which will be further investigated.





Ill. 129 Initial structural system spatial consequenses



Ill. 130 Initial structural system spatial consequenses

Ill. 131 Initial structural system spatial consequenses





Ill. 128 Initial structural system investigation

Sub-conclusion

When designing the structure, a general wish of the construction to reflect the flow of forces and the stability means is apparent. Furthermore, because of the prospect of utilizing the created boundary spaces as longer spaces, the placement of the bracing must be considered. Therefore, the third concept is chosen and will be further detailed in the detailing phase.

96 Design development









Structural concept 2



Ill. 133 Static system concept 1

Ill. 134 Static system concept 2

Ill. 137



Ill. 136 Spatial drawing concept





Ill. 139 Model illustration concept 1

Ill. 140 Model illustration concept 2





Spatial drawing concept 2

Structural concept 3



Ill. 135 Static system concept 3



Ill. 138 Spatial drawing concept 3



Ill. 141 Model illustration concept 3

Design development

LIGHT AND OPENINGS

Entrance building

Preliminary

The openings and experience of light in the entrance building will in the following be elaborated. This is both in terms of the façade, as well as the relation to the existing buildings.







Ill. 144 Open in top



Ill. 146 Large distance to malt building

Sub-conclusion

A slight distance towards the existing buildings will insinuate the distinction between new and old. Furthermore, this will also create an interesting light setting, which will highlight the existing structures. A skylight window will create more evenly distribution of the light, but at the same time, the insinuation of the whole plane will disappear with this mean. Continuing, by strategically placing openings in the facades, the ability to control the light will appear. Therefore, the façade structure will be further elaborated.



Small opening in top Ill. 143



Ill. 145 Skylight window



Ill. 147 Small distance to malt building

FACADE STUDY

Entrance building

Preliminary

In continuation of the light study, a further investigation on the façade of the entrance is conducted with a general focus on the indoor climatic aspects.

The balance between open and closed façade elements in the south façade most be considered to avoid overtemperatures, while still providing sight towards the trees and fiord. Iterations on façade compositions and use of eaves are simulated in Bsim as an estimate on the expected indoor temperatures. Further iterations are elaborated in appendix 2.



■ 1.0 ■ 1.2 ■ 1.3

Ill. 148 Number of hours above 28 degrees celsius in the course of a year (Bsim results)



The use of eaves and additional closed façade elements provides an opportunity for passive shading while displaying a simple composition and light expression in the façade, as seen in iteration 1.3. Further investigations on the south facade concerns blinding and energy problematics of and glass facade, as investigated in the following.





Ill. 153 Diagram of sun position in relation to expected opening hours



Ill. 154 Channel glass south facade iteration 2.1



Ill. 156 GWP of Bendheim channel glass (Bendheim n.d.) and 3 layer clear glass (LCAbyg)



Ill. 155 Channel glass south facade iteration 2.2



Ill. 157 Number of hours above 28 degrees celsius in the course of a year with channel glass (Bsim results)

To optimize issues regarding blinding from direct sunlight the design exploration utilized channel glass (Bendheim n.d.). Similar to polycarbonate in the appearance, but partly made of reused glass and a u-value of 0,19 W/m2K. Therefore, this material will be examined as a possible blinding material. This is done by researching on opening hours and frequency of visitors during the day in similar attractions, as seen in appendix 3. Thereby, the placement of the blinding is optimized, to minimize the disturbance in the opening hours.

In the north façade of the entrance building, a use of channel glass proves opportunities to reduce energy demand for heating, as the heat transferring capabilities of channel glass exceeds the performance of 3 layer clear glass, while also reducing the GWP of the Furthermore, the placement of the



Ill. 158 Channel glass north facade iteration 3.0



Ill. 160 Channel glass north facade iteration 3.2 Iteration 4.0: 3.2 + 75% CG of the west facade

100 Design development

channel glass on the northern façade will be determined by strategic openings to provide transparency of the functions.

The use of closed facade elements, eaves and channel glass provides a optimal indoor climate and energy performance of the entrance building. The placement of the channel glass in an aesthetic and spatial matter is seen in the continuation of the plane strategy, seeing every item as individual planes. This still contributing to the transparency of the building, but instead of a fully open and unspoiled façade, actual window openings are distributed mildly, to create smaller but more frequent experiences. Apart from that, the channel glass still reveals the silhouettes of the outside, meaning that the natural setting towards south will still be seen.



MATERIAL STUDY

Malt building and entrance building

Preliminary

To initiate the material study, a field trip towards Nordkraft revealed the desire to pair new materials to similar materials as in the malt building and the production building. Furthermore, this trip also revealed the material parings which has been done in the transformation of Nordkraft. This trip sparked off a desire for using a contrasting material to the existing. Furthermore, the materials must be consistent throughout the entire project, meaning that the materiality of the box in the entrance building must be the same as the boxes in the malt building. Thereby, the following studies emphasises these considerations and is examine both the exterior and interior conditions.









Ill. 162 Meeting between existing and added materials, Nordkraft











Ill. 163 Exploration of pairing of materials





Ill. 164 External material study entrance building - brick

Ill. 166 External material study entrance building - steel

Enviromental impact



102Design development



Ill. 167 External material study entrance building - wood





and wood

103 Design development

Interior of malt building

To continue the integrated way of dealing with architecture, the considered materials will be examined in relation to LCA. Here, the immediate benefit of re-used brick and wood claddings is shown. However, the use of materials with higher GWP is possible when considering the amounts used. This to further qualify the different possibilities of the material choices.

Interior of entrance building

In continuation of the previous studies, a study of the interior of the entrance building in relation to materiality has been conducted. Here, the planes and boxes are examined, but also the flooring, ceiling as well as the possible construction elements is elaborated. Additional iterations is found in appendix 4.



Ill. 171 Material study added structures in malt building -Brick



Ill. 172 Material study added structures in malt building Concrete



Ill. 173 Material study added structures in malt building Steel





Ill. 174 Material study added structures in malt building wood



Ill. 175 Material study added structures in malt building dark wood



Ill. 176 Material study added structures in malt building wood and steel



Ill. 177 Material study entrance building wood cladding, wood ceiling, steel construction and concrete flooring



Ill. 178 Material study entrance building perferated steel cladding, trape zoidal plate ceiling, timber construction and green rubber flooring



Ill. 179 Material study entrance building burned wood cladding, trapezoidau plate ceiling, timber construction and concrete flooring



Ill. 180 Material study entrance building concrete cladding, wood ceiling, timber construction and light concrete flooring

Sub-conclusion

To conclude, to insinuate the light structure, contrasting the existing exterior and interior settings, as well as contribute to a minimal environmental footprint, the use of light wood elements is chosen. To reflect the difference between the planes and the boxes, but continue the desired coherence, different structures of wood will be used, boards for the planes and planks for the boxes. Moving on to the entrance building, a desired contrast between the construction and the ceiling means that the construction will be either steel or wood. However, with the use of wood for both boxes and planes an interest in using steel as contrasting material is appealing. Even though, both wood and steel construction will both be examined later. In relation to the flooring, the prospect of having a durable and continuous material from the outside to the inside is appealing. Furthermore, to add to the industrial setting, concrete flooring has been chosen.

URBAN SPACE

Initial study

Preliminary

A desire to extend the flow in the city centre as well as activating the area around the site by contributing to urban regeneration, means that the outdoor space must be appealing. Earlier studies (in the macroclimate section) revealed a dilemma regarding sun access onto the site, as well as noise problems. When designing, these, together with the overall functionality and possibly flexibility will be considered. A desire to actively using the square for the purpose of outdoor serving, shorter stays as well as the possibility of moving some of the functions from Bryggekulturens Hus out occasionally.



Ill. 181 Possible concepts of use of urban space

Extention of functions from the building



Ill. 182 Placement of outdoor seating in relation to solar conditions





Ill. 184 Possible stategy of greenery placements

Sub-conclusion

The prospect of addressing the lines of sight and flow from the city and the train station is immense to consider when detailing the urban space. Furthermore, the desire for creating a flexible urban





space could ultimately be extended to the parking area, to create possibilities for larger events, such as beer festivals eg. The urban space will be further detailed later.





Ill. 186 Window detail malt building

INTRO

Design development

Preliminary

To progress the design process into the synthesis phase, detailing of previous elaborated design elements will follow. This consists of finalizing and detailing the construction as well as other transformation interventions, all contributing to the perception of the spaces.



Ill. 187 Design detailing process diagram

110 Design detailing

STRUCTURAL OPTIMIZATION

Detailing of structural elements

Preliminary

Continuing the iterations upon the construction and structural systems, the chosen concept will be optimized to lower the material use.

Both glulam and steel will be examined, which, combined with the previous material studies will be further detailed. During the optimization, one of the key aspects is the minimal use of material. Here, the general aim is to minimize the height of the entrance building, and therefore, minimal cross sections in the beam will be examined. The overall system and applied loads for the two critical load cases can be seen on the following page, and calcu-





lations on load combinations can be found in appendix 5. When optimizing, the use of steel cross sections IPE and HEA will be examined along with glulam GL28c. Furthermore, the optimization will consider various spacings between the frames, possibly affecting the perception of the boundary spaces. Spacings on 1m and 2,5m is shown here, and for 5m in appendix 6.



	1m spacing		2,5m spacing	
Elements	Cross sections	Utilization (%)	Cross sections	Utilization (%)
Beam	HEA140	82%	HEA180	85%
Column south	HEA100	23%	HEA100	43%
Column north	HEA100	32%	HEA100	65%
Bracing south (util. for LC2 (critical))	HEA100	1%	HEA100	3%
Bracing north (util. for LC2 (critical))	HEA100	0,7%	HEA100	1%
Deformation (SLS test (max. 8,2cm (1/200)))	5,29 cm		7.35 cm	
Total construction volume	1,86 m ³		$0,92 \text{ m}^3$	
Elements	Cross sections	Utilization (%)	Cross sections	Utilization (%)
Beam	IPE240	76%	IPE330	79%
Column south	IPE120	40%	IPE140	46%
Column north	IPE120	62%	IPE140	78%
Bracing south (util. for LC2 (critical))	IPE80	18%	IPE80	53%
Bracing north (util. for LC2 (critical))	IPE80	1%	IPE80	3%
Deformation (SLS test (max. 8,2cm (1/200)))	2,44 cm		2,89 cm	
Total construction volume	1,69 m ³		1,01 m ³	

s355 steel

HEA

IPE s355 steel

GL28c wood

Elements	Cross sections	Utilization (%)	Cross sections	Utilization (%)
Beam	9,0 x 23,3	84%	14,0 x 30,0	84%
Column south	11,5 x 13,3	61%	9,0 x 26,6	54%
Column north	11,5 x 13,3	89%	9,0 x 26,6	76,5%
Bracing south (util. for LC2 (critical))	9,0 x 10,0	8,2%	9,0 x 10,0	17,4%
Bracing north (util. for LC2 (critical))	9,0 x 10,0	5,4%	9,0 x 10,0	11,2%
Deformation (SLS test (max. 8,2cm (1/200)))	10,8 cm		7,15 cm	
Total construction volume	11,8 m ³		8,37 m ³ Desig	n detailing

112 Design detailing 1,01 m³



Ill. 193 HEA s355 steel 2,5m spacing



Ill. 194 IPE s355 steel 2,5m spacing



Ill. 195 GL28c glulam 2,5m spacing

Sub-conclusion

The optimization shows that the use of steel will contribute to smaller elements. Furthermore, when comparing, the use of 2,5m spacings contributes to a lower use of material. Combined with the desire for having a minimal cross section on the beam, the possibility of contrasting the use of wood in

114 Design detailing the interior, as well as having a strong industrial reference, the steel HEA profile will be used. The element in this solution has a quite high utilization, when not considering the bracings. However, a desire for comparing s355 and s235 is apparent, in order to lower the needed strength class and ultimately save money.

s355		s235		
Elements	Cross sections	Utilization (%)	Cross sections	Utilization (%)
Beam	HEA180	85%	HEA180	96%
Column south	HEA100	43%	HEA100	60%
Column north	HEA100	65%	HEA100	91,5%
Bracing south (util. for LC2 (critical))	HEA100	3%	HEA100	4º/o
Bracing north (util. for LC2 (critical))	HEA100	1%	HEA100	2,4%
Deformation (SLS test (max. 8,2cm (1/200)))	7.35 cm		7.36 cm	
Total construction volume	0,92 m ³		0,92 m ³	

Comparison between s355 and s235

HEA steel

As seen above, by using s235, the elements will be further utilized, without changing the cross-section proportions. Furthermore, with similar deformation results, s235 will be used.

In relation to the optimized structure, a desire for changing the cross-section type for the bracings is

	HEA	s235 CHS (pipe) s235		pe) s235
Elements	Cross sections	Utilization (%)	Cross sections	Utilization (%)
Bracing south (util. for LC2 (critical))	HEA100	4%	D=42,4mm (2mm thickness)	73%
Bracing north (util. for LC2 (critical))	HEA100	2,4%	D=42,4mm (2mm thickness)	13,8%
Volume (all bracings)	0,13 m ³		0,06 m ³	

Volume (all bracings)

Exchanging HEA bracing with pipe profile

2,5m spacing

apparent. This to ultimately heighten the utilization, as well as insinuate that the element is stabilizing. Therefore, a investigation on the use of CHS pipe cross-sections has been conducted. The result ultimately reflects that the material used has been lowered, and furthermore the utilization has risen. Therefore, this will be used.

Design detailing

JOINTS

Detailing

To provide stability in the other direction, initial studies have been conducted. This reflects the use of wires as well as massive elements. As this will be examined based on more general conditions, the use of wires will ultimately create a distinction between the primary elements of the frames, and the secondary, which is appealing. Furthermore, the symmetric and even placement of the wires contributes to the mild expression of the entrance building, rather than creating chaos.







Ill. 196 Stability in the other direction investigation

Preliminary

An important aspect within the LCA is the prospect of disassembly. Therefore, this has been considered throughout the detailing phase of the structure, by adding pinned rather than welded joints. This study is adding to the theories of disassembly by addressing the joints, and how they are possibly assembled. This is done for multiple situations as well as for the supports.



Sub-conclusion

An overall desire for distinguish the different elements in the frame is appealing, also to provide a lighter expression. Therefore, the use of visual and large joints ultimately refers to the industrial setting, as well as helping split up the elements.

WINDOW DETAILING

Materials and expression

Preliminary

Moving to the detailing of the windows, both the implementations on the entrance building and the interventions on the malt building will be examined. This in terms of placement, framing and materiality, all to contribute to the appearance of the buildings (rest of the studies can be found in appendix 7).

Study on mullion spacings



Mullions following the columns in-

cluding extra mullion in between

Ill. 201



Ill. 202 2:3 window size

Ill. 200 Mullions following the columns

Study on mullion material



A general desire for following the existing lines,

weather it is in the malt building or in the entrance

building is appealing. In the entrance building, the

mullions must therefore follow the lines of con-

struction, but to split up the otherwise large windows, mullions between will be added. This to

overall contribute to the mild and calm expression

of the building. Moving to the malt building, some

Ill. 203 Aluminium mullions

Sub-conclusion



Ill. 204 Black aluminium mullions



of the lines created by the existing windows will be

reflected in the mullions added to the windows. To preserve and insinuate the straight enclosed volume of the malt building, the window will be placed in the outer perimeter. The distinguishment from the existing will also be reflected in the use of a light corten steel frame, creating a mild coherence to the brick façade.



Ill. 205 Wood mullions



Mullion design investigation



Ill. 206 No mullion





Ill. 207 Multiple mullions









Ill. 209 Mullions following all existing lines

Ill. 213 Window placement outside of wall

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Window placement investigation







Outside frame investigation





Ill. 215 Medium frame





Design detailing

VENTILATION

Initial study

Preliminary

Following the previous investigation on the placement of mechanical ventilation, a study on the size of a duct has been done, to examine the spatial consequences of introducing a mechanical ventilation system into the malt building. Estimations on ventilation rate and duct dimensions is elaborated in appendix 8.

The chosen duct path is based on a balanced central system with vertical main ducts. Here, the main distribution paths avoid the main areas of the workshop and restaurant, as it runs along the edges of each floor. The intersections between exhaust and supply are minimized and prohibited to the double height of the workshop area.

The altercations to ensure functionality for mechanical ventilation provided the last detailing to the plan solution.





Ill. 218 Mechanical ventilation concept and critical path

120Design detailing







To continue the visions of the urban space, more specific sketches has been conducted. Here, the placement of green areas, seating and considerations regarding flow on the site is investigated. Furthermore, possible distinguishments between the pavements insinuating similar space-makings as inside the buildings are examined. Lastly considerations regarding macroclimate have been included.



Ill. 221 Sketches on urban flow



Ill. 223 Sketch on overall correlations between the parking and the square

Sub-conclusion

To conclude, by placing the large parts of the seating area in a submerged zone, the disturbance from the road will be lowered. Furthermore, the placement and distribution of green zones, contributes to creating intimate spaces, as well as insinuate that

URBAN SPACE DETAILING

Structure and distribution



Ill. 222 Sketches on distribution of elements in the urban space

the setting is more of a square than a park. Lastly, to create a coherence with the interior of the entrance building, similar concrete elements will be used as the primary pavement. However, to distinguish between seating and flow zones, different materiality's will be used.



CONCEPT

Bryggekulturens Hus

With the proposal for Bryggekulturens Hus a general respect for the history and the local attachment is reflected in the minimal interference with the malt building. Instead, by adding transparent structures to the façade, the building opens up, even though it is not. A lantern-like structure at the corner of the malt building is attracting and insinuates life and social interactions, which continues through the square centered between the three buildings. The transparency and lightness of the added structures are heavily contrasting the existing buildings and combined with the withdrawn and subjecting status of the entrance building, the general focus will be on the malt building, as well as the nature behind. When moving towards the entrance building, the

larger openings here and in the malt building reveals the functionality and spatiality of the interior. The movement from arriving to the site until one is standing in the malt building reveals a series of spatial compositions of scale, space and materiality, all adding to the perception of the architecture.

The base functions of Bryggekulturens Hus are placed in the malt building, giving the building a new life, transformed from a historical brewing empire into a centre for experimentation and dissemination. When entering, a predetermined circulation path forms a unique and whole experience of both historical and experimental impressions.



Ill. 225 Concept of added structures and elements



Exploded view of added structures Ill. 226

124 Design presentation Ill. 227 Exploded view of malt building showing internal interventions





Ill. 229



Ill. 230 Spatial journey of scale - the open entrance building



Ill. 231 new and old



Ill. 232 Spatial journey of scale - open atrium in malt building



Spatial journey of scale - the enclosed windbreaker

Design presentation



SITE PLAN

Urban distribution

parking lot, all covered in greenery to appear more flects an interest in merging with the flows of the attractive. The main part of the square is placed city arriving from either the centre, or from the withdrawn from the disturbance of the road, where plenty of seating zones, highlighted by a shift in pavements, contributes to extending the brewpub part of the square forms a desire for a flexible outinto the urban space. The pavement of the seating door space, with the possibility of hosting various zones is made of red concrete pavement, relating events, ultimately including parts of the parking lot. to the expression of the malt building, and create This ensures an active outdoor space, contributing visual and spatial boundaries.

The urban spaces consists of a square as well as a The distribution of elements in the urban space retrain station. Furthermore, the choice of pavements and the integrated inclusion of the parking lot as a to attracting people and regenerate this part of the city.



Ill. 234 Multifunctional site plan - extending into square



Ill. 235 Multifunctional site plan - extending into parking lot

SITE PLAN

References and materials



Ill. 236 References urban square functionality and pavement transitions



Ill. 237 Material concrete pavement



Ill. 238 Material red pavement

Edges between inside and outside

When distributing the functions in the buildings, an important aspect was the relation to the outside for the ground floor functions. This is exemplified in the case of the brewpub and the brew shop, all contributing to different experiences and relations with outside, weather it is physical or visual connections. This ultimately adds to the transparency of the functions, which heightens the relation to the city.





Ill. 239 Edges between inside and outside 1:100

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Ill. 240 Render - entrance building

THE SPATIAL DISTRIBUTION

Plans

The distribution of the functions is centrally placed around the entrance building, which also functions as the main entrance to the buildings. The main functions of Bryggekulturens Hus are placed in the malt building, experiencing local and historical references when attending a course or visiting the museum. This is all connected through a central atrium, where visual contact to the different facilities appears. When illustrating the plan solutions, the interventions made on the interior will be shown. The relatively large interventions in the interior reflect a desire for breaking up the otherwise rational structure of the floors, which has resulted in a more dynamic and visualy connected floor distribution. Attached to the circulation as an active part is the

production building of Thisted Bryghus, where the experience of a modern brewing production can be experienced.

The distribution of spaces also reveals a desire to place the extroverted functions like gastro restaurant and the brewpub on the ground floor, creating relations to the city and opens for frequent and shorter stays. Furthermore, the distribution also highlights the accessibility, as the ground floor is entirely payment free. Thereby, the line of payment starts when entering the large staircase, which is also apparent in the placement of the reception in close relation to this.



	Overall area [m ²]
	-
	119
	6
	7
	51
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1)	26
	20
k	78
	6
	-
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	(incl in goods storage)
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Ill. 242 Accessibility - free ground floor



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Ill. 245 Possibilities of flow when entering 1st floor









Ill. 249 Plan 3rd floor



Ill. 250 Interventions 3rd floor plan











Ill. 253 Multifunctionality workshop





Ill. 254 Multifunctionality museum stair

Multifunctionality in the plans

By designing a typology like the dissemination centre, an important aspect is the degree of flexibility and multifunctionality in the plans. In the case of Bryggekulturens Hus, this ultimately opens for more interactions, by being able to host serval events. The main multifunctional spaces are captured here, and consists of the entrance building, the museum stair and the workshop spaces.

Ill. 252 Interventions 4th floor plan









Ill. 255 Multifunctionality entrance building



Ill. 256 Section AA + East facade malt building 1:200

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FACADES AND SECTIONS

Spatial experience

ventions made on the malt building, as well as the of the entrance building reflects a desire for concreation of space and materiality. Here, the spatial trasting the experienced mass of the existing buildexperience of the functional distribution is appar- ings, but also contrasting in terms of materials and ent, where the previous mentioned journey through structures, highlighting its functional use as the enscale, tactility and light is seen. Furthermore, the trance hall. Important here is also for the entrance relations between the buildings are highlighted in building to not favor one of the existing buildings,

The facades and sections reveal the general inter- ridor in the edge between new and old. The façade the detachment of elements, resulting in a glass cor- but instead creating its own architectural language.



Ill. 257 Interventions east facade


Ill. 258 Section BB 1:200

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Seating area

Ill. 259 Section CC + north facade entrance building 1:200



Ill. 260 West facade 1:200

Ill. 261 Interventions west facade

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Ill. 262 South facade 1:200







Ill. 264 Section DD 1:200

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Urban square

Ill. 265 North facade 1:200



Ill. 266 Interventions in north facade

DETAILS

Construction and relations

The case of transformation and addition to an already existing structure require a large focus on detailing of the elements and the meeting between the elements. In order to capture the spatial transition between the entrance building and the malt building, a zoomed in section is provided. Furthermore, by adding a new function to the malt building, the requirements regarding energy optimizations are

apparent. In this proposal, the east and west façade will be internally insulated, whereas the south façade will be externally insulated, because of the already different appearance compared to the rest of the malt building. The strategy behind the insulation of the malt building, as well as details on the creation of the new building is shown in a series of detail drawings.





Ill. 268 Detail 1 transition between new and old 1:50

Ill. 267 Zoomed-in section on the transition between new and old 1:100

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Roof 0,12 W/(m²K)



Renovated wall 0,18 W/(m²K)

- 1.Existing brickwall
 2. Mineral insulation 180mm & Wodden I-joist cc. 600mm
 5. Vapor barrier
 3. Mineral insulation 45mm & counter batts cc. 600mm
- 4. 2 layer plaster bord

Ill. 269 Detail 2 of entrance building 1:50





Ill. 271 Render - workshop

SOCIAL SUSTAINABILITY

Social generators

the prospect of heighten the social sustainability on a series of levels, going from personal to national. This is reflected in the included functions of Bryggekulturens Hus, where a mixture of tasting, trying

One of the core elements of the design process was and learning experiences all sets the base for social interactions. To visualize the different scales of social sustainability, the following diagrams capture how Bryggekulturens Hus supports them.



Ill. 272 Different scales of social sustainability



Ill. 273 Interactions based on similar interest



Ill. 274 Societal and personal social relations based on dissemination and knowledge sharing



Ill. 275 Societal and personal social means of learning



Ill. 276 Social means on city scale based on historical references

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Ill. 277 Personal and city scale social means of interactions between a various user group



Ill. 278 Personal social mean of unique sensual experience.



Ill. 279 Social mean based on city scale, by activating an otherwise introverted space

MATERIALS AND CONSTRUCTION

Textures and structures

The primary materials chosen in the building is wooden claddings for boxes and planes, as well as steel elements for the construction, the staircases and the railings. The used materials are chosen because of the contrast to the materiality of the malt building and the production building. This is both in the colour, but especially in the tactility. Adding to this, the steel and wood create strong references to the construction of the malt building and furthermore the steel highlights a desired industrial reference. Lastly, the choice of materials also reflects a sustainable standpoint especially in terms of the use of wood, which is bio negative. An overall intention of the added materials was within the prospect of

easy assembly and disassembly, contributing to the circular way of dealing with architecture. This is reflected in the choice of materials but especially also in the joining of the structural elements.

As previously seen in the case of Nordkraft, the transitions between the existing materials and the new added materials are an important aspect of understanding the interventions. Here, the desire was to distinguish the new from the old, by creating distance as well as contrasting the materials. Following, examples of meetings between new and old materials has been captured.



Ill. 280 Transition between wood and raw brick Ill. 281

Contrast between steel and wood

Ill. 282 Transition between existing brickwald and steel





Ill. 284 Life cycle of wooden materials

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HEA180 s235 steel

HEA100 s235 steel

Steel wire

Ill. 285 The structure

The construction of the entrance building consists of a series of slim steel frames, to limit the amount of material used. The columns of the frames are offset from the façade to provide smaller boundary zones for foyer and brew shop. Furthermore, the frames are stabilized by the implementation of bracings, contributing to the possibility of having hinge connections, distinguishing the spatial experience of the boundary zones as well as guiding the sectioning of the façade. In the other direction, a series of wires are stabilizing the frames, combined with the roof construction. The wires are evenly and symmetrically distributed to avoid chaos to the otherwise mild expression of the entrance building.

Continuing, as stated earlier, the joints of the construction reflect a large focus on disassembly. This can be seen in the exploded views, and because of the easy assemble and disassemble process, the possibility of reusing the elements appears.







Design presentation

INDOOR ENVIRONMENT

Well-being

The integrated approach requires a large focus on technical aspects like indoor environment. During this thesis the main indoor environment focus has been on the entrance building. The use of eaves, a balance between closed and transparent façade elements, and the utilization of channel glass in the south façade has prevented the prospects overtemperatures, excessive energy demands, and blinding people entering the building. Furthermore, the highly placed window in the facades provides pos-

sibility for natural ventilation through cross ventilation. Ultimately, the natural ventilation strategy can be extended by the used of the atrium in the malt building to form thermal buoyancy. The intentions of each aspect providing a pleasant indoor environment through passive strategies. However, mechanical ventilation to provide a healthy indoor environment is implemented to sustain the new functions. In appendix 9, a description of the duct paths for mechanical ventilation is shown.



Ill. 288 Addressed indoor environment aspects

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Ill. 289 Malt building

CONCLUSION

Changing the perception of beer

The proposal for Bryggekulturens Hus composes the aim of this thesis about changing the perception of beer into a more taste-oriented culture. Here, several elements such as historical preservations, combining the past, the present and the future as well as creating a platform for social interactions has been an integrated part of the process of designing. With the aim of transforming the existing malt building, a large focus on how to conform to local history and cultural heritage, but at the same time progress the building into being fully functional in its new function, was reflected in the design process.

Aiming for a minimal interference in the facades but at the same time making the malt building more extroverted, the addition of transparent elements in the form of the extension of the gastro restaurant as well as the entrance building poses a transparency

in the organization of functions as well as sparking an interest in discovering the buildings. At the same time, the transparent elements provide focus on the monumental appearance of the malt building, by retracting itself from it.

The rational and horizontal spatial distribution in the malt building posed a challenge to the implementation of new functions and the interplay between these. Here, larger interventions have resulted in a coherence between functionalities and ultimately heightened the perception of the spaces. Overall, with the combination of functionalities, spatiality and historical references, the otherwise introverted and unappealing space surrounding Thisted Bryghus has opened, to ultimately function as a social generator for the city, but also the nation, with the aim to pose a bigger transparency and accessibility in the creation of craft beers.

During the creation of the thesis and the design proposal, serval aspects cause for further reflections. This includes the applied strategy of transforming, the inclusion of sustainable measures as well as used methods and tools.

Transformation

A large part of the thesis lays within the prospect of transformation. Given the minimal experience within this topic from previous semesters, but an overall desire to utilize already existing structures, the framework was set.

During the exploration of theory on transformation, the notion of tectonics and sustainability were quite apparent. This sparked a pathway into understanding transformation by addressing these already well-known themes and ultimately the positioning within this field was immense to describe. Furthermore, the early notion of transformational interventions and how to address several interdisciplinary topics from the beginning were immense to sustain an integrated approach to the topic.

When dealing with transformation, the balance between historical referencing and the inclusion of a new function is proved difficult. Because of the uncertainties within the topic, a general strategy of minimal interventions on the building were followed. However, a general need for breaking up the floor plan distribution were registered, which caused for more radical and aggressive interventions and ultimately opened for the notion of the skin of the building as the primary element to preserve. Internally, the focus was more pointed towards securing the right settings for the coming functions. When transforming one could therefore ask; Is it sustainable to reuse a building, if the building is not conforming to the intended function?

Bryggekulturens Hus

An immense part of the process was to see the transformation as a part of a larger circular system, with the possibility of reusing the building again in the future as a driver for addressing the building. This causes for a reflection upon the provided interventions, are they too aggressive when thinking of a future use? Where are the boundaries of how much can be subtracted?

The interventions in the façade, including additions of volumes as well as strategical replacement of windows reflects a desire for keeping the stature and composition of the malt building. However, to conform to the use as part of Bryggekulturens Hus, alterations must be made. Removing a part of the existing windows, including the ornamentation, could turn problematic when removing all added structures in the future. However, the need for opening the building were immense, and will possibly also be necessary in the future.

Similarly, the aggressive intervention on the internal floors poses the same questions, but possible also gives the same results; With the demands changing from the use of rational horizontal distribution into more free-flowing spaces, the interventions were immense. One could even suggest removing the entire 'meat' of the building in the future, contribute to more flexibility when reusing it.

Sustainability

In relation to the notion of transformation, the term of radical tectonics and circular thinking was an integrated part of the design process. Especially LCA and disassembly were immense to include, considering the conditions of transforming and adding to the existing. However, when accessing the notion of LCA, questions was raised. To what extend must LCA control the choice of materials and processing? During the process, serval materials has

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been examined in relation to different prospects, including contrast, tactility and LCA. In terms of LCA, locally produced wood will always be the best possible choice, and therefore, the choice of steel for the construction and staircases calls for a deeper understanding of the notion of space, tactility, and appearance. Here, the industrial reference as well as minimal cross sections were ultimate parameters in the choice. However, wood was preferred in other parts of the project, causing the ultimate questions: Have we been too soft in conform to environmentally friendly materials, or should LCA have a larger role to play?

Ultimately, with the increasing climate crisis and the desire to lower the CO2 emissions in the building sector, including low polluting materials is to a larger degree needed. Furthermore, the notion of reusing materials and possibly even whole buildings poses equally heigh considerations. During the process of developing the façade of the entrance building, a change in strategy from primarily using glass to utilizing channel glass, ultimately resulted in lowered CO2 emissions as well as sparking a focus on reuse. Here, channel glass was made primarily of reuse glass, and is therefore posing a more sustainable solution. Therefore, when dealing with environmental sustainability, one must consider multiple aspects.

Every building provides and fulfil a societal role. An important part of the thesis was therefore within social sustainability and ultimately heighten the local values of the settings around Thisted Bryghus. This was ultimately done by implementing several functions to attract a diverse user group, as well as the intended creation of interesting and attractive spaces both internally and externally. However, social sustainability as opposed to environmen-

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tal sustainability is not easy to predict and ensure. Human behaviour and interactions have for long been investigated, but still, many regenerations of areas have the opposite effect. However, this thesis includes multiple registrations and theoretical perspectives on the theme, ultimately forming the base for social interactions to happen.

Methods and tools

The prospect of transforming ultimately questioned the overall structuring of the process. Therefore, this thesis used The Integrated Design Process as an overall guidance, but because of the already existing building, the overall approach was further specified. This specification ensured an early integration and understanding of the transformational prospect, ultimately formed a rather different process than usually experienced at the Architecture & Design education. However, the interdisciplinary way of dealing with the combination of architecture and engineering rooted in The Integrated Design Process formed an important framework for dealing with the prospect of transformation. Furthermore, the transformation also created a desire to integrate sketching and investigations in the early stages of the project, always questioning how a certain analysis could affect possible design proposals. During the thesis serval tools were used to design. The prospect of transformation caused for a notion of how to easily and beneficially design and distribute space. Here, the use of plans, but especially sections and models has proven important in understanding and conforming to the existing. This is used to a larger extent than in previous projects, where the use of a 3D model often provided the chosen tool. Therefore, the thesis has sparked an interest and awareness of the use of additional tools in the otherwise digitally progressing architectural world.

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Ill. 1 - 324: Own illustrations

Epilog



ventil т thods - Daylight and facade Bsimm õ Materials - Structural optimization e - Window) detailing

Ill. 290 Malt building

Transformation methods (additional)

Preliminary

A continuation of the theories by Christoffer Haarlang has been conducted, reflecting multiple ways of dealing with the prospect of transformation.

Technical - Historical - Phenomenology

A method to register, analyse, and valuate existing structures in a phenomenological perspective in all project phases. Here, the existing structure is perceived intellectual and emotional. The technical aspect is concerned with the understanding of materials and detailing of construction elements, as well as the condition of these elements. The historical aspect concerns the current situation in relation to architectural and cultural history.

Skin – Meat – Bone

A method to perceive and understand the 'whole' and tectonic intentions of a building. Based on Semper's notion on tectonic, the method concerns the elements of the earth work, the hearth, the framework/roof, and the lightweight closing membrane. Skin concerns the membrane dividing outside from inside - often the façade - and its expressivity and cultural acceptance through time, which defines the buildings accepted lifespan. Meat concerns the volume, the spatial configuration within the volume, and the atmosphere of the spaces. Bone concerns the structural aspects that both influences the atmosphere within the construction and the firmness of the construction itself. The attention to these elements when analysing and the building enables the design solutions to contain the aspect of time. The optimization of each building element to extend the lifespan of the building. Skin is the opportunities for maintenance, meat is the flexibility of the interior, and bone is durability of the construction and the opportunities for future transformations.

Landscape - Still life - Portrait

A method to analyse and assess existing buildings

with an attention to the variation in scale, where the architectural qualities – technical, historical, and phenomenology - is perceived in the landscape or urban scale, the architectural middle scale, and the detailed scale. The method concerns the different ways the building is perceived in relation to the different scales and should inform the different challenges in each scale and their interplay, thus developing holistic design solutions not only concerning the architectural middle scale. Landscape concerns the large scale of urban structures and nature landscapes. Still life concerns the middle scale of architectural elements and their interplay. Portrait concerns the details of architecture.

Look - Reject - Develop

An approach to describe the structure of the initial registration, analysis, and valuation phase, the sketching phase, and the projection phase. The method is based on the immediate and impulsive response to a rejection or 'to forget about' the information acquired through a thorough analysis of the building, whereas a synthesis is formed, acknowledging that not every aspect of the analysis can be included at first. Then, the project is developed, and the intentions are described.

Subtraction – Reconstruction – Repair – Reshape – Addition

Describes a method to understand the architectural interventions when transforming architecture. Subtraction and reconstruction concern the re-establishment of something that has been, repair and reshape concerns the change of something existing, and addition concerns the introduction of something new in the context of something existing.

Appendix

Daylight and facade (additional)

Additional material for the investigation regarding daylight and facade studies has been conducted.



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Ill. 292 Daylight investigation southern workshop space

178 Appendix

Ill. 291 Daylight investigation double heigh workshop

















Bsim - Indoor climate

The results of Bsim regarding thermal comfort within the entrance building is shown in the following. The chart represents the hottest day measured in the simulations and reflects the maximum load on the thermal comfort. On the following page, each simulated iteration is shown.



Ill. 293 Bsim iteration results



No Eave



No Eave



Eave 2m

Ill. 300 Iteration Eave 2m







Eave 1m



Eave 2m



Materials in entrance building

Further iterations on material choices for the entrance building is shown. These iteration serves as more experimental possible choices and reflects the manifold in iterations. Alternative materials of rubber flooring an polycarbonate facade elements was envestigated. Each iteration clearly reflects the many possible path of with the design could have taken.



 Ill. 302
 Iteration: Green rubber flooring, perferated steel cladding, light steel construction and ceiling



Ill. 303 Iteration: Polycarbonate cladding, black rubber flooring, light steel construction and ceiling



Ill. 304 Iteration: Polycarbonate cladding, orange rubber flooring, wooden construction and ceiling



Ill. 305 Iteration: Wood cladding, concrete flooring, steel construction and ceiling



Ill. 306 Iteration: Perferated steel cladding, black rubber flooring, steel construction and ceiling

Appendix

APPENDIX 5 + 6

Load cases and structural optimization

To set the base for the structural optimization, the set up of load combinations has been conducted. Furthermore, in relation to the optimization, the 5m spacing study is shown here.



Snow load (line load) = 1/8 KN/m

Ill. 308 Assigned loads



Ill. 309 Placement of loads on construction

	5m spacing			
Elements	Cross sections	Utilization (%)		
Beam	HEA220	88%		
Column south	HEA120	53%		
Column north	HEA120	81%		
Bracing south (util. for LC2 (critical))	HEA100	7%		
Bracing north (util. for LC2 (critical))	HEA100	3%		
Deformation (SLS test (max. 8,2cm (1/200)))	7,55cm			
Total construction volume	0,66 m ³			

HEA s355 steel

IPE s355 steel

GL28c wood

Elements	Cross sections	Utilization (%)
Beam	IPE400	86%
Column south	IPE180	46%
Column north	IPE180	76%
Bracing south (util. for LC2 (critical))	IPE100	57%
Bracing north (util. for LC2 (critical))	IPE100	5%
Deformation (SLS test (max. 8,2cm (l/200)))	2,58cm	
Total construction volume	$0,75 \text{ m}^3$	

Elements	Cross sections	Utilization (%)
Beam	14,0 x 40,0	90%
Column south	11,5 x 30,0	62%
Column north	11,5 x 30,0	89%
Bracing south (util. for LC2 (critical))	9,0 x 10,0	25,7%
Bracing north (util. for LC2 (critical))	9,0 x 10,0	18,7%
Deformation (SLS test (max. 8,2cm (1/200)))	6,7cm	
Total construction volume	6,18 m ³	

Window detailing

A continuation of the window detailing studies has been conducted, including additional iterations as well as studies on the malt building about mullion and frame materials.



1:2 window size

2:3 window size including extra mullion



Mullions following the columns including two extra mullions in between







Ill. 310 Corten steel



Ill. 311 Black steel







Ill. 312 Grey aluminium





Ill. 313 Wood



Mullion material investigation





Ill. 317 Wood

Appendix

Mechanical ventilation

The estimations on duct dimensions are based on the ventilation rates for the rooms supplied by the main distribution duct on a critical path. Due to the high people load of the restaurant, lecture, and workshop a critical path of the supply duct on the 2. Floor towards the restaurant is used for the estimations. Thermal comfort is not included in these calculations, as the thermal comfort is sustained by natural ventilation.

Ventilation rates necessary to sustain atmospheric comfort is based on the following calculation:

$$Q_h = \frac{G_{c,p} + G_{c,b}}{C_{c,i} - C_{c,o}} * \frac{1}{\varepsilon_v}$$

 G_{c} Ventilation rate in I/s

G_{c,p} People pollution in Olf. Activity levels of 1-1,2 MET is used, 1 Olf/person.

building pollution in Olf. Non-low polluting building, 0,2 Olf/m² floor. $G_{c,b}$

C_{c,i} Intended quality of indoor air, in decipol. Category B is used, 1,4 decipol.

 $C_{c,0}$ Quality of outdoor air, in decipol. Town with good quality air, 0,1 decipol.

Ventilation efficiency. Mixing ventilation, 1. εv

(Danish Standards Association/CEN/CR 1752, 2001)

As an example, the ventilation rate for the restaurant top deck is calculated:

$$Q_h = \frac{(20 * 1 \, olf) + (31,5 \, m^2 * 0,2 \, olf)}{1,4 - 0,1} = 178,1 \, l/s = 641,1 \, m^2/h$$

The other ventilations rates for the rooms connected to the critical path is stated in the path diagram below:



Ill. 318 Calculated ventilation ducts

188 Appendix The aim is to minimize pressure loss in the system to save energy demands to operate the system (SEL). The estimations on duct dimensions is based on the ventilation rate - as found before - and recommended airflow speeds:

Recommended speeds

- Connection: 2 3 m/s
- Secondary distribution 2 4 m/s
- Main distribution 4-6 m/s
- Main 6 9 m/s

(Michael Pominanowski, Lecture slides, 2019)

From here, the pressure loss on straight duct paths is found through SBI-nomogram 10 (Statens Byggeforskningsinstitut, 1967) as seen on the following page.

These estimates provide a recommended minimum and maximum dimensions:

- 4 m/s : 310 mm Ø with a pressure loss of 0,065 kp/m2 pr. m.
- 6 m/s : 250 mm Ø with a pressure loss of 0,17 kp/m2 pr. m.

Outlets

A Lindab PCS has been chosen as a free mounted ceiling outlet. The size of the outlet depends on the ventilation rate:

As an example, the lecture 2 room has a ventilation rate of 367 m/h, and through the table below, a single outlet providing this ventilation rate has a height of 420mm. Two outlets with a ventilation rate of 183,5 m/h have a height of 300 mm.

More inlets are necessary to ensure clearance in rooms with the original ceiling height of approximately 2,6m.

(https://itsolution.lindab.com/lindabwebproductsdoc/pdf/documentation/comfort/dk/technical/pcs.pdf)

	Mini	imum	p _t ={	50 Pa	p _t =	50 Pa	Størrelse	ØD	Ød ₁	L	н	Vægt
	P _i =	5 Pa	L _{WA} =3	30dB(A)	L _{WA} =3	35dB(A)	[mm]	[mm]	[mm]	[mm]	[mm]	[kg]
Størrelse	l/s	m³/h	l/s	m³/h	l/s	m³/h	125	240	125	340	215	3,4
125	20	73	30	106	36	131	160	300	160	360	260	4,6
160	34	122	48	173	59	212	200	360	200	390	300	6,9
200	53	190	65	235	81	292	250	460	250	420	350	9,6
250	79	286	109	393	135	484	315	540	315	460	420	11,4
315	121	437	-	-	188	675						

Appendix



Appendix

Mechanical ventilation ducts

The duct paths for mechanical ventilation is displayed in the following plans. The system is designed as a balanced system with supply and exhaust channels. A central ventilation unit is placed in the existing furnace/technical room and is connected to the malt building on ground floor. The duct paths extend into the entrance building through the 1. floor, and runs through the diagonal elements of the steel frames in the entrance building.



Ill. 320 Ground floor mechanical ventilation

