



In front of you lies the Design Research for the graduation studio Urban Architecture. The research for the this booklet is executed in four subjects; the new school system, the material of ceramics, the location in Delft, and the people who use it. This research is used as a guide for the design of a craft school in Delft. Which is part of my graduation project for the master Architecture Urbanism and Building sciences at the technical university of Delft.

The research is developed during the whole design process, in order to come up with the right ideas for the design of the new craft school for ceramics in Delft. The research is executed by doing desk and field research, in which different articles and books are used and people are interviewed. During this process I got guidance from my teachers; Mechthild Stuhlmacher, Leeker Reinders and Ger Warries who I want to thank for their interesting conversations and support along the way.

Furthermore I want to thank my fellow students for the conversations we had about the research and design which brought the whole project to an higher level. Finally I want to thank my friends, parents and girlfriend in particular for their patience with me and their support during my graduation year.

I hope you find this design research enjoyable and informative

Sam Vos
29 January 2021

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S Y S T E M

The New Vocational School

The “System” stands for, the organisation of the new craft school. Through our history practical learning environments, are executed in different ways. To find out how the “system” of the

new craft school should look like, these different practical learning environments will be analysed in this chapter. In order to compose a new system for the craft school of 2021.



1a. Development of the Workshop

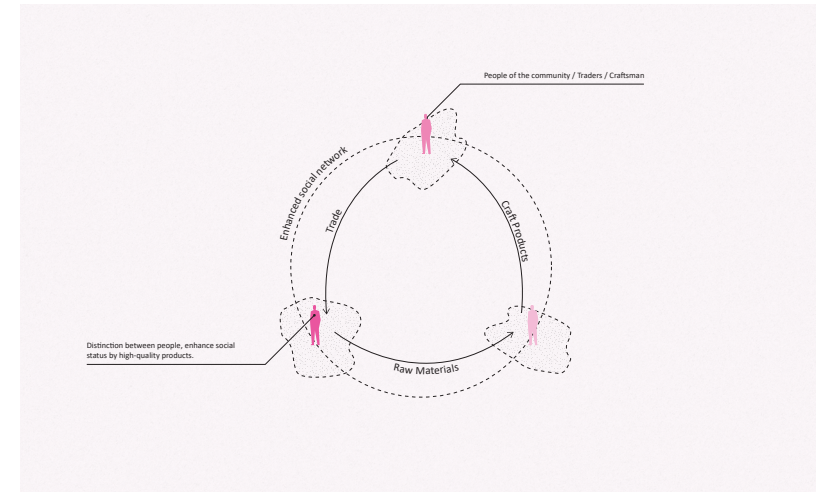
Communities and social networks

In the last decades, vocational education is having difficulties due to automation and robotisation. Which results in less vocational jobs and disappearing knowledge in most craftsmanship¹. One of the problems is the positioning of the ROC (the current vocational schools) in the Netherlands, fenced off buildings which are not connecting to their communities or their students. To create a new vocational school, which is part of the assignment of the graduation studio 'Urban architecture, Craft in the City' I will analyse different workshop through our history. The workshop can be understood as; places where they are practising craftsmanship (ateliers, workplaces, small factories, vocational schools, etc.). While going through history, not all workshops systems will be highlighted, only a couple to show the development and there specific networks. This research will go through the following eras; Prehistory (5000 BC), Late Bronze Age (1200 BC), The Greek Empire (1000 BC), The Roman Empire (500 BC), The Middle Ages (1200), Industrial Revolution (1800), 20th Century, and the 21st Century. The essay will be translated into a diagrammatic timeline to create an overview. From the different diagrams, a new diagram will be composed which should represent 'the new craft school'.

1a. Development of the Workshop

Prehistory (5000 - 1200 BC.)

I started my research from 5000 BC in the prehistory. During prehistorian times there were two things that were distributed; raw materials (amber, obsidian and jade for instance) and craft products. The products and material became more prestigious the further they were from their source². The arising of the craft products and the exchange of it has three major consequences for the communities in that time. The first one is that it created the possibility for people to make craft specialisation the source of their livelihood. The second one is that it created social networks within and between communities. And the third one it created a social distinction between people, the possibility to enhance the social status of people by getting high-quality products³. According to Düring 'the rise of craft-oriented exchange networks from the fifth millennium BC onwards appears to him to be a critical development in the rise of complex societies in the eastern Mediterranean⁴.



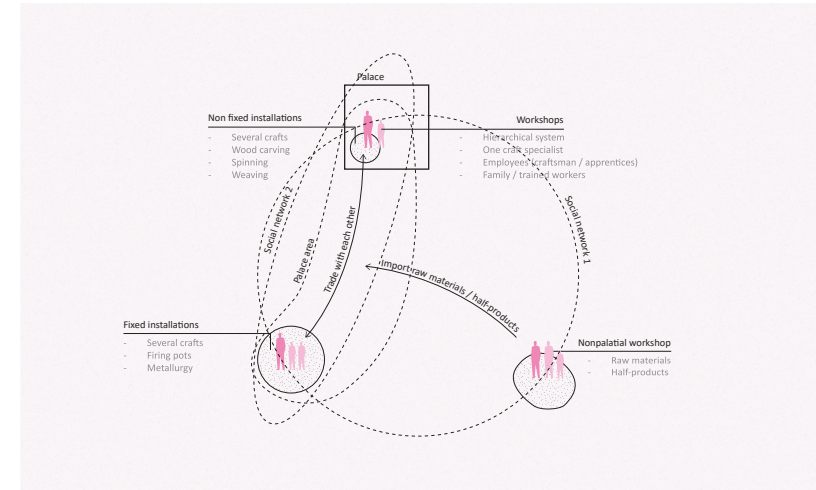
[2] Diagrammatic representation of the workshop community and the social network within the Prehistory - Illustration by Author

1a. Development of the Workshop

The Later Bronze Age (Tiryns Community) (1200 - 1000 BC.)

Up to the late bronze age, a lot of development took place within these communities, and workshops arose. To get a better understanding of these developed communities, I looked into the Tiryns community (around 1200 BC in Greek) and their workshops. The **community** was based on three craft systems, two (palatial workshops) consist within the palace area (city wall) and one (nonpalatial) outside of the palace area. In the workshops within the boundaries of the palace area, different crafts were carried out. One of these workshops was inside of the palace building, in this workshop, only the crafts were carried out which didn't need a fixed installation (like an oven). In the workshop outside the palace but within the palace, area crafts were carried out that needed fixed installations. Both these workshops were under the control of the palace, and they traded a lot of goods with each other (for instance half-products that were finished within the palace). The craft system outside of the palace area was not under the control of the palace. It delivered raw material or half-products to the workshops within the palace area. Within the workshops, there was a hierarchical system. One craft specialist (carried out different crafts) and his helpers, which could be other craftsman or apprentices. They were family or just fully trained workers. Most of the time, the apprentices lived in the workshops. Within the workshops, the tools were shared, and different crafts were carried out⁵. Besides that, in the late bronze age, they started to apply written prescription for the craft. They implemented exact measurement and weights systems⁶.

→
Mapping the
area, p.96



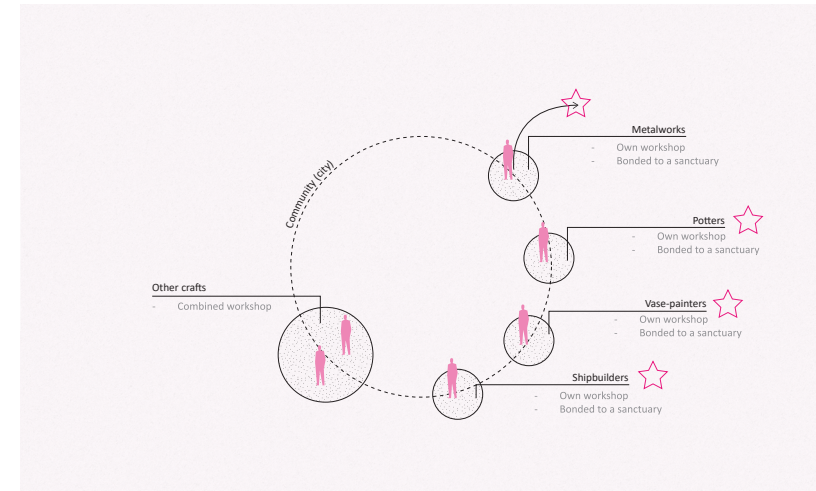
[3] Diagrammatic representation of the workshop community and the social network within the late bronze age - Illustration by Author

Important of this community is the exchange of products, and the connection between the different workshops. Within the palace area, which can be translated to a school. But also outside the palace area, which can be translated to the connection of the school with its surrounding workshops (professionals). For the new system it is important to research if there can be created a connection between school system and the nearby workshops. In order to exchange knowledge and enhance the craft in general.

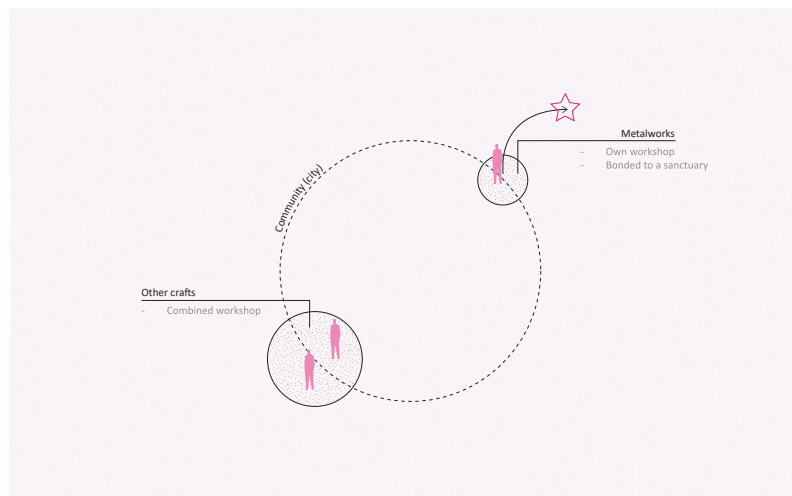
1a. Development of the Workshop

The Greek Empire (1000 - 600 BC.)

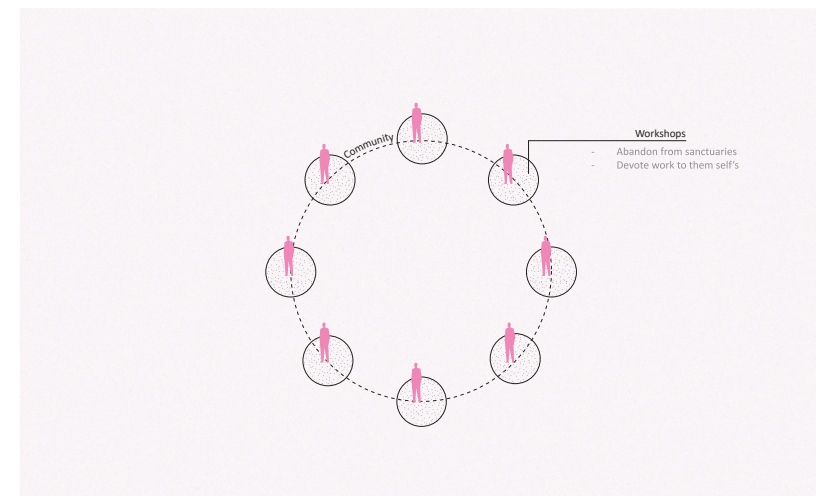
In contrary to the combined workshops in the Tiryns community. In the 10th century BC metalworks received their own workshops in the Greek empire (started in Olympia) which were bonded to sanctuaries. Their privileges eventually were matched by other crafts (potters, vase-painters, shipbuilders) in the 7th century BC. From the 6th century BC workshops abandon themselves from the sanctuaries and started to devote their work to themselves by placing their names and paintings on it⁷.



[5] Diagrammatic representation of the workshop community and the social network within the Greek empire 700 BC. - Illustration by Author



[4] Diagrammatic representation of the workshop community and the social network within the Greek empire 1000 - 800 BC. - Illustration by Author

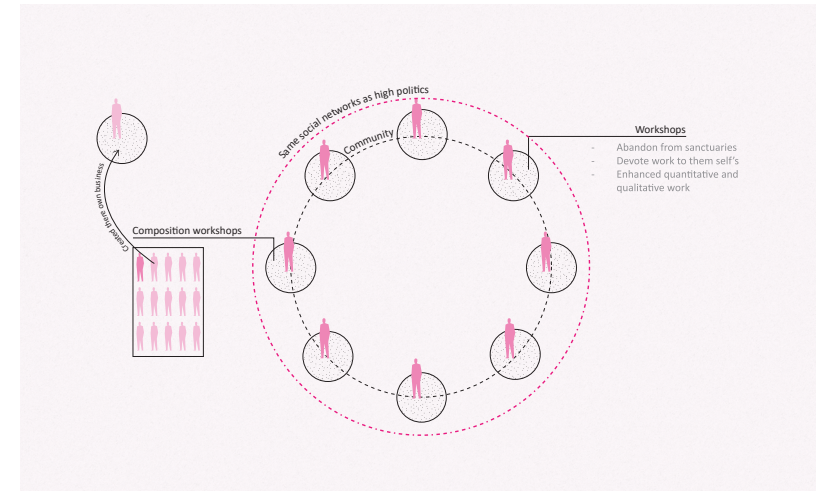


[6] Diagrammatic representation of the workshop community and the social network within the Greek empire 600 BC. - Illustration by Author

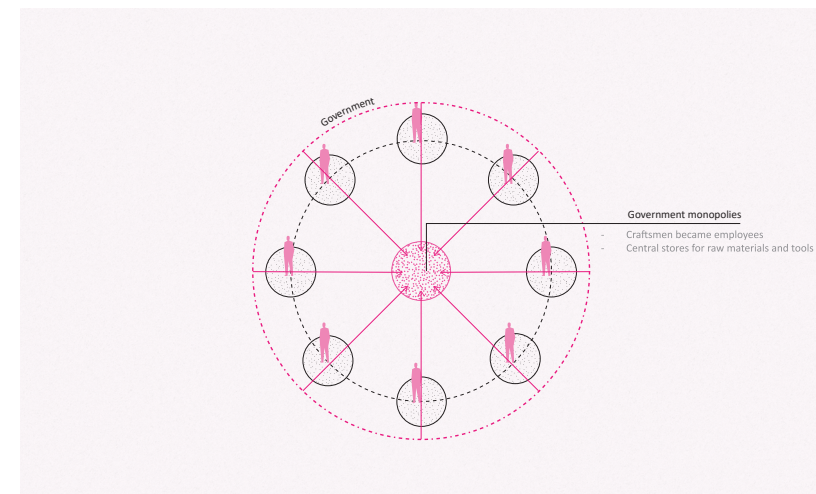
1a. Development of the Workshop

The Greek Empire (600 - 100 BC.)

At the beginning of the 5th century BC, the craftsmanship and workshops get another boost, because good work became admired by high culture politics. Which enhanced the quantitative and qualitative work of the craftsman. Because that created the opportunity to be in the same social networks as high politics. In this time, an usual size workshop had a craft specialist (the boss), sometimes some employees (craftsman/apprentices), and several slaves. During this time, the interesting was, that privileged, specialised, skilled slaves could set up their own Business by their masters. This created that specialised craftsman were found as far as the borders of Russia and the Alps working under commission of local employers⁸. From the 5th century BC till the 2nd century BC there was a lot of growth of the Greek system. But in the 2nd century BC, there was a kind of fall back to a palace-centred system like the Tiryns. Because products became nationalised, the products became government monopolies. Within these crafts, craftsmen became governmental employees with salaries. The workers got the needed raw materials and tools from central stores. Large enterprises like metalworkers and brick-makers felt under this system⁹.



[7] Diagrammatic representation of the workshop community and the social network within the Greek empire, 500 BC. - Illustration by Author

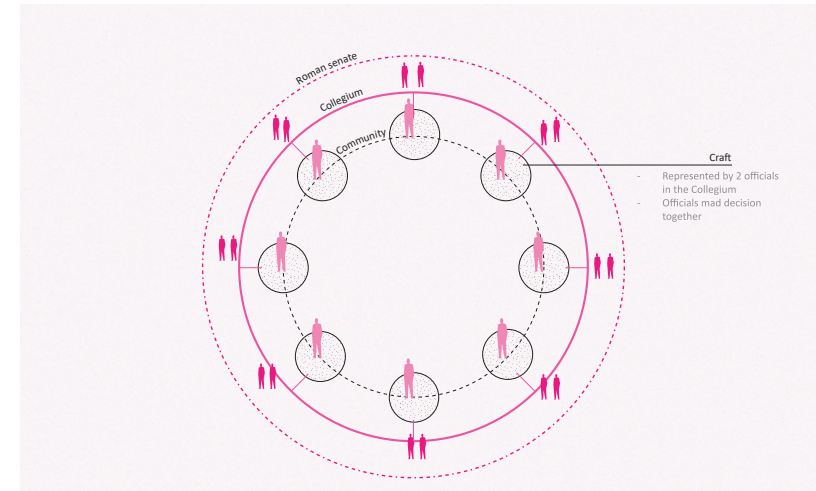


[8] Diagrammatic representation of the workshop community and the social network within the Greek empire, 200 - 100 BC. - Illustration by Author

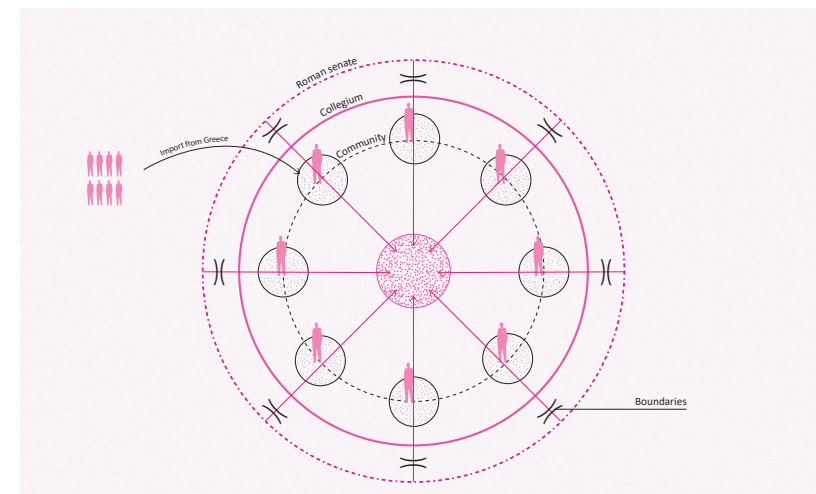
1a. Development of the Workshop

The Roman Empire (500 BC. - 300)

In 500 BC the traditional workshops and the crafts that took place there were organised in the community by the collegium, which is a board of officials filled by two officials of every craft. These officials made the decision together. They were not the same as the Roman senate¹⁰. With the beginning of the Roman empire (around 20 BC), the craft production was a continuation of Greek principles. They even imported highly skilled craftsman from Greek. During this time, people from the collegium tried to create a barrier between the politicians and the craftsman.



[9] Diagrammatic representation of the workshop community and the social network within the Roman empire, 500 BC. - Illustration by Author

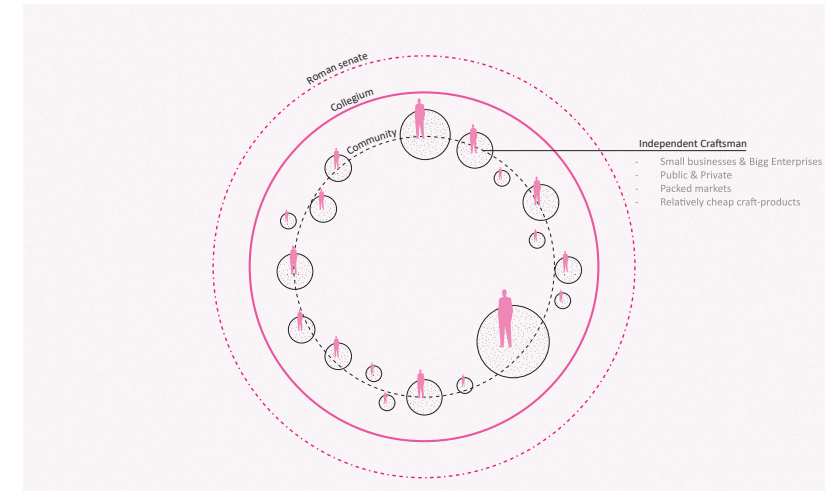


[10] Diagrammatic representation of the workshop community and the social network within the Roman empire, 20 BC. - 300 - Illustration by Author

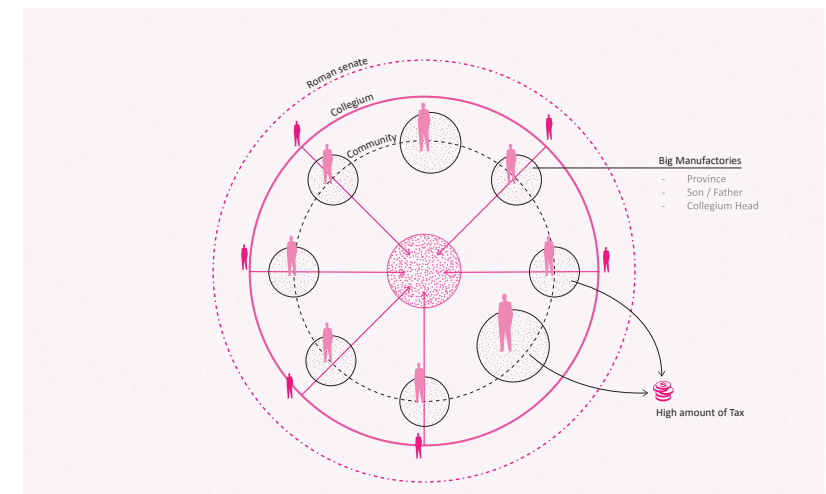
1a. Development of the Workshop

The Roman Empire (20 BC. - 300+)

The Roman senate was not totally in favour of this barrier. But in the end, old monopolies were broken, which created a lot of small independent craftsman working public and private. Also, big private-enterprises developed. This development created fully packed markets with relatively cheap craft products¹¹. Then during the so-called crisis of the 3rd century, the Roman empire tried to centralised the craftmanship again. This affected the number of workshops, which decreased everywhere. In every province, big manufactories were established, regulated and represented by important figures from the collegium. In this time, sons followed their father's craft and corporations had to pay high taxes¹².



[11] Diagrammatic representation of the workshop community and the social network within the Roman empire, 20 BC. – 300 - Illustration by Author



[12] Diagrammatic representation of the workshop community and the social network within the Roman empire, 300 + - Illustration by Author

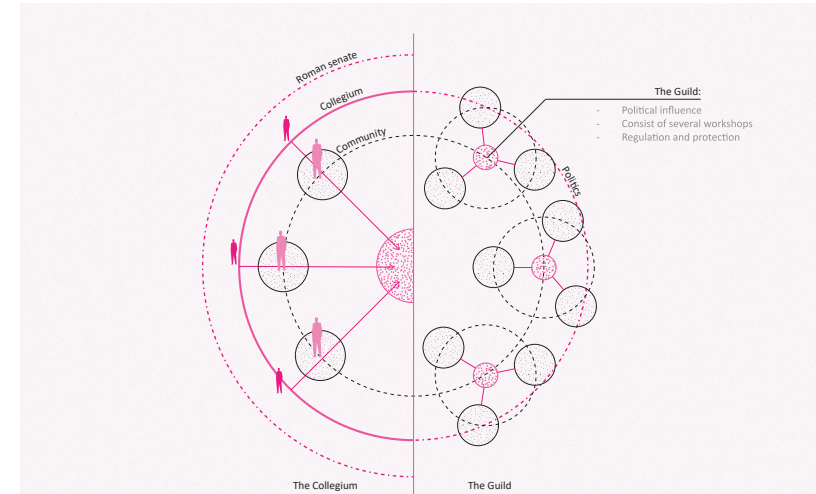
Regulation and representation of an important figure of the craft towards the government is crucial. In case of an educational system it is important that people from the craft profession represent the schools and the craft education towards the government, because they know best what the right moves are in case of educating young professionals. The head master of the school should be in that sense a **guild master**.

1a. Development of the Workshop

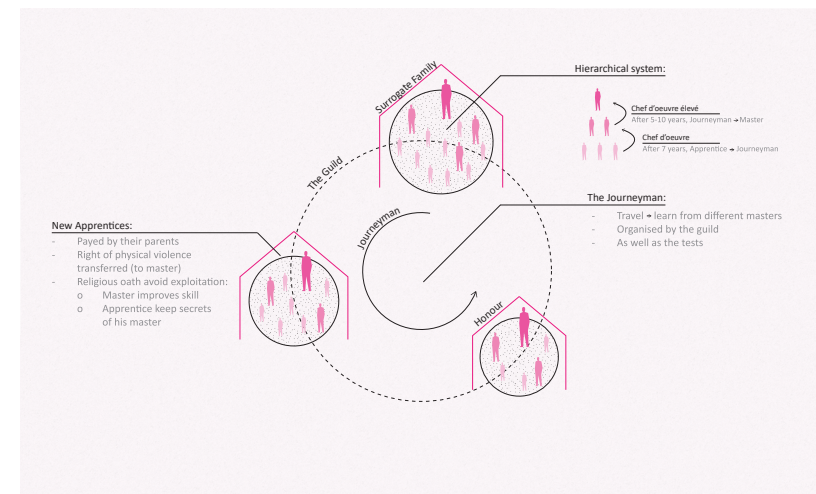
The Guild (Middle ages and Renaissance) (1200+)

During the late middle ages (around 1200) the craft guilds appeared, which can be seen as a development of the **collegium**. Nevertheless, there was an important difference between the guild and the collegium. It seems that the collegium didn't have much influence political wise, and mainly functioned as a representation of a particular craft profession. On the contrary, the guild, due to their economic leverage had a huge influence political wise¹³. The guilds were **communities** to which workshop were connected. As illustrated with 'The Livre des métiers' in which hundred different crafts (workshops) were divided into six groups; furs, foods, metals, jewellery, clothiers, textiles, and buildings¹⁴. The main goals of the guilds where regulation and protection, the guilds created relations of trust between there members, facilitated lower transaction costs, enhanced innovations, and controlled the market¹⁵. During the time of the guilds, the workshop was traditionally seen as the home of the craftsman. He worked in the place where he raised his kids, slept and ate¹⁶. The medieval guilds were based on hierarchy, in which there where three levels; the apprentice, the journeyman, and the master. As an apprentice, you could promote to a journeyman after seven years by successfully doing the chef d'oeuvre. After becoming a journeyman, I took you approximately five to ten years to promote again, by doing the Chef d'oeuvre élevé, in which you proved you were worthy of taking the place of the master¹⁷. For the journeyman, it was possible to travel to other workshops, which created the opportunity to learn from different masters.

→ Mapping the area, p.96



[13] Diagrammatic representation of the workshop community and the social network within the Middle ages and Renaissance, 1200+ - Illustration by Author



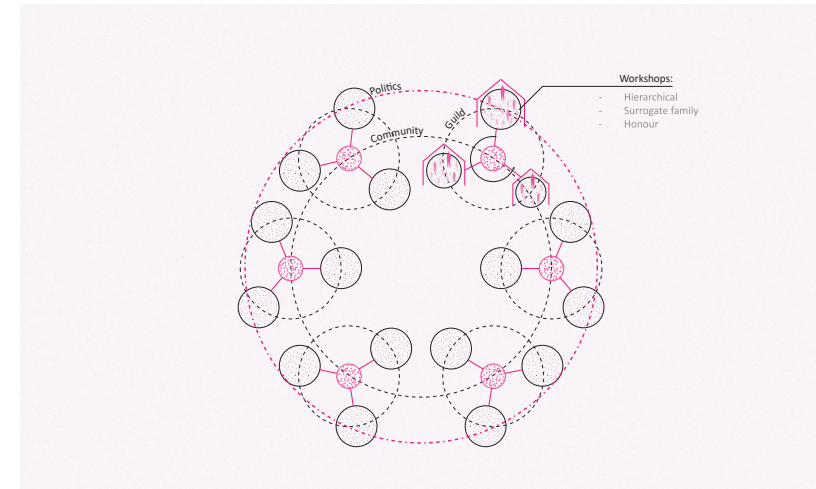
[14] Diagrammatic representation of the workshop community and the social network within the Middle ages and Renaissance, The Guild - Illustration by Author

Important for the new craft school is that the students learn and work at the same time, as in the guilds. In which there are different levels of education, which goes from the general education of a craft to specializing particular skills within the craft. In this system the teachers that educate the students are also the colleague of the students of a higher rank. As the journeyman travels to different workshops of the same guild, the students should do internships at nearby workshops or ateliers.

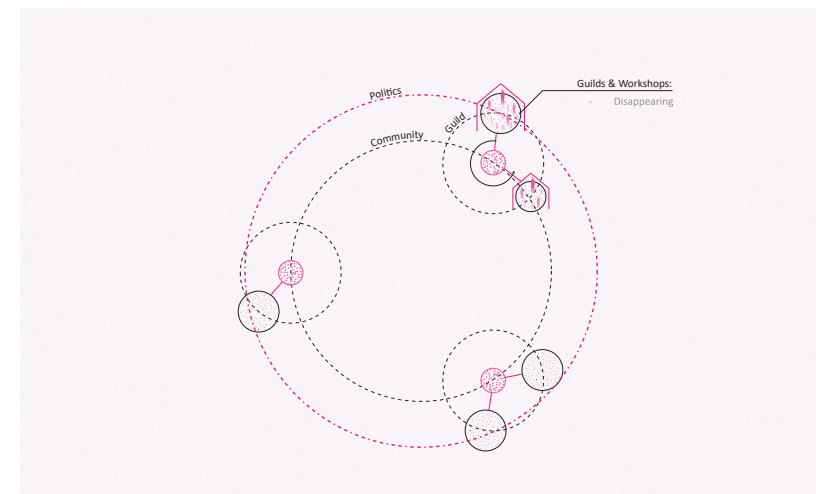
1a. Development of the Workshop

The Guild (Middle ages and Renaissance) (1200 - 1900)

At that time, this was organised by the guilds. Also, the two tests were organised by them¹⁸. The education cost of the new apprentices was most often paid by their parents. Furthermore, the right to punish misbehaviour with physical violence was transferred from their birth father to the master (which became his surrogate father, the workshop was based on a surrogate family)¹⁹. To avoid exploitation of the master, by using the apprentice as cheap labour, the master had to take a religious oath in which he agrees he will improve the skill of the apprentice. On the other hand, the apprentice had to take a religious oath in which he agrees to keep the secrets of his master. The surrogate family of the workshop was based on honour²⁰. Most of the guilds started to vanish with the beginning of the industrial revolution at the beginning of the 19th century they were eventual abolished at the end of the 19th century.



[15] Diagrammatic representation of the workshop community and the social network within the Middle ages and Renaissance, 1200 – 1800 - Illustration by Author



[16] Diagrammatic representation of the workshop community and the social network within the Middle ages and Renaissance, 1800+ - Illustration by Author

1a. Development of the Workshop

Industrial Revolution (1800 - 1900)

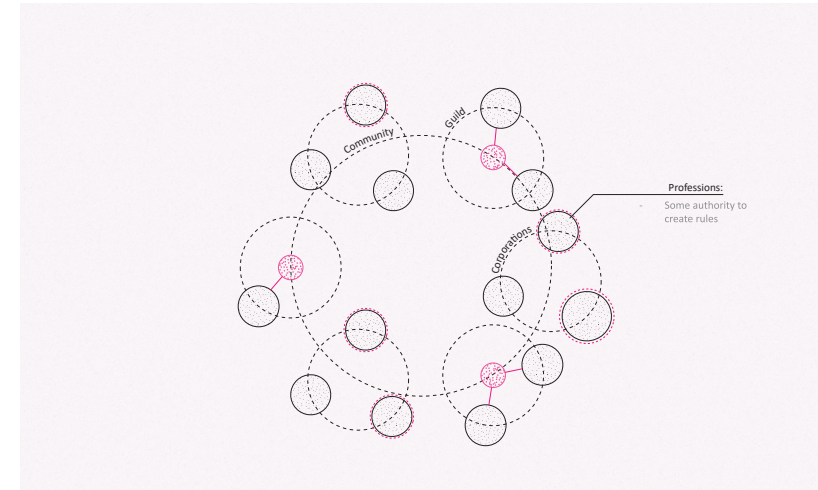


The Guild
(Middle ages and
Renaissance),
p.18

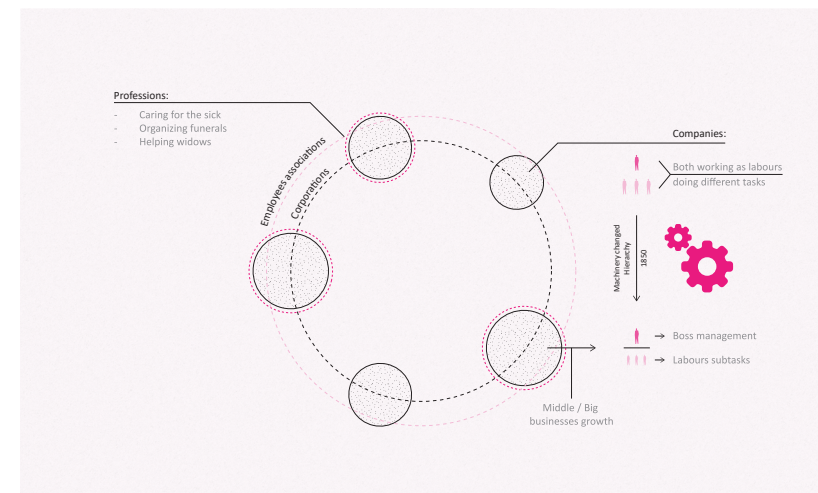


Production, p42

At the beginning of the 19th century during the industrial revolution, most of the **guilds** vanished, and corporations took their place. Within these corporations, some professions had the authority to create rules²¹. At the beginning there were the same hierarchies, there was a boss (master) and employees. This hierarchical system changed when the machinery was introduced around 1850, because of the **machinery** middle/big businesses growth, which created more distance between the boss and the employee. You couldn't find the boss in the workplace anymore, and employees only had subtasks, which caused they couldn't do each other's work. This resulted in that employees were not able to grow within the company because they were not educated enough²². At the end of the 19th century, the companies recognised this problem and business schools were established. Besides the machines that were introduced around 1850, the employees' associations were founded. Initially, they were sociability clubs, which organised things for their members like; taking care of the sick, organising funerals, and helping the widows²³.



[17] Diagrammatic representation of the workshop community and the social network within the Industrial revolution, 1800 - Illustration by Author

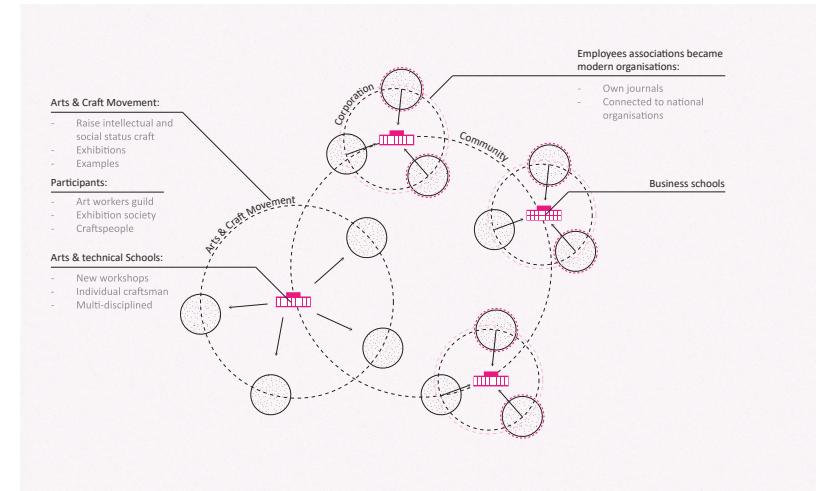


[18] Diagrammatic representation of the workshop community and the social network within the Industrial revolution, The Corporation - Illustration by Author

1a. Development of the Workshop

Industrial Revolution (1800 - 1900)

During the late 19th centuries also the workers recognised that they have to step up for themselves and the employees' associations became a modern organisation with their own journals. These local organisations were most often connected to national organisations²⁴. At the same time, in the late 19th century, the Arts and Craft movement arise in the United Kingdom. Which was a reaction on the damaging effect of the machinery that the industrial revolution brought with it and to enhance the status of the decorative arts²⁵. They tried to raise the intellectual and social status of the craft by exhibitions in which examples of their work were shown. The arts and craft movement consisted of different societies; the art workers guild, the exhibition society, and craftspeople from small workshops and manufacturing companies²⁶. This eventually led to new art and technical schools which stimulated the generation of new workshops and individual craftsmen. These new group of craftsmen was multi-disciplined and performed different crafts simultaneously²⁷.



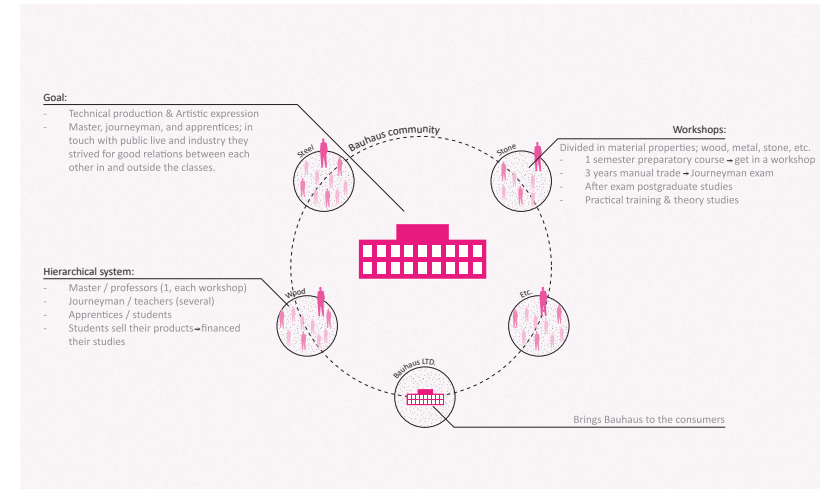
[19] Diagrammatic representation of the workshop community and the social network within the Industrial revolution, 1850 – 1900 - Illustration by Author

1a. Development of the Workshop

20th century (1900 - 2000)

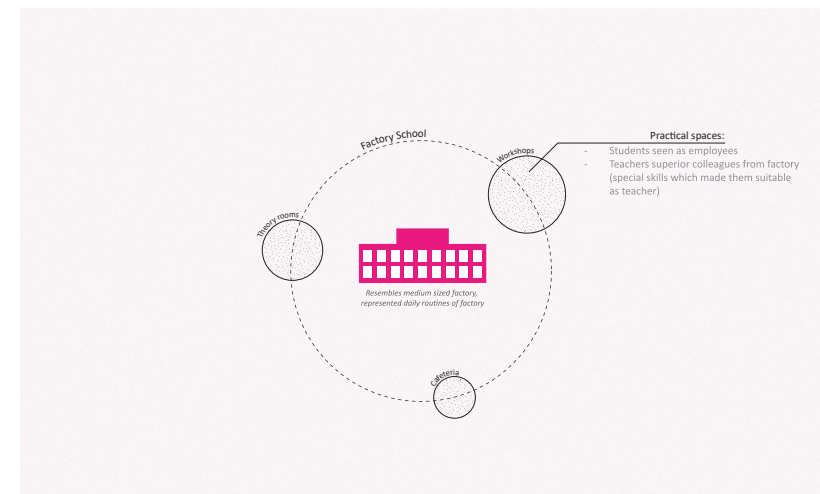
Following the footsteps of the Arts and Craft movement, Bauhaus was established in 1919 as a reaction on the Industrial Revolution. It emerged from the Deutscher Werkbund²⁸. Bauhaus goal was to reconnect the areas of technical production and artistic expression, which was separated by industrial production. Within this, functionalism was the most important design principle. In 1925 Bauhaus moved from Weimar to Dessau, where the famous Bauhaus school was built. With this move, Bauhaus became an Academy for design in which the former masters became professors and the pupils became students and gain the opportunity to get a Bauhaus diploma²⁹. Besides the system that changed the offered workshops changed as well. In the new Bauhaus Academy, the woodcarving and stone sculpture workshops where, in 1929, replaced with a more modern department, the plastic workshop³⁰. Furthermore, in 1925 the Bauhaus Ltd was founded, which was responsible for bringing the Bauhaus industry to the consumer. The hierarchical system was originally formed like the **guild**; a master, several journeymen and the apprentices. The education form was different. First, the new students had a one-semester preparatory course, which had to be completed successfully to get accepted in one of the Bauhaus workshops³¹. After the preparatory course, students got three-years of manual trades in their workshop, ending with the journeyman exam. Where after the student was able to start their postgraduate studies. Every workshop was headed by a master, which later on became the professor³². The workshops divided into material properties; wood, metal, stone, etc. within the workshop, the student got theory studies and practical training³³. The main goal of the education system of the Bauhaus was to bring the master, journeyman, and apprentices closely in touch with the **public life** and industry. They strived for good relations between each other in and outside the classes³⁴. Because of this relationship with the public and industry students were able to sell their products which eventually financed their studies³⁵.

Besides the particular arts and craft school like the Bauhaus, also other more practical schools arise in the 20th century. These practical school will be described based on the factory school: Hoogovens training centre, completed in 1966³⁶. The Hoogovens training centre is an initiative from the Royal Dutch Steel Factory Works in IJmuiden. The school resembles a medium-sized factory, where the students were trained and eventually recruited for the company. The whole system of the school was built around the daily routines of employees of the real factory³⁷. Whereby the students, all boys, were seen as employees as well. Within the school there where three kinds of spaces; workshops (practical spaces), Theory rooms, and the cafeteria (in connection to the workshop floor to persuade the student to work for the steel factory)³⁸. The hierarchy in the school was the same as in the factory, teachers where your superior colleagues from the factory. Which had a particular skill which made them suitable as a teacher.



[20] Diagrammatic representation of the workshop community and the social network within the 20th century, Bauhaus - Illustration by Author

Concerning the education system, Bauhaus looks a lot like the guild system. The only important difference is that Bauhaus focusses on the connection with the consumer by using the Bauhaus LTD. Which in case of the new craft school is important, to bring the young professionals in contact with the consumer. In this way graduated students are ready to enter the market when they are finished with these studies. Furthermore the Bauhaus is focussing not only on the craft of technical production but also on the artistic expression, which gives the craft a higher value.



[21] Diagrammatic representation of the workshop community and the social network within the 20th century, Factory School - Illustration by Author

Important of the factory school is that students been seen as employees, and that they are educated in an environment that resembles a small factory. Which makes them more familiar with the environment where the end up in, but also these them to start working in these kind of environments. Besides that, at the factory school the teachers are professionals with special skills which they learn there students.

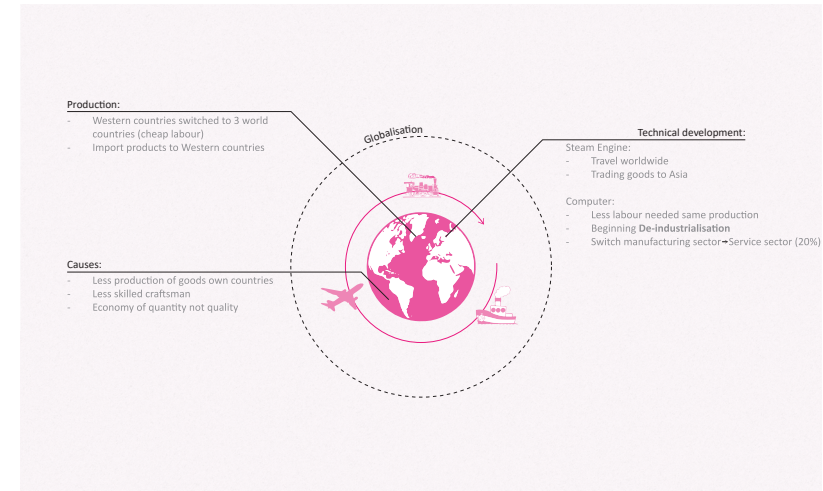
←
The Guild
(Middle ages and
Renaissance),
p.18

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Mapping the
area, p.96

1a. Development of the Workshop

20th century (1900 - 2000)

Something more worldwide which occurred in the 20th century, but already started in the 19th century was globalisation. Because of our technical developments (steam engines) part (10%) of our European society was able to travel worldwide and with this wider our sales market. So, in the beginning, we were trading our goods to Asian countries³⁹. But with the development of technical possibilities in the 20th century, computers, for instance, less labour was needed to create the same production. This started the beginning of the deindustrialisation, which causes a switch from factory labours to the service sector⁴⁰. People became economically wealthier, and in 1994, 20% of the European people working in the manufacturing sector switch to the service sector⁴¹. Because of the globalisation, western countries started to produce their products in third world countries as it was much cheaper due to the labour cost⁴². As a consequence, we are now importing products from these Asian countries, because they are cheaper. To conclude, globalisation and deindustrialisation cause lesser production of goods in our own countries which created that there are less skilled craftsman. Besides that, the most of the European customers are not willing to pay for a locally produced high-quality product that is twice as expensive as a lesser quality product imported from China⁴³. So there is just a small sales market for the local craftsman.



[22] Diagrammatic representation of the workshop community and the social network within the 20th century, Globalisation - Illustration by Author

1a. Development of the Workshop

21st century (2000+)

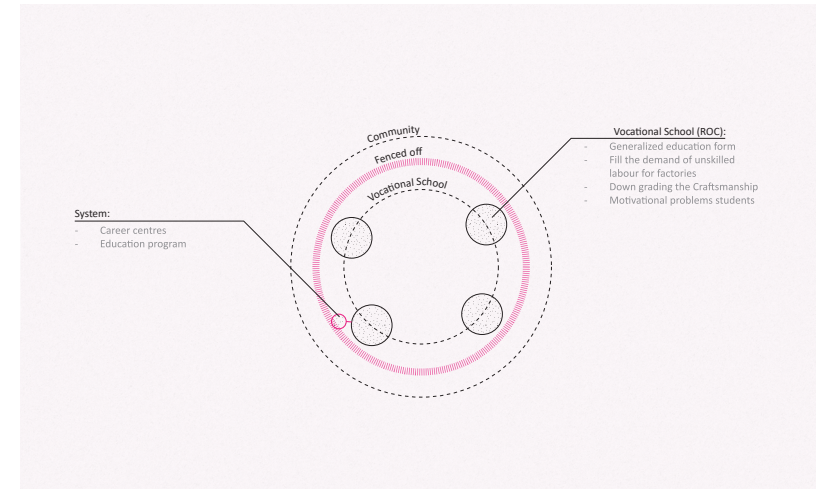
About the 21st century, three systems (workshop types) will be discussed; the vocational school, ateliers, and online craft platforms. The vocational school started to become a full-time education, flourishing after the second world war, with the main task of making the youth “industrial-minded”⁴⁴. Because after the second world war, there was more significant demand for semi- and unskilled labourers, the vocational education became **generalised**⁴⁵. This generalisation affected the development of craftsman; the education of crafts skills shifted to more abstract and theoretical knowledge. Because of this reduction in craft orientated education, motivation problems emerged between the students in 1960. Most of the student only went to school because it was mandatory⁴⁶. Besides that, the transition from the manufacturing sector to the service sector, described in the previous chapter, triggered the change of vocational education even more. Eventually around 1995 the vocational schools where reorganised; smaller schools in the cities where sold and replaced by massive property developments in the urban periphery⁴⁷. Instead of 500 MBO schools spread through the Netherland, 50 ROC’s (regional vocational education centres) where established⁴⁸. Because of this, the buildings became isolated and fenced off of society⁴⁹. To forge a better connection between the students from these ROC’s and the society, the ROC’s created ‘career centre’ additionally to their education program. But as Jan Geurts remarks; the ROC’s shouldn’t add a career centre but be a career centre⁵⁰. Besides that, it is crucial that the vocational institutes stay connected. Otherwise, they will not be relevant in the future. To be relevant, they need to be a cultural and social endeavour, not only a property development⁵¹. The student needs to feel that they are part of a community, the student can relate to their profession in the future, and there position in society⁵².

Because of the leg of practical training at the vocational schools, companies will train their students from the vocational school themselves. This will not provide the students with a diploma, but it gives them an indication of their competence which, according to Ruud Vis is way more relevant⁵³. This is a solution for the companies working with craftspeople to keep the practical level of their new employees high enough. Next to this initiative from the companies, it also works the other way around. Motivated students from the vocational school approach craftspeople to learn the skill and techniques from them. Students choose to do **on-job training** which they combined with one day of school, for instance⁵⁴. Because of this, the student is able to learn from the craftsman that where trained in the old system, which made them highly skilled in their profession. This significant small groups of student that are motivated most of the time end up working for their teachers or start a small atelier themselves. Because there are not much-motivated students, it is hard for a craftsman to find people with the drive to learn their skill. The majority of the vocational student, do not see themselves working in this kind of craft environment⁵⁵. Because of the small size of most of the ateliers/companies colleagues in the craft world ask each other for help if they have bigger commissions. They **help each other** with providing work.

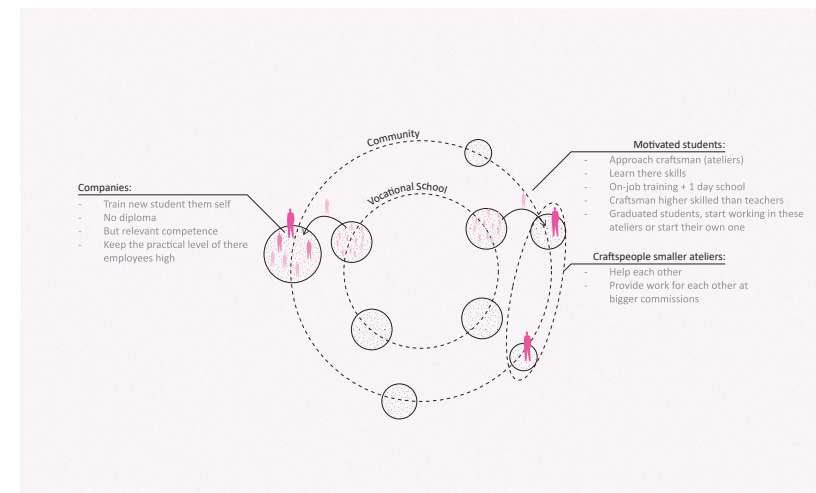
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Industrial
Revolution, p.22

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area, p.96



[23] Diagrammatic representation of the workshop community and the social network within the 21st century, ROC - Illustration by Author



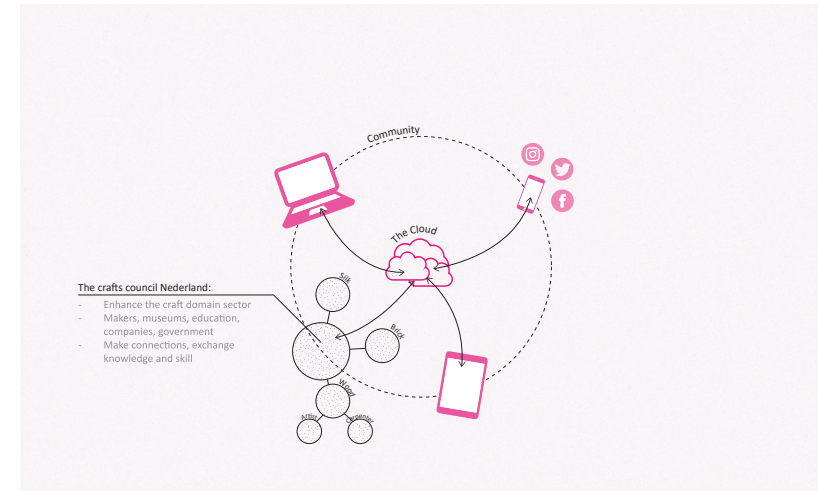
[24] Diagrammatic representation of the workshop community and the social network within the 21st century, Ateliers - Illustration by Author

Important feature of the ateliers is that they learn student the craft by on-job training. Which again should be related to the new craft school system as learning while doing.

1a. Development of the Workshop

21st century (2000+)

Something completely different but definitely from this century is the online platforms, where they provide craft knowledge to the mass. Platforms like; Twitter, Facebook, and Instagram but also more specific platforms like the 'Crafts Council Nederland'. Established in 2012, the Crafts Council Nederland's goal is to enhance the Craft domain sector and make it noticeable⁵⁶. They connect the crafts community; makers, museums, education, companies, and the government. To make a connection between people who have the craft knowledge/skills and people who want to learn this kind of knowledge/skills. They established an online platform as a podium for the craft domain. On their website, you can search for crafts, with the 'craftsmap', linked to materials and companies/ateliers that are connected to these crafts. But also for materials, which are connected to certain craftsmanship and again their companies & ateliers.



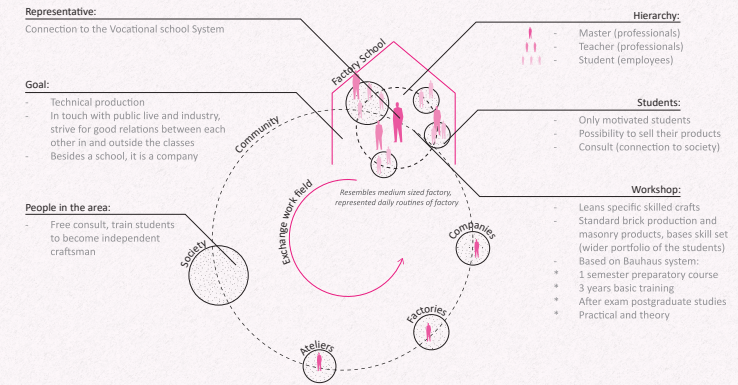
[25] Diagrammatic representation of the workshop community and the social network within the 21st century, Crafts Council - Illustration by Author

1a. Development of the Workshop

Position

After researching the different workshop I am now able to formulate my position towards the new craft school. The new craft school, should be like the factory school. Where the student are constantly in contact with the working environment. In which the school system functions as a combination of The guild and Bauhaus, learning by going through different levels of specialisation. First the student should learn in general, what the craft consist of. In my case learning in general the **production** and the **implementation** of ceramic bricks. After one or two years the students should be ready to specialise them self in more difficult tasks. As the guild it is important that school should function as work orientated atelier, which is in connected to the smaller shops, ateliers, factories in the area to transfer knowledge and skill. From the Bauhaus it is important to look into the social system within the school; students, teachers and masters are equal, and have an good relation with the community. Students should be placed in a position that they have to connect with this community, by selling their production or by giving advise as working persons. This is again overlapping with the factory school, students are seen as employees, to prepare them for the real work. The 'factory school' doesn't sound as a particular craft school, but I think that we need to embrace the mechanisation and see how we can still continue delivering high quality products. As William Morris, of the Arts & Craft movement explains. The machines are not entirely the problem, but the system in which we use them is. Breaking the manufacturing of an object into small tasks, created weak relationships with the results of their labour⁵⁷. At the new craft school, the students need to learn the opposite. They will learn to do the full production process in order to deliver high quality products.

→
Production, p.42
→
Masonry
Techniques,
p.56



[26] Diagrammatic representation of the workshop community and the social network within the concluding diagram, The new craft school - Illustration by Author

C R A F T

The production and implementation of ceramic brick

In this chapter the different production methods and implementation techniques of ceramic brick will be explained. While doing this the different machinery and products needed for this process will be highlighted, in order to find out what kind of

spaces and machines the new craft school for ceramics need to function properly. Furthermore the special technique of making form bricks will be explained through an interview taken at the brick factory the Zilverschoon in Randwijk.



2a. Material Biography

Why Ceramic Bricks?

The quality of brick appeals to me because, it can be used in both a sculptural and compositional way, in which the dedication and personal commitment of the architect and bricklayer stands out. Nevertheless, in my opinion, this craftmanship is disappearing in the new buildings that are been build. Nowadays distinctive bonds are rare to be found, and most often simple bonds made from the most basic and cheapest bricks are been used in order to save money. Furthermore because of the automation prefab panels glued with brick strips become more and more attractive to use. Which brings the craftmanship of making and implementing bricks even more in decline. For these reason I think the new craft school for ceramics should mainly focus on a specific kind of brick, “the form brick”, which big factories don’t make because it is not profitable for them. Another feature of the form brick is that they are mainly used for renovation projects, which make them indispensable because renovation projects keep existing. By doing this the school stands out against the big factories. In order to learn this specific skill the student should learn first the basics of producing and implementing bricks, to become valuable craftsman.

2a. Material Biography

History

Ceramic brick work was first used around 6000 BC in Mesopotamia (currently the region of Iraq and Noord-East Syria). In that time they created sun dried mud bricks reinforced with straws, formed by hand. The dried bricks were stacked to build small homes, but also, huge buildings like the Ziggurat (Pyramid build out of staircases).

In the Western-world not much brick was used till 600 BC, because the **Greek** used blocks of natural stone for their buildings. But this changed around 600 BC, when the **Romans** start using bricks, these bricks were relatively big (500 mm wide). The Romans used mortar to connect the bricks for their buildings, in which they used new construction possibilities like **arch- and vault structures**.

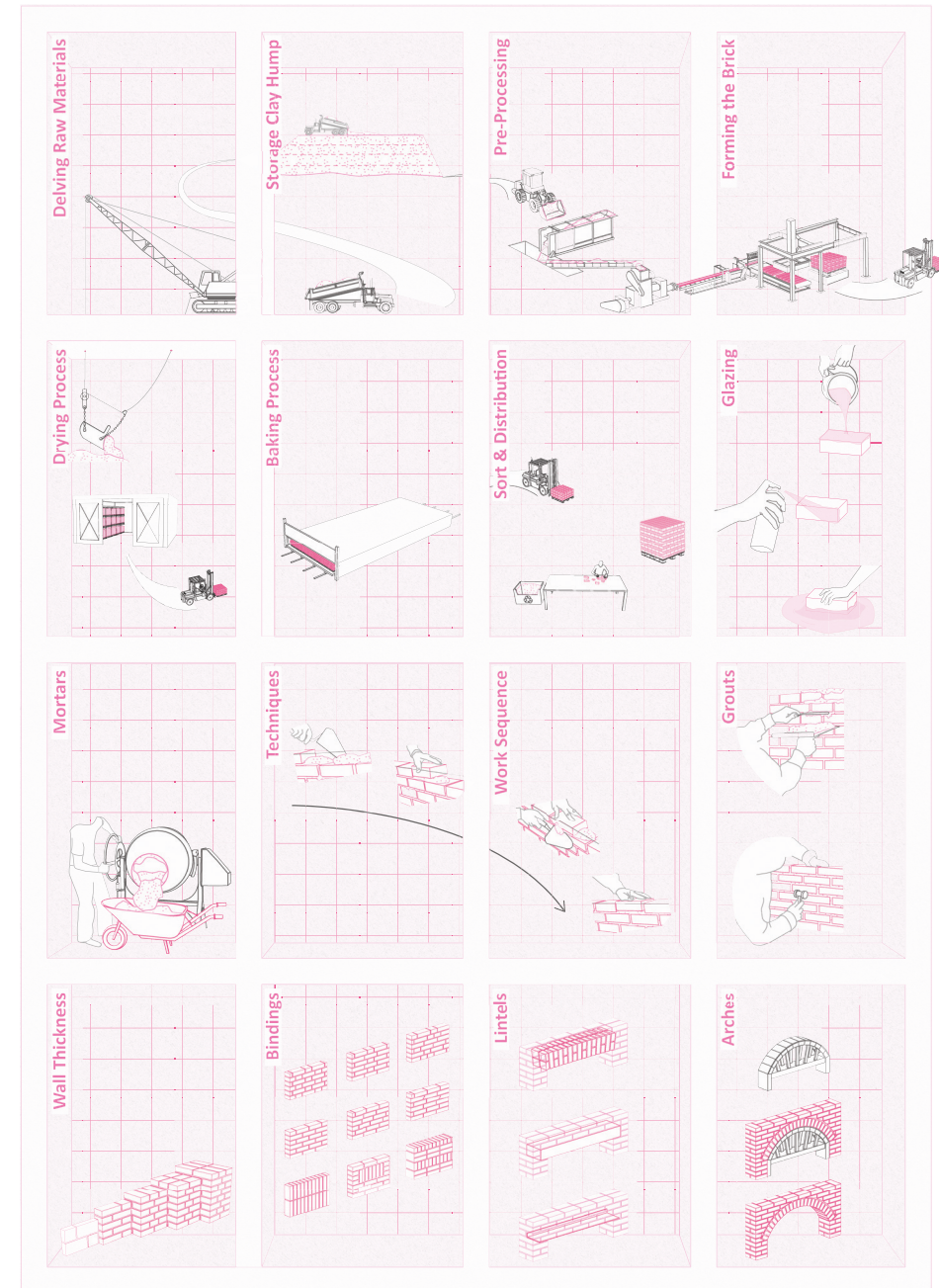
The knowledge of brick making disappeared with the fall of the Roman Empire. It lasted till 1000 AC, because during the Romanesque period brick was re-introduced in the Gothic architecture, after it was long gone. During this period the craft of brick making and stacking was not seen as a theory but was carried out as a tradition.

During the Age of Enlightenment (1715-1800) a lot of new innovated theories were developed, especially for the use of metals and glass. For brick on the other hand, no theories were developed and the craft was still based on traditions and skill of the craftsman. This changed in 1900 when rules and norms were introduced along with technology about concrete.

←
The Greek
Empire, p.10

←
The Roman
Empire, p.14

→
Openings (lintels
& arches), p.70



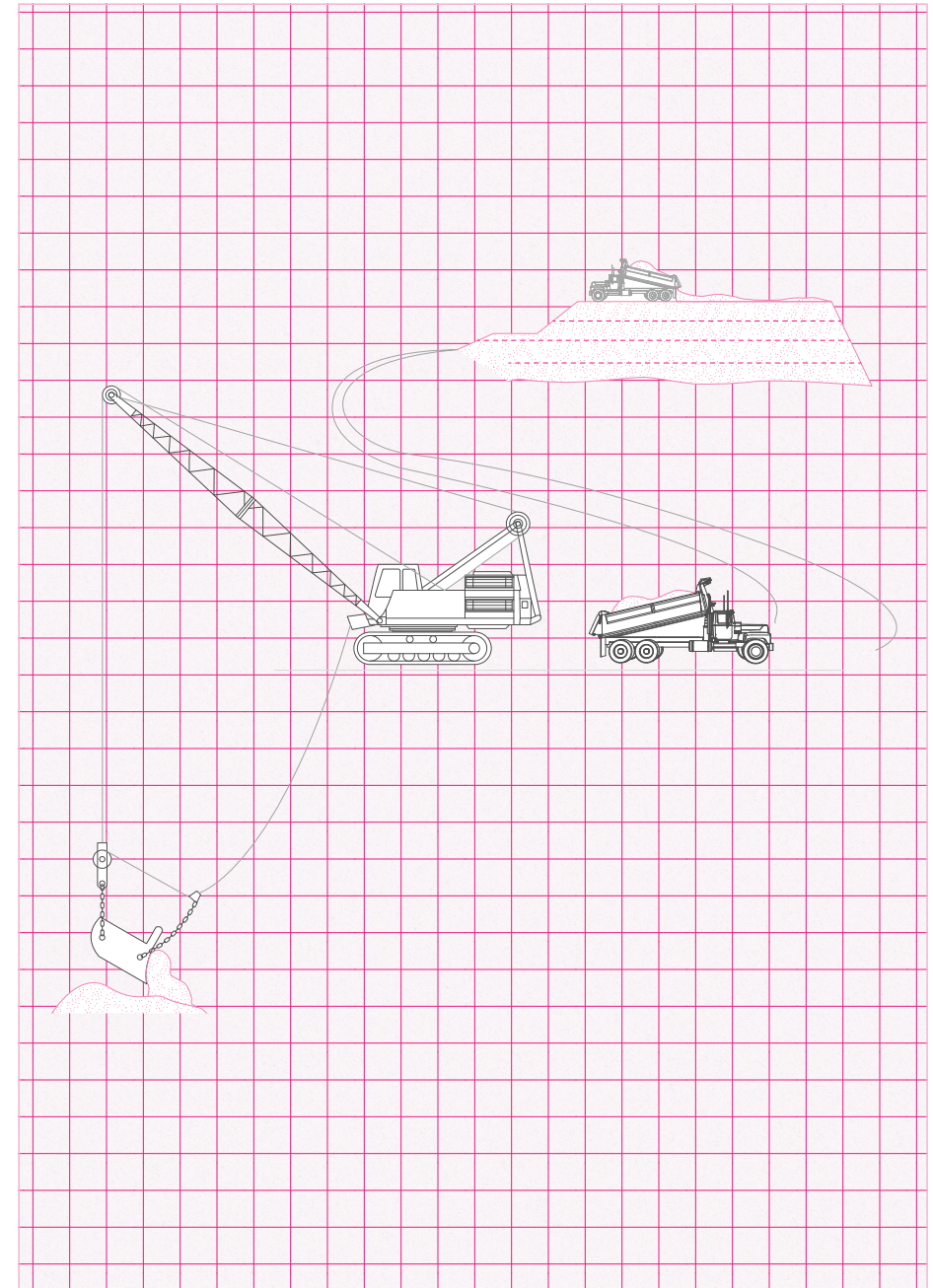
[28] Overview ceramic bricks, production and masonry techniques - Illustration by Author

2b. Production

Delving Raw Materials

The huge variety in clay types, explains the long tradition of ceramic industry in the Netherlands. Clay consist of inorganic and organic parts. The inorganic parts consist of Silicon bonds, diverging from grain size and small amounts of minerals (Fe₂O₃ Iron and CaO Lime) which influence the colour of the brick. The characteristics of the clay are not only defined by its minerals but also by its grain size and grain structure. In order to get the right grain size and structure; the sieve method is used. With the sieve method the loam and sand content in the clay can be defined, which is important for the type and colour of the brick. Low amount of loam or skimmed clay (20% of loam) is used for Handvorm- and Vorm brick. While high amount of loam fat clay (+/- 50% of loam) is used for (roof) tiles, pipes and Strengpers bricks.

Due to the modern transportation techniques factories are not depended anymore on local raw material delving. Nowadays factories are able to purchase raw materials oriented on the market. The clay is delved by draglines, placed in trucks, and transported to factories. At the factories the clay is put on a clay hump (kleibult) which can be done outside or in a shed. By placing the clay in a shed it is protected against the weather (rain and frost). This is for some techniques (Strengperstechniek) important, because the clay mass is more sensitive. For Vormbak techniques it is not important for instance. The stock (clay hump) is beside the logistic role, important for the consistency of the clay quality. The minerals and the grain size of different shipments need to be equalised. This is done by placing the shipments in horizontal layers on the clay hump. While the clay hump is excavated in a vertical way. Because of this every excavated hump of clay consist of the same mixture of layers.



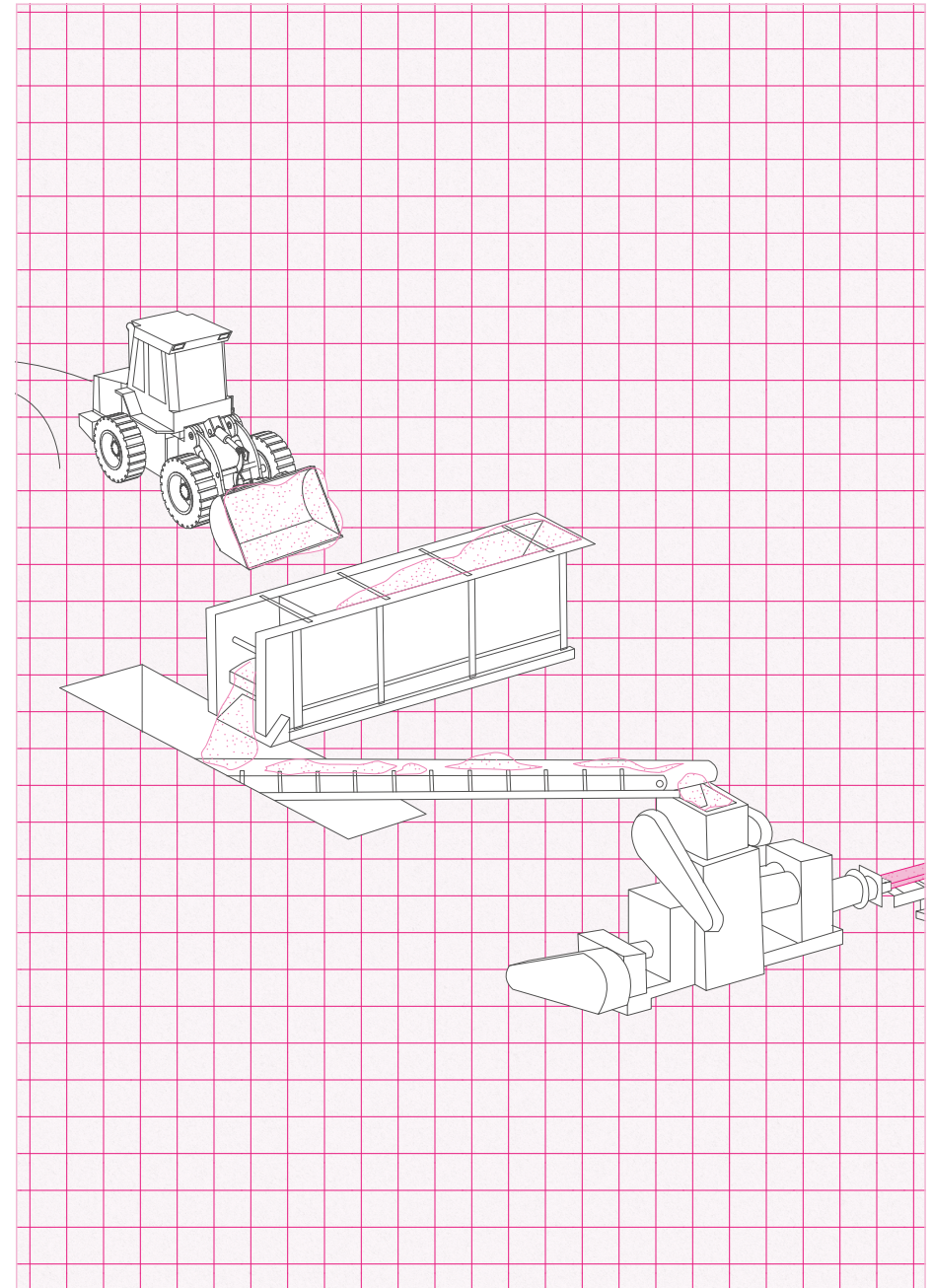
[29] Delving raw materials - Illustration by Author

Implement in project:
 - Storage for clay hump (kleibult)
 - Approachable for trucks

2b. Production

Pre-processing

During the pre-processing the clay, is kneaded and blend to a plastic and smooth material. From the stock the clay is transferred by truck or front loaders to the box feeder (1 m wide, 5/10 m long). The bottom of the box feeder, slowly moves forward, while the clay is scraped from the belt by a winder. Different types of clay can be blend in the machine and additives can be added in precise dosages. In this phase metals and stones are removed from the clay. For the pre-processing diverse machines are available, each factories use different ones which depends on the raw material they use and the production method. The machines are; rollers, graters, and blenders. In this production phase most often water and steam is added to the clay. The right amount of water gives the clay the correct consistency, while the steam improves the clay plastic properties.



[30] Pre-processing - Illustration by Author

Implement in project:

- Front loader
- Box feeder (1m wide, 5- 10 m long)

- Rollers, graters & blenders
- Water & steam supply

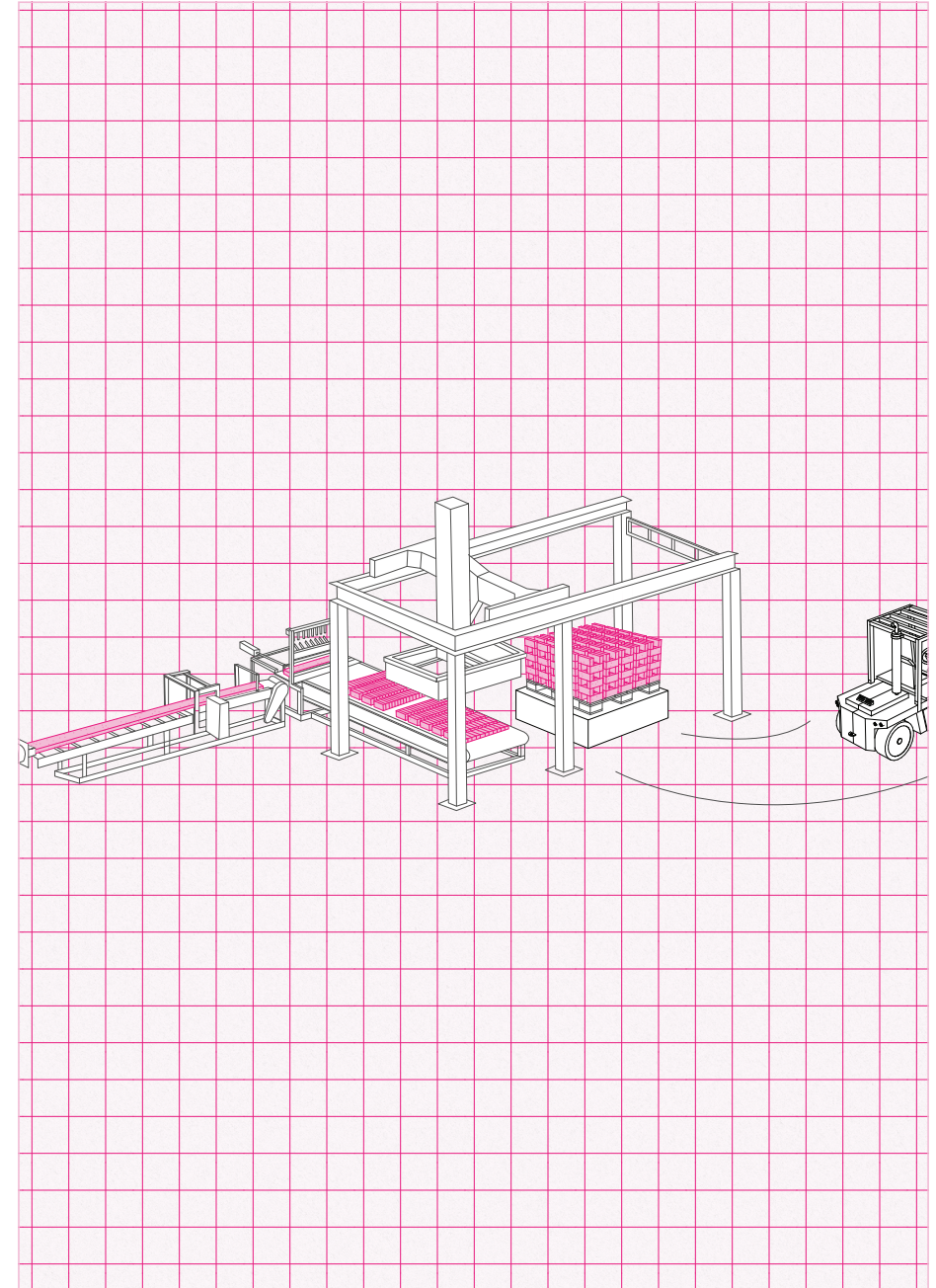
2b. Production

Forming the Brick



Interview, p.74

In the Netherlands there are 4 methods to form a brick. The first method, **Handvormen**; in this process a wooden frame with one of more compartments the size of a brick is used as a mould. The compartments are cleaned with water and sprinkled with sand (so the clay doesn't stick to the frame). Where then a ball of clay is thrown in with force, after all the compartments are filled the excesses clay will be removed with a thread. The frame will be turned and the bricks will fall on a platform that will transfer the bricks to the next stage in the production process. The second method, **Vormbakmethode**; in this process the clay is not thrown in with force but pressed in a frame with brick size compartments. Because it is pressed the bricks get straight edges. The big machines can produce 40.000 bricks every hour. The third method, **Strengpers**; is the less advanced method. The clay is pushed by a screw to an opening with the size of a brick. From this opening an endless string of clay is pushed on a roller conveyor. At the end a precise configured thread is cutting the string with the thickness of a brick. Different than the Handvorm and Vormbak method is that the Strengpers method has the possibility to perforate the brick. This is possible because the setup piece at the end of the opening can be changed to a modified piece with a certain pattern in it. The Strengpers is also used for; roof tiles, pipes, and hollow wall elements. To make the brick even stiffer the clay can be vacuumed before it goes to the Strengpers. Afterward the bricks can be sprinkled with sand or sawdust to give it a different structure. The fourth method, **Vormstenen**; this is the most specific method of them all, this method is used to create bricks with a special form (round shapes, angled corners). To make these bricks a specific mould is created to form them. These bricks are for instance used for restoration purpose. Because this method is most often not in line with the production process of bigger automated factories they are made in smaller factories. Sometimes the bricks are after they are formed and dried send back to the bigger factories, in order to give them the same colour and structure during the baking process. But for a small amount of this Vormstenen, Periodieke ovens are used. Because the creation of this brick is labour intensive the bricks are very pricy.



[31] Forming the Brick - Illustration by Author

Implement in project:
- Strengpers
- Sand Storage

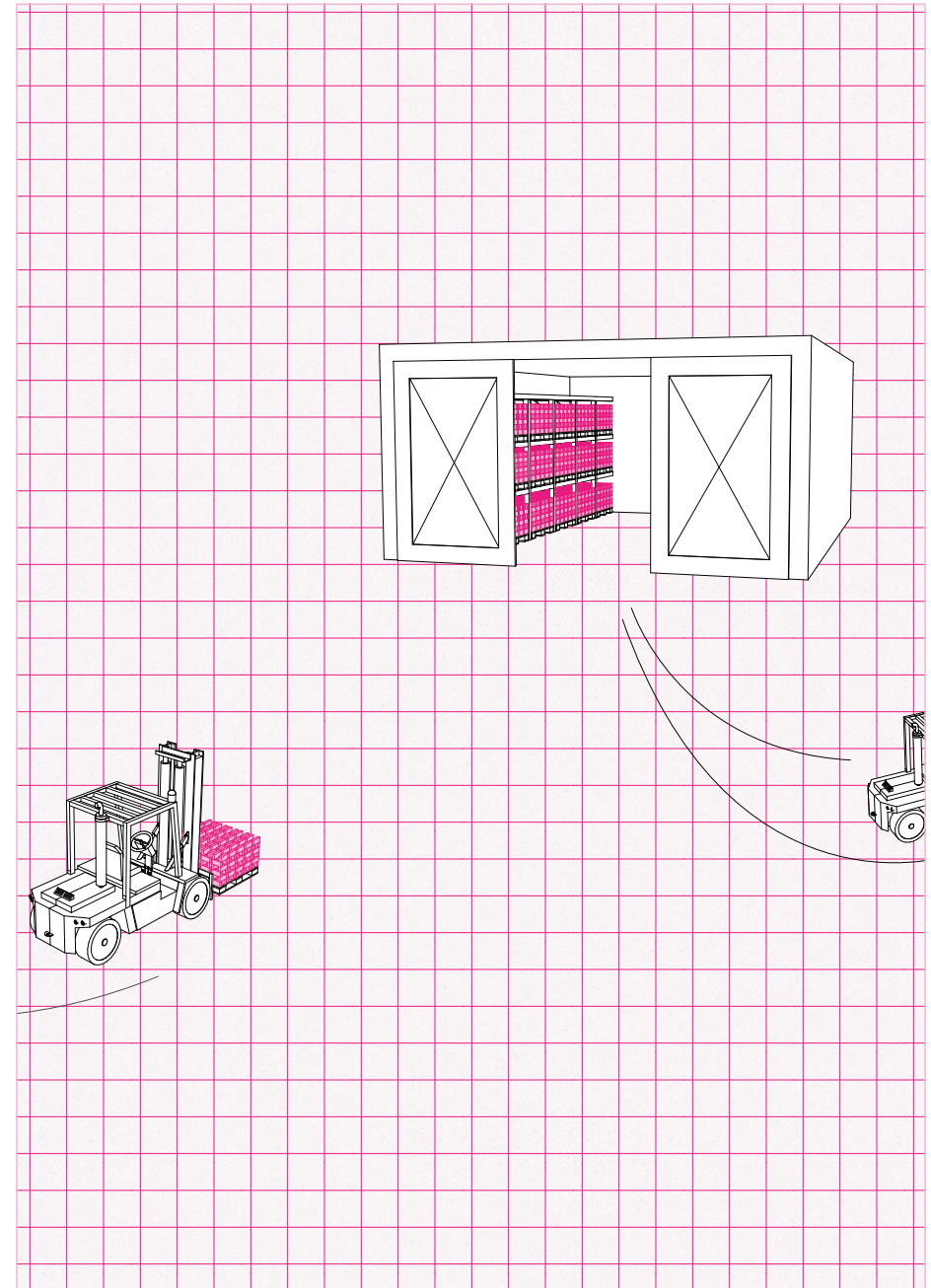
- Space to create Vormstenen and casts

2b. Production

Drying Process

Before the baking process can start, the excess water have to be removed from the clay bricks. This is in between 20-30 %, and need to remove to prevent that the brick will crumble down during the baking process. In the past the drying process happened by nature, in the open air or in covered scaffolds. This process use to take weeks (8 weeks). But nowadays they are using artificial drying chambers, which been tailored to optimize the whole production process of the brick. In general the drying of the brick will take 30 hours, when finished the brick is called a **Greenbrick**. In the process the clay bricks are placed on iron perforated scaffolds, which are transported into the drying chambers. In the drying chambers hot air (partly from the ovens) is pushed in, to vaporise the water out of the clay bricks. An system with ventilation, heat exchangers, and heat source systems can create the perfect drying process, in order to give the brick specific qualities. several rooms are need each with different qualities. While drying the clay bricks

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Interview, p.74



[32] Drying process - Illustration by Author

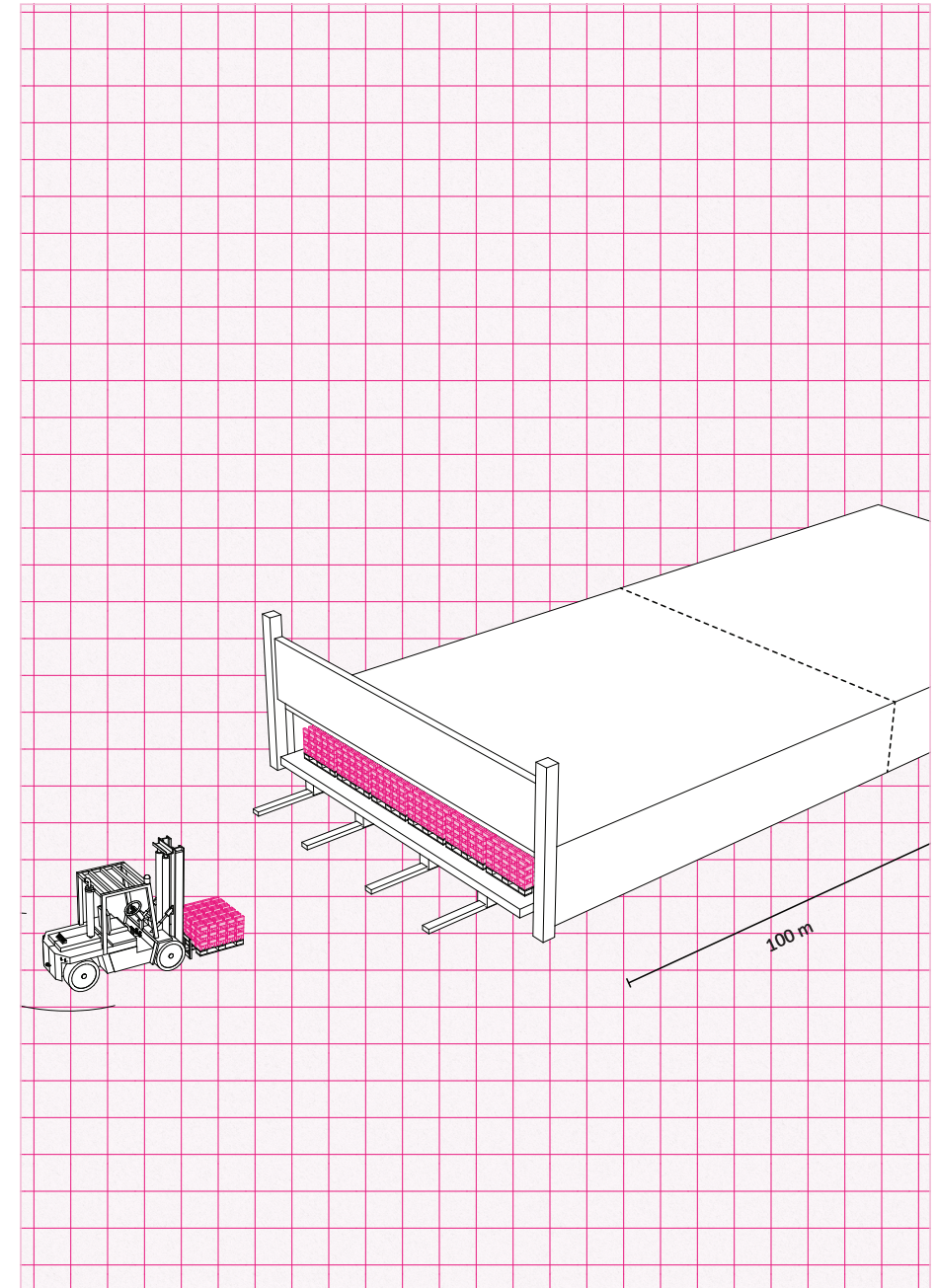
Implement in project:
- Drying chambers
- Forklift

2b. Production

Baking process

The greenbrick (yellow and grey from colour) is already pretty solid, but not strong enough to use as a building product. In order to give it the right strength and characteristic colour the brick has to be baked. The bricks are baked in 900 to 1100 C°, this process is called the Sinterprocess. As there is an ideal drying period for bricks, there is also an ideal baking process for bricks, to get the optimal product. The last century the baking process went through a huge development; the ovens but also the operating systems changed. This resulted in full automatic ovens, continuous firing, and a 24/7 production process. Despite these developments there are still five types of ovens in usage in the Netherlands. The first type is the Periodieke Veldoven. The oven is built on site. Bricks are stacked on each other, in the middle is the fire hall placed. The process takes 8 weeks. The problem of this oven is that there is not much consistency. The periodieke veldoven produced 35% straatsteen, 40% Gevelsteen, and 25% binnenmuursteen. The second type is the Permanent Veldoven. This oven is built out of two or three walls with heating holes. Not many Permanent Veldoven exists anymore, in 1950 only 30 of them were used in the Netherlands. After a while arches were built on top of the oven to manage the baking process better and the heat lost was reduced. The third type of oven is the Ringoven. In this type of oven the fuel supply is constantly transported around. Baked bricks and green bricks are constantly switched through a port. Due to this system green bricks are slowly heated and finished bricks are slowly cooled. This is because the fire comes closer and gets further away during the baking process. A variation on this oven type is the **Zigzag oven** which is a smaller folded version of the Ringoven. The Ring oven has already way more efficient than the Veldovens. The fourth type is the Vlamoven. The Vlamoven is an oven built up of several rooms, which works similar as the Ringoven system. Nowadays the Vlamoven is still used in the Netherlands. The Ring- and Vlamoven are filled from the back to the front. To do this a forklift is used. The last and fifth type is the Tunneloven. The Tunnel Oven is the most modern way of baking bricks. In the middle of the oven is the heating source. Because the tunnel is 100 m long, 9 m wide, and 1,5 m high the green bricks are slowly heated, and after passing the heat source slowly cooled. Because the heat source and speed can be controlled, this process is the most efficient way of baking bricks.

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Interview, p.74



[33] Baking process - Illustration by Author

Implement in project:
- Tunneloven (9m wide, 100m long, 1,5m high)

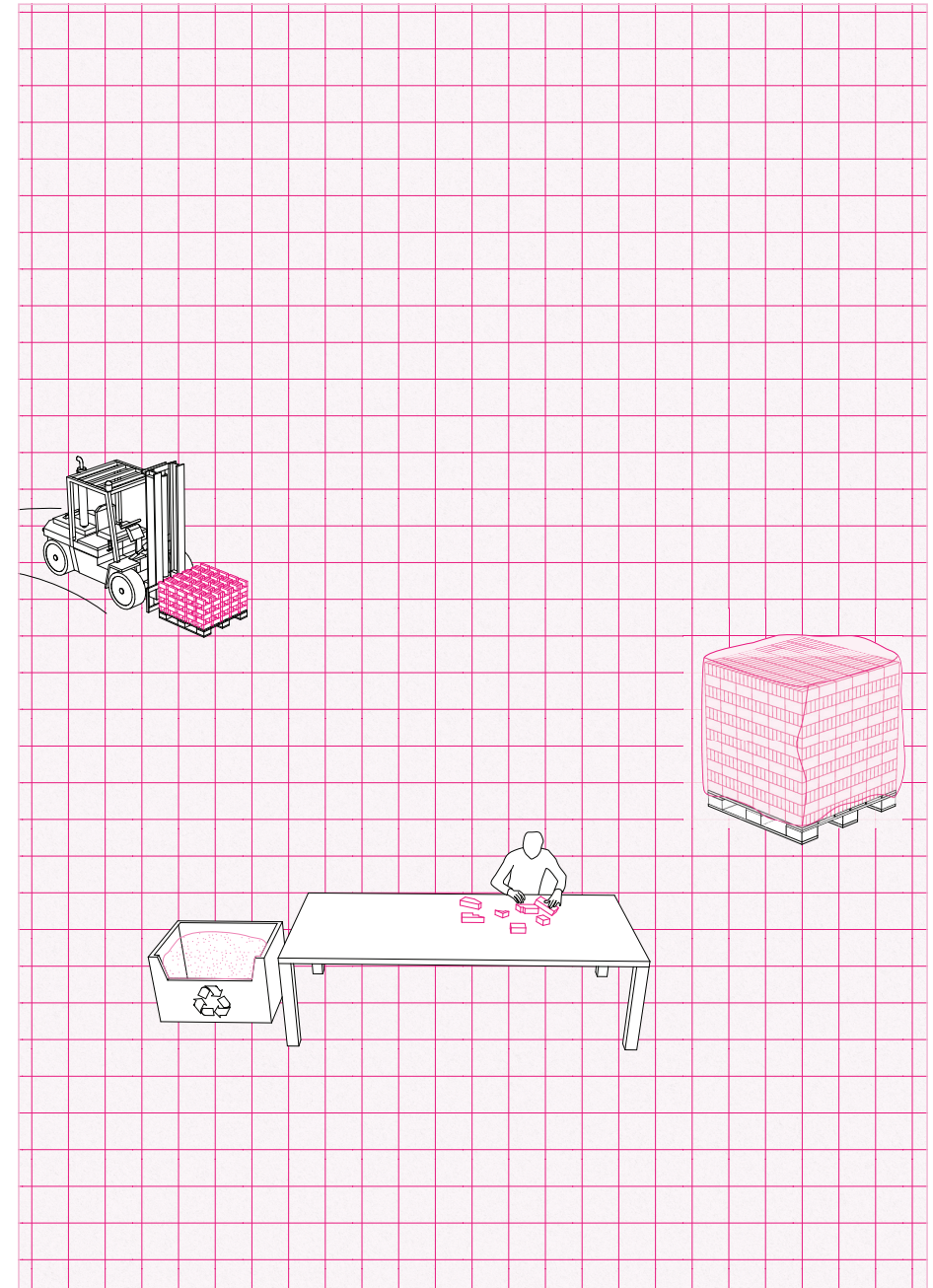
2b. Production

Sort & Distribution process

In the drying and baking process of bricks it is obvious there is a small difference in the end product. Because of this at the end of the baking process the bricks have to be sorted. This is labour intensive work and in modern factories they try to avoid this. By having the control during the process allot of the sorting can be avoided, it possible to mark in advance the bricks that will be different. In this case it is relatively easy to pick out the different bricks in the end and is in not necessary to go through the whole stack of bricks. This sorting process is not needed with a Tunneloven because, the backing process in a Tunneloven is so even, that the quality of the bricks is the same.

The brick fabrication ask for allot of space, because of the; storage (raw-materials), pre-processing, drying chambers, ovens, and storage for the end product. Due to the automatization, modern brick factories have complex systems to coordinate everything. From the Tunnelovens the bricks are directly placed on a pallet, ready for distribution. Sometimes the bricks are sealed with a plastic layer to protect the bricks against the weather. On a standard pallet 380 Waalformaat bricks are placed. On the building site, the bricks are removed from the trucks with a crane, and distributed by wheelbarrows. The **rest products** created during the production of the brick can be brought back in circulation. It can be blend in during the clay production. Possible harmful substances have to be removed.

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Interview, p.74



[34] Sort & Distribution process - Illustration by Author

Implement in project:
- Storage
- Sorting space

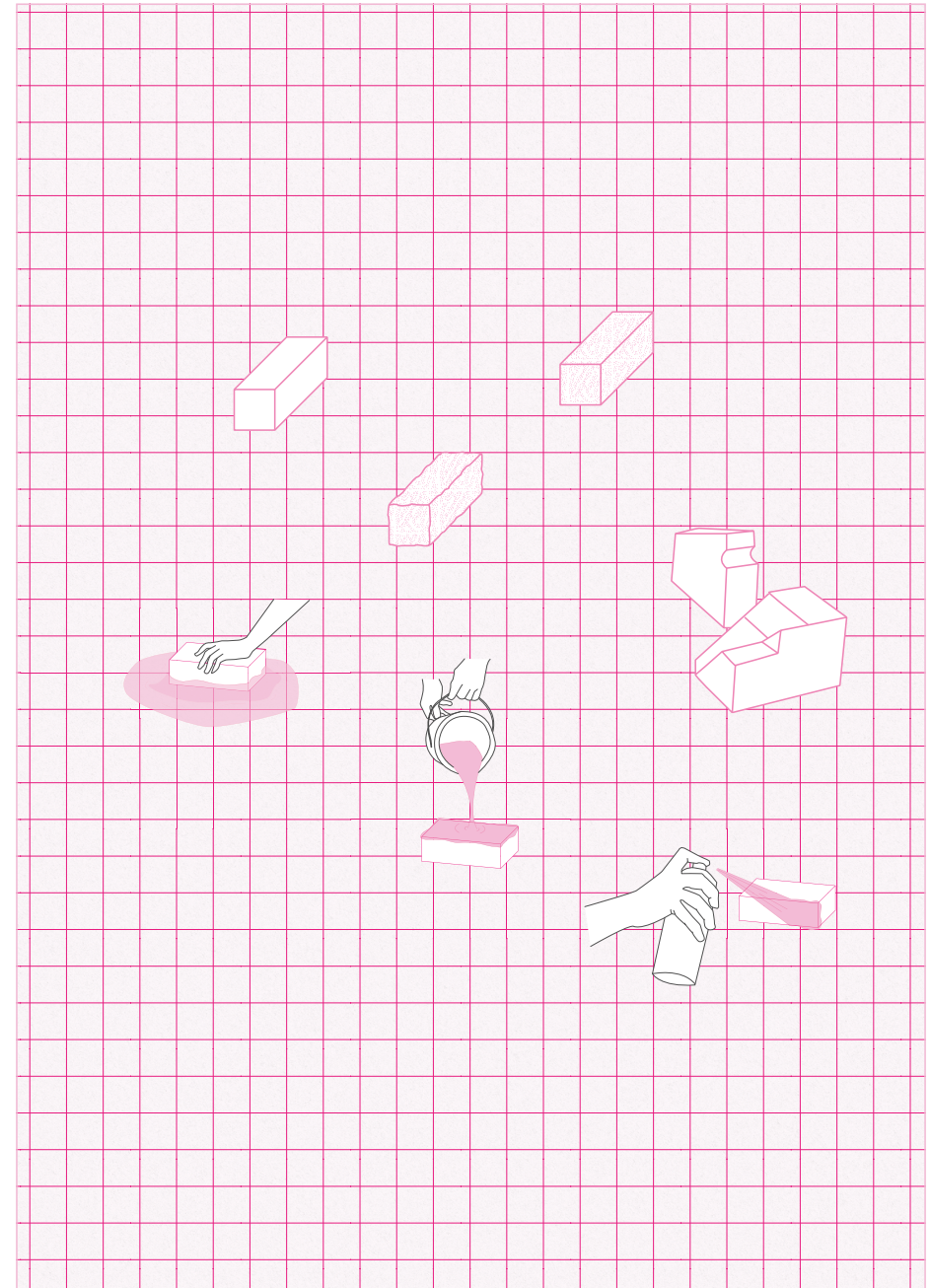
- Rest products space

2b. Production

Forms & Colours

There are 3 main types of bricks; The Masonry brick used for facades and constructions. The pavement brick used for solidification. And the light Masonry brick used for interior walls. In the past bricks were sorted in these 3 types after they were baked. They did this because there was less influence on the whole baking process. Due to the automation the modern factories are now able to produce specific bricks. Furthermore nowadays there are fixed norms for every brick, to prevent that different factories make different bricks with the same name. Because of standardisation every brick can be created everywhere.

The colour of the brick is defined by; its chemical composition of the raw material, the baking process (temperature, oxygen, and the form & amount of sprinkled sand), and the glazing layer that can be applied (dip, irrigate, and spraying). Due to the variety in clay types in the Netherlands, we have a lot of different brick colours and types. Clay with a high amount of iron becomes red, and clay with a high amount of calc becomes yellow. Besides that minerals can be added to give it a different colour; manganese oxide gives a brown or black colour, while adding chrome or cobalt gives a green or blue appearance. In general the shade becomes darker when baking the bricks on a higher temperature.



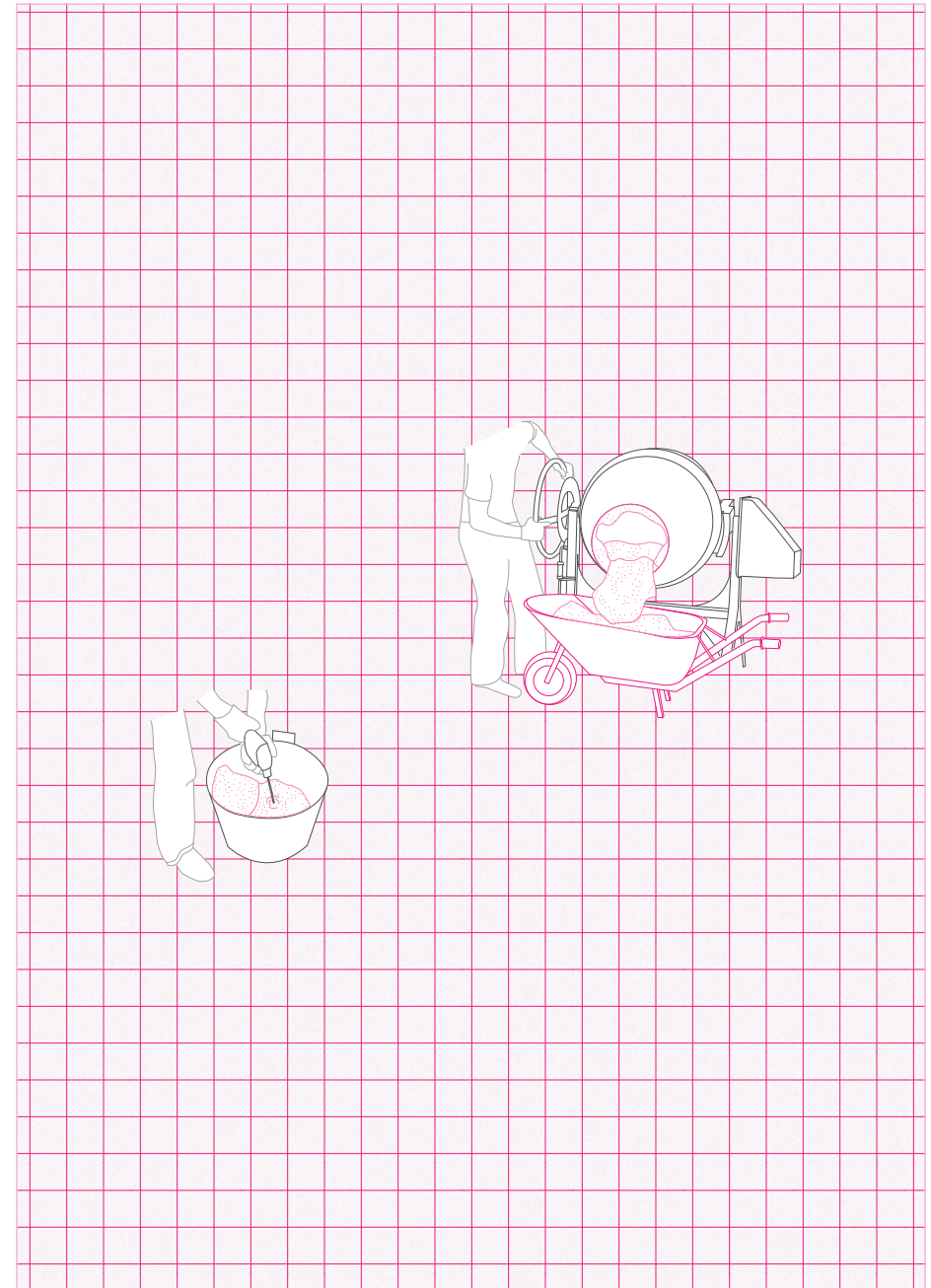
[35] Forms & Colours - Illustration by Author

Implement in project:
 - Glazing chambers
 - Small ovens / kiln

2c. Masonry Techniques

Mortars

Before the bricklayer can start, he needs mortar. The visual characteristics of masonry work are besides the bricks determined by the mortar. The surface of a Wallformaat brick wall consist of 20% mortar. There are two types of mortars; the masonry mortal, which is not the direct finish. Masonry mortar is used functional for its binding and compressive strength. Nowadays walls of 280 meters without dilatation can be created by using this mortar. Masonry mortar most often is scratched out for 15 mm and later finished with a decorative joint (siervoeg). Besides that the Masonry mortar can be used as decorative mortar, but this doesn't happen that often, you call this Doorstrijken. The Decorative mortar are used as expressive possibilities for the architect. They do not have an structural value, but they can crack. The composition of the Decorative mortar is slightly different as the masonry mortar because it has to be stiffer, because the Decorative mortar have to stick directly to the wall. Besides that there are allot of more raw materials available for the Decorative mortar, because there are less norms for it. Portland cement with river sand gives a greyish mortar, while if you add shell calk to it, it becomes lighter. Thorncement on the other hand creates an dark mortar. To create different colours minerals can be added.

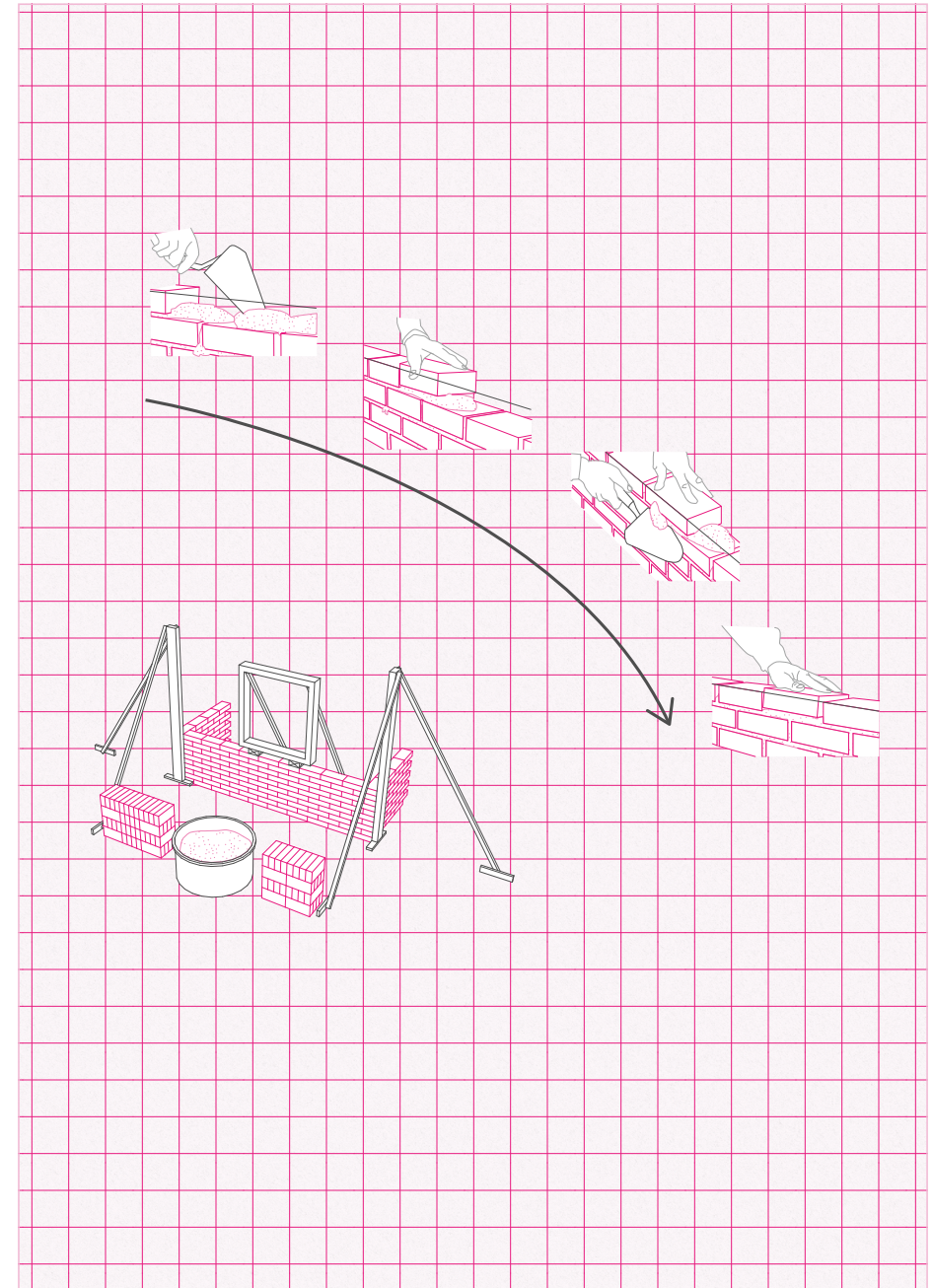


[36] Mortars - Illustration by Author

2c. Masonry Techniques

Techniques & Work Sequence

With masonry techniques, approximately, three kinds of building elements can be created; walls, columns, and arch- and vault structures. The work sequence for creating a wall is as follows; first the carpenter have to set out the dimensions. A carpenter is doing this because, the carpenter also sets out the window and door frames. In the Netherlands it is normal that the window and door frames are placed before the bricklayer starts. So while placing and dimensioning the frames, it turned out it would be easy if the carpenter also dimensioned the rest of the wall. Before the bricklayer starts he first place a mortar tub with bricks behind him. So that the materials he need are close, in order to work in a consistent flow. The bricklayer works from brick to brick, and from layer to layer. During this process the bricklayer uses one hand (right hand if he is right) to put the mortar bed with his trowel. The other hand he uses to slide (vlijt) the brick in the mortar. The excesses mortar will be removed with the trowel and put back in the mortar tub. While laying the brick the bricklayer will follow the wire the carpenter placed. The maximum strokes a bricklayer can do in once is 1,5 m. besides whole bricks, also parts of bricks are used. Half bricks and drieklezoren (3/4 of a brick) are used most. Traditionally a brick layer takes the brick 'between the thighs' to chop it, he uses a hammer and a sable to break it. Nowadays, the use also saws, diamond saws and circle saws. If the brick is not to hard the bricklayer also tend to use the edge of the trowel. Breaking the brick with the trowel is most convenient for the bricklayer because he doesn't need another tool.



[37] Techniques & Work Sequence - Illustration by Author

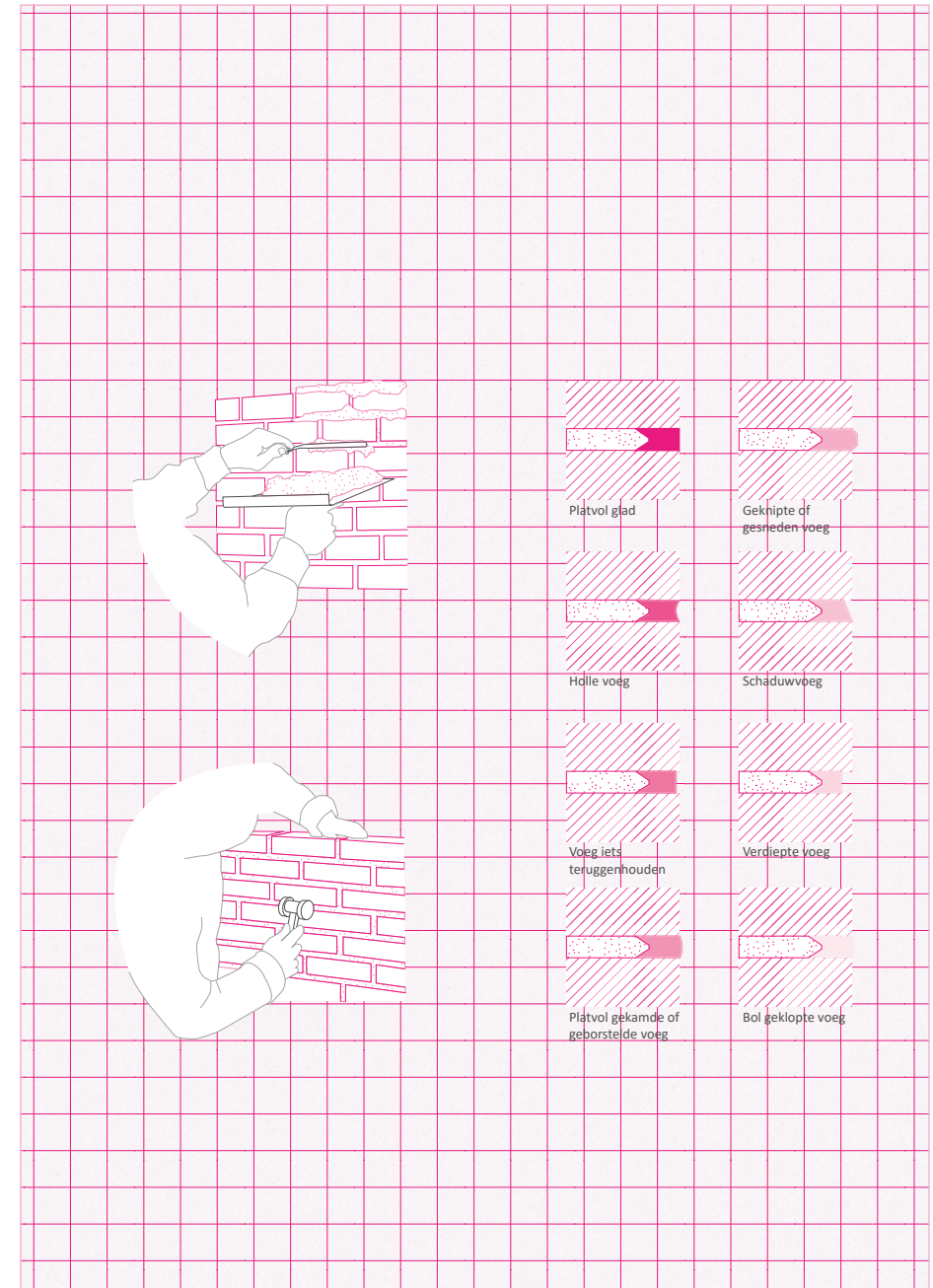
Implement in project:
 - Storage for carpenter products
 - Mortar tubs

- Trowel, Hammer & Sable
 - Diamond & Circle Saw

2c. Masonry Techniques

Grouts

Grout as already explained in the mortar section, are the spaces between the bricks. A finished grout can be made while applying the masonry mortar, but also afterwards. If the grout is finished afterwards, 'the decorative grout', it is important to make the masonry work a little bit wet to create a stronger connection. When the mortar colour difference allot with the brick colour and the bricks are sleek (Vormbakstenen) the masonry work can look like tiling. If the brick work is not sleek (handvormstenen) the whole wall can look very sloppy. By giving the grout and the brick the same colour, the whole volume looks homogeneous. To give the grout a form the bricklayer can use a grout roller. A recessed grout emphasises the brick, while an protruding grout emphasises the grouts.



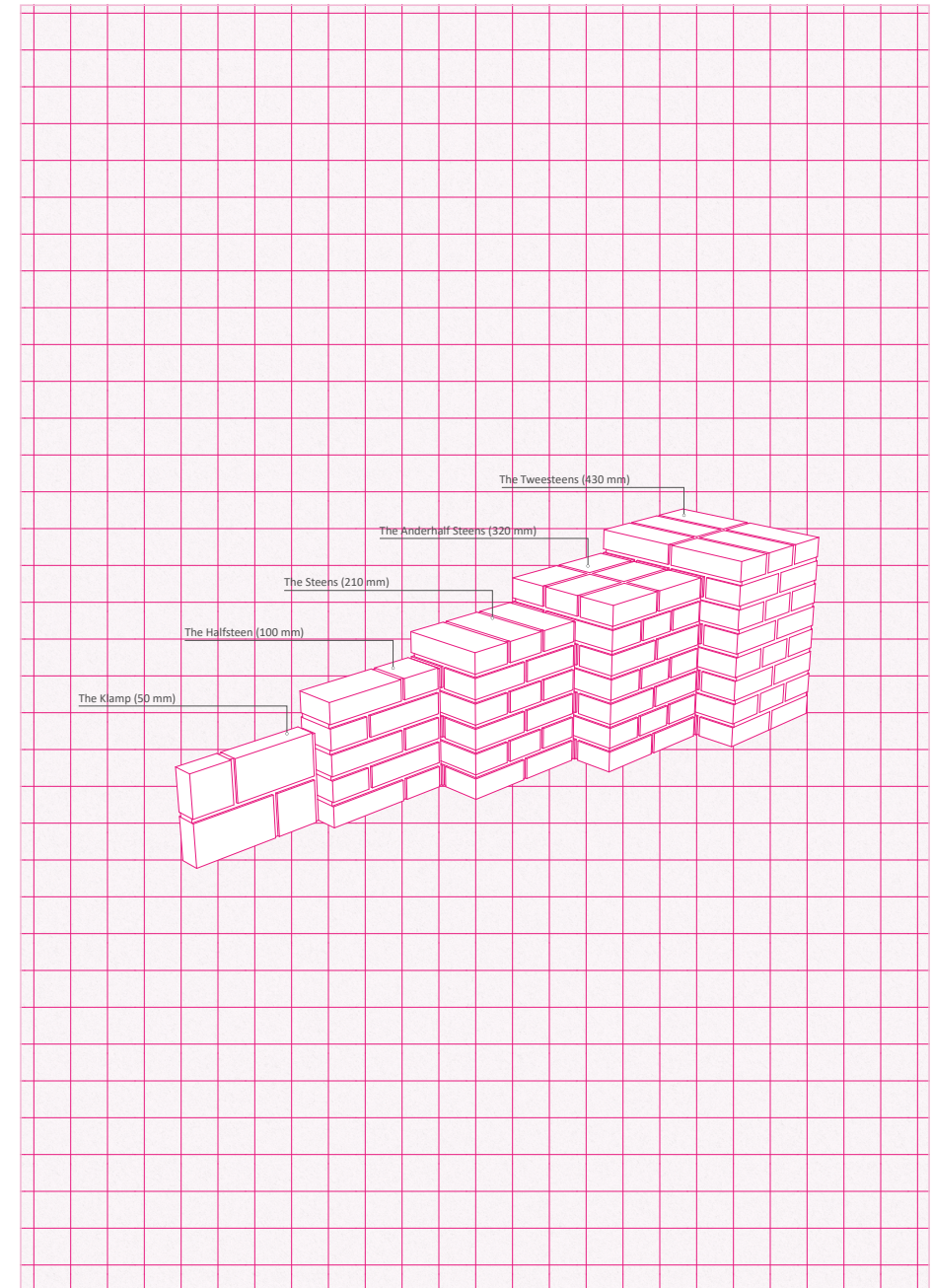
[38] Grouts - Illustration by Author

Implement in project:
 - Grout roller
 - Spatula

2c. Masonry Techniques

Wall Thickness

The base units of a brick wall are the layer size (lagenmaat) and the head size (koppenmaat). These units are created by the brick size and the grout size. The layer size is the brick thickness plus the horizontal grout thickness. The head size is the bricks width and vertical grout thickness. In general the grout thickness is around 10 mm. For the wall thickness there are originally 5 types; The Klamp (50 mm) in which the brick is put on his side. The Halfsteen (100 mm) bricks are stacked in the normal way. The Steens (210 mm) brick are stacked in their normal way but turned 90 degrees. The Anderhalf Steens (320 mm) is an combination of a Halfsteens and a Steens wall. The last one the Tweesteens (430 mm) are two Steens walls combined. Besides the different thicknesses of a wall, in 1920, the cavity wall (spouwmuur) is introduced. Before the cavity wall some walls had the problem of moisture penetration. The cavity wall exist out of two individual walls with air in between it, connected by cavity anchors. The air space in between the two walls (30-100 mm) ventilate the cavity. Because of this the walls quicker get dry and there will be no water penetration through the insulation material. To drain the water out of the wall at the top and the bottom of the wall an open Stootvoegen are placed. The inner wall don't have to be the same material as the outer wall, in the Netherlands most often different materials are used. For the inner wall; big limestone blocks, concrete, and a wooden skeleton can be used.

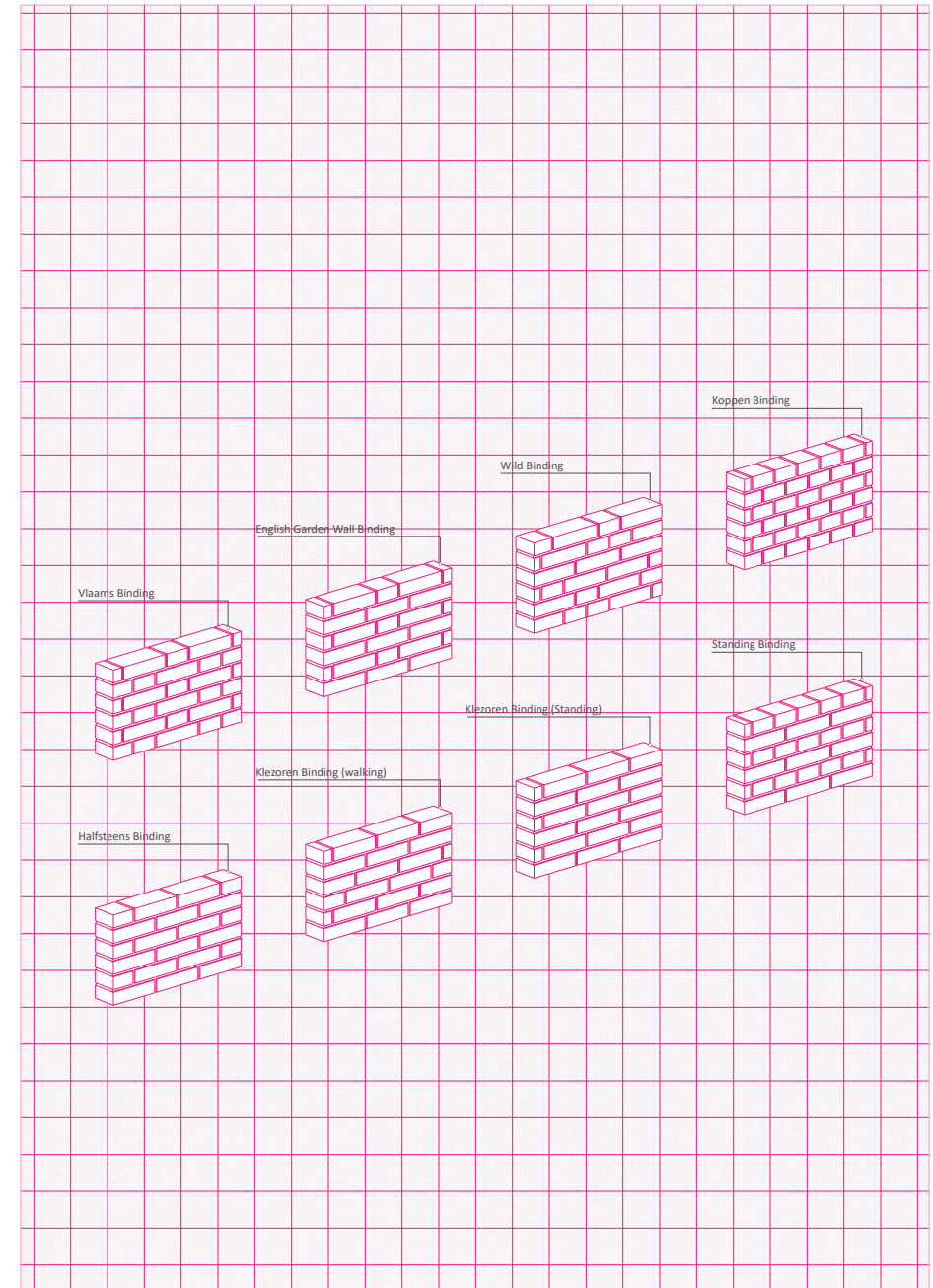


[39] Wall thickness - Illustration by Author

2c. Masonry Techniques

Bindings

In the past bindings were necessary for the strength of the wall. Today the mortars are advanced enough to add most of this strength. Nevertheless the bindings of the wall still provide more resistance as a whole, against burdens. The biggest strength of the wall is obtained when the bricks are overlapping the most, so if a brick is overlapping the other brick with a halve strek (whole brick). For structural walls the rule is that the bricks are overlapping each other with at least a quarter of a strek. At the corners of a wall, most often drieklezoren (3/4 of a brick) are used. The word klezor comes from the English word closure, closing stone. For every binding there are more corner solutions possible. In the Netherlands most of the time halfsteensmuren are implemented, this is because we use most of the time cavity walls. There are a lot of different bindings and these are related to the location where they came from. Nowadays they are used everywhere. One of the most difficult ones for the bricklayer is the wild binding, due to the pattern. It is hard to avoid coincidental patterns. Important for the bricklayer is to avoid ongoing grouts, at least a quarter of a brick has to overlap, otherwise the wall can easily get cracks and it will lose its strength.

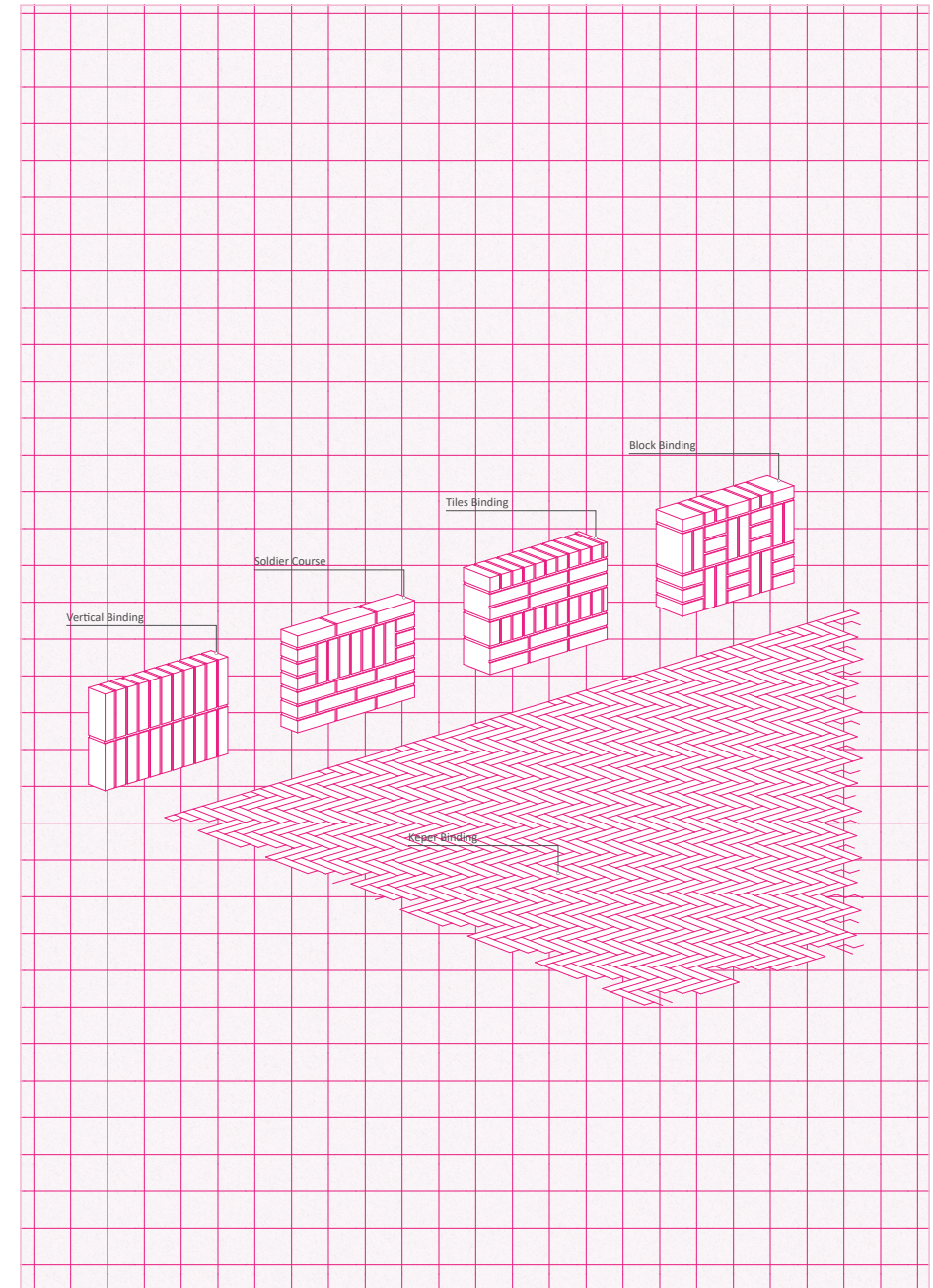


[40] Bindings - Illustration by Author

2c. Masonry Techniques

Special Bindings

Placing bricks flat and parallel to the wall, is just one way to implement bricks. There are a lot of different possibilities as shown in the bindings section. The bricks can also be placed vertical. Because of the small amount of stability and the huge vertical grouts, placing bricks in a vertical way, ask for focus and craftsmanship. The most common form is the Rollaag (in English called the Soldier course). The Rollag is used to bridge unequal heights, mostly used above window or door frames. Besides that there are special decorative bindings. One of these is with a vertical continuous grout, this gives the effect of tiling. it is named Tegolverband. Another one is placing the bricks alternate horizontal and vertical. This is only possible if the dimensions of the layer size and head size are in the same multitude. Otherwise the bricks have to be cut. The last one, the Kepperverband formed when the bricks are twisted 45 degrees. This is mostly used for pavement, if it is used in the façade it only functions as decoration. If one layer is put in an angle you call this the Stroomlaag. The decorative possibilities can be extended by implementing relief in the façade, and by implementing colours. An horizontal layers in a different colour named Speklagen.

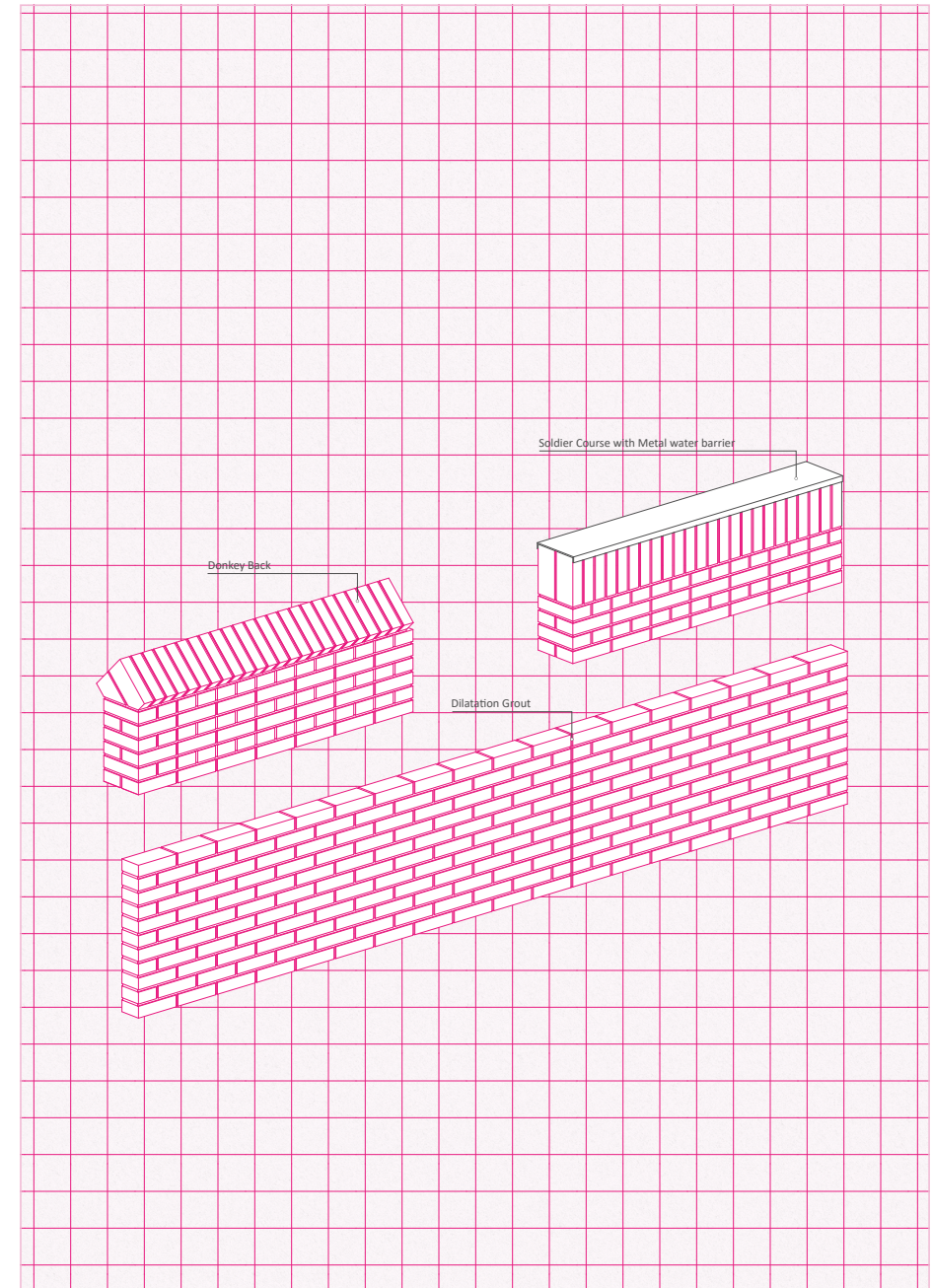


[41] Special bindings - Illustration by Author

2c. Masonry Techniques

Special Brick Sizes & Structures

In masonry work there are a lot of different elements that have to be created; wall termination, water barriers, and dilatation grouts. In countries like England they use a lot of Vormstenen to end a wall. This is because the English factories have time scheduled for Vormstenen in their general production process. Due to the demand for them, the price of the Vormsteen is higher but still cheaper than natural stone. For wall ending at the top, in the Netherlands, normally a Rollaag is used or for independent walls an Ezelsrug. For the wall ending it is important to put it on an angle, otherwise the water cannot get away, and there is a possibility for water rash, algae growth, and frost damage. The ending of the wall can also be finished with another material like; concrete, natural stone, or metals (copper, zinc, and lead). For the water barrier, most often metals are used, and placed in the horizontal grouts. Besides wall ending, there are dilatation grouts, these are normally placed every 15 meters and are used to avoid cracks in the wall. If the structure is strong insulated the dilatation grout has to be placed between 12 – 8 meters because the wall has a bigger expansion coefficient. For the dilatation grout, in general, a normal grout size can be taken. To keep the dilatation grout completely open is the best, but most often it is filled with kit. Kit grouts are less maintenance free, and used to prevent water damage.

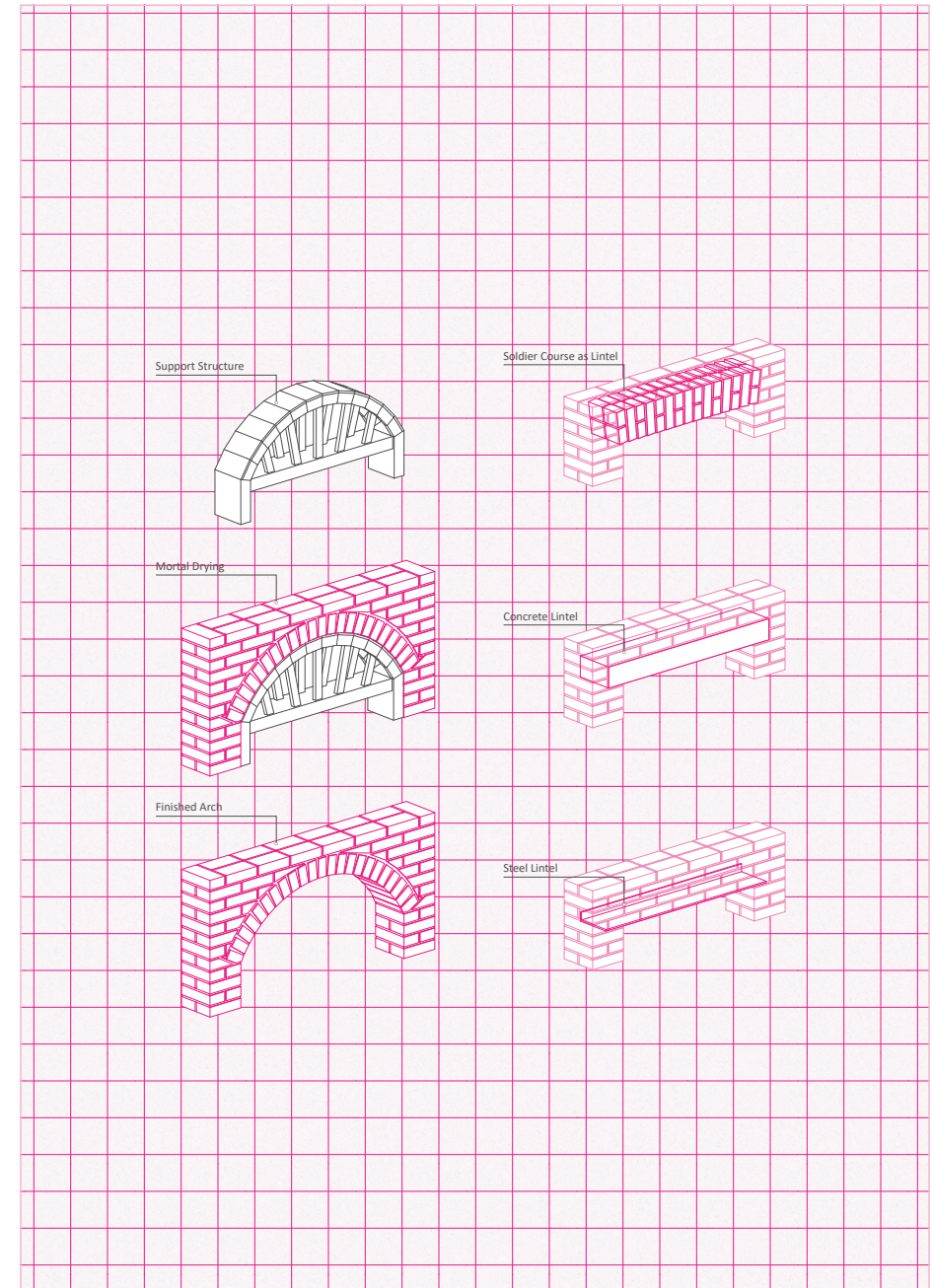


[42] Special brick sizes & structures - Illustration by Author

2c. Masonry Techniques

Openings (lintels & Arches)

In the Netherlands masonry work mostly evolved from carpentry work. The window frames were part of the wooden structures. In the 16th century cities where completely built from wood, but because of city fires, wooden structures and facades were banned. Due to this buildings were built from brick, the window frames kept their loadbearing function. The top part of the window frames were used as lintels. Nowadays there are different types of lintels; prestressed ceramic lintels, prefabricated concrete lintels, and steel lintels. The lintels are completely or partly hidden in the façade behind the brick work. Openings in the façade can also be made by arches, through placing the bricks perpendicular in the arch. If the arch is lower more horizontal force is needed, the Rollaag can be seen as an arch with minimum height, therefore it has a small span. While making an arch a support structure is needed, to keep everything in place while the mortar is drying. The support structure is most often made out of wood. In the support structure a central point is needed, from which a thread is placed to define the mortar between the bricks. In order to build an arch, *geschifte* bricks are needed because the inner and outer bow have a different length. To connect the arch to the rest of the masonry work, 'aanrazeren' is needed, to fill the spaces between with small strips of brick.



[43] Openings (Lintels & Arches) - Illustration by Author

Implement in project:
 - Try out lintels
 - Wood structures for arches

2d. Interview

André Bleumer Zilverschoon Randwijk

The Zilverschoon Randwijk, a brick factory specialized in making Form Brick. One of the few left in the Netherlands. To give an understanding of the size of these factories; The Zilverschoon produces 800.000 bricks a year, while a normal brick factory produce up to 160.000.000 bricks a year. This difference is so huge because, the Zilverschoon makes allot of different bricks, all by hand, while a normal factory creates maybe 4 different types of bricks in 4 different colours by using full automatic machinery. Because the new craft school of ceramics will focus on the form bricks, we got the opportunity to see the whole production process at the Zilverschoon.



[44] Square in front of the zigzag oven - Picture by Author

Entering the factory side, you arrive at the square used as storage. With in the back the zigzag oven, nowadays not in use any more.



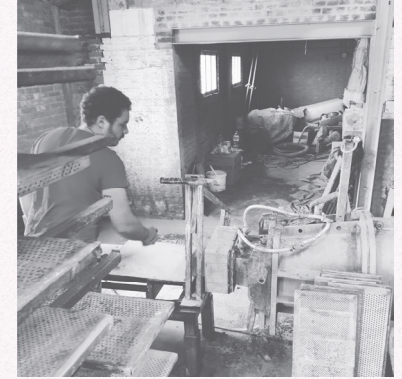
[45] Clay hubs - Picture by Author

Different hubs of clay to create different brick colours



[48] Treadmill with clay - Picture by Author

In front of the strengpers a treadmill with clay is placed to bring the clay into the strengpers.



[49] Mouth piece strengpers - Picture by Author

Out of the mouth of the strenpers a thick string of clay will be pushed, and cut in blocks with a thread.



[46] Recycled clay hub - Picture by Author

Clay hub of lost clay in the production process, that will be used for making new products.



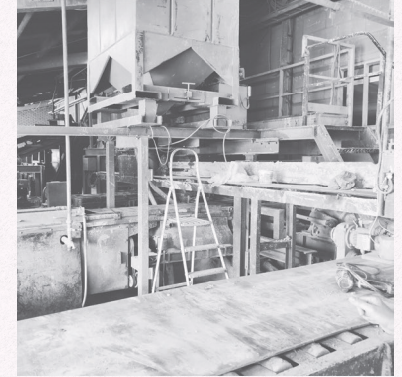
[47] Residue of recycled glass - Picture by Author

The factory is doing tests with different recycled materials, as recycled glass to see if they can use it for the production of a new brick.



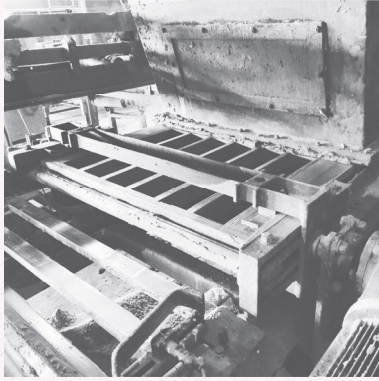
[50] Clay cutter - Picture by Author

Strenpers blocks will be cut in bricks with this machine.



[51] Sanding vormbak method - Picture by Author

The wooden cast will be sand on the treadmill before the clay is pushed in.



[52] Clay pushed in vormbak method - Picture by Author

Clay is pushed in the cast with a machine.



[53] Turning vormbak method - Picture by Author

After clay is pushed in cast will be turned, and bricks will fall out.



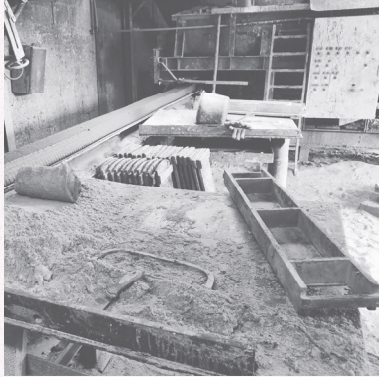
[56] Cutting the brick - Picture by Author

Huger bricks are cut with a steel tread by following a silhouette cast in form of the brick.



[57] Stacked green bricks - Picture by Author

Bricks stacked on perforated plates to improve the drying and baking.



[54] Handvorm method - Picture by Author

Table with sand the cast and steel thread to create a handvorm brick.



[55] Treadmill with clay - Picture by Author

Clay picked from treadmill and thrown in the sanded wooden cast, poking out clay will be cut straight, cast will be turned around, the bricks fall out, and be placed on a car.



[58] Stacked green bricks - Picture by Author

Bricks in line for the drying tunnel



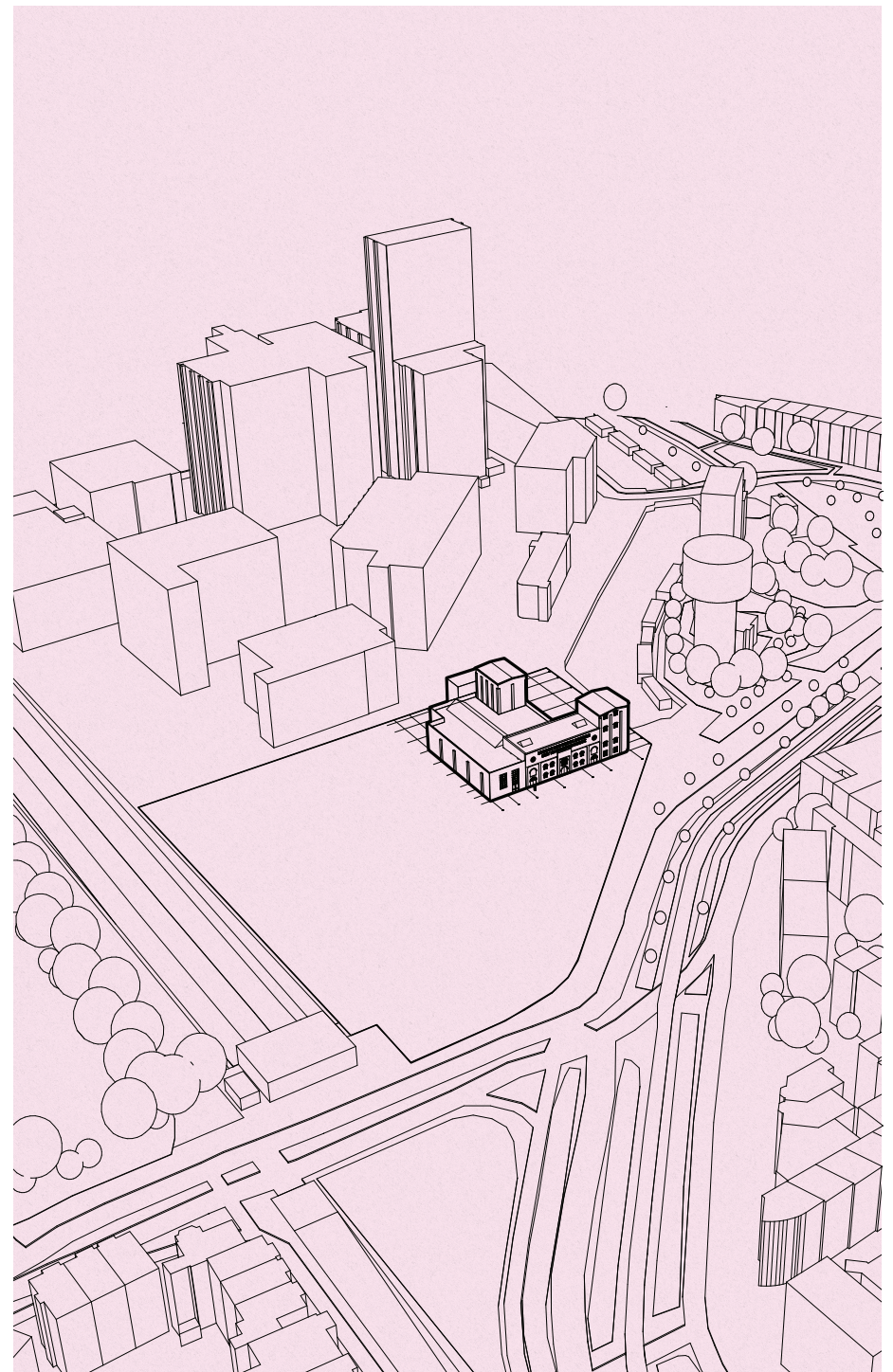
[59] Drying tunnel - Picture by Author

30 meter long tunnel in which the bricks will be dried.

LOCATION

New craft school in Delft

In this chapter the location of the new craft school for ceramics in Delft will be highlighted. In which the reason for Delft and the choice of the specific location will be explained, the existing monumental building on the side will be analysed, and the surroundings will be illustrated. In order to get a better understanding of the context the new craft school will be placed in.



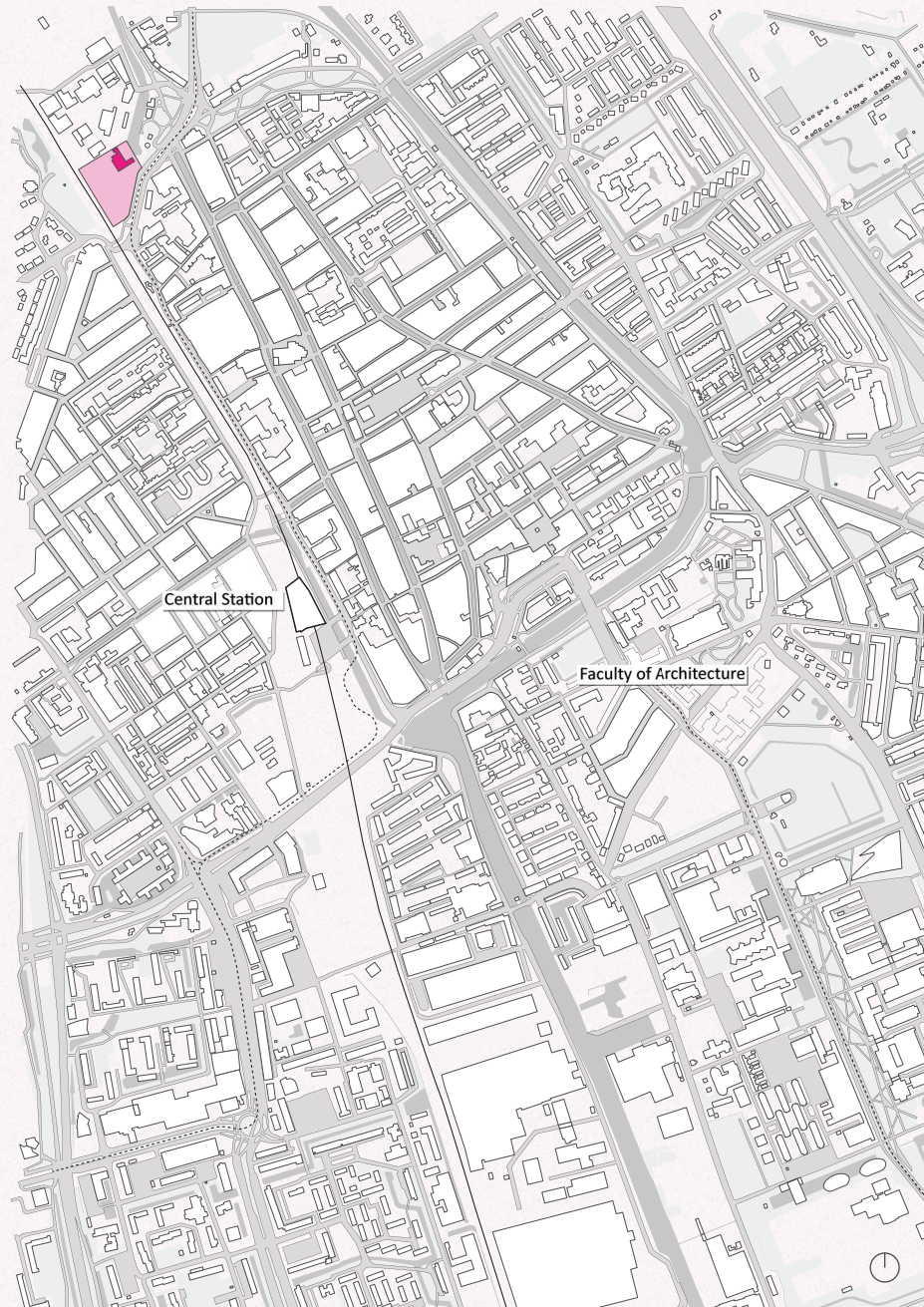
3a. Delft

Why Delft?

In the coming years Delft want to bring back the crafts schools, in which children between 12 and 19 years old can learn a craft⁵⁸. The municipality of Delft want to bring back these type of vocational schools because, next to the outstanding quality of the technical university of Delft, they want to become outstanding in more practical education. This is due to the fact that most of the local children is not going to university but to a vocational school. In the coming years the municipality want to create thousands of jobs in the manufacturing industry, but this is only possible with practical educated employees⁵⁹. For the type of craft that is educated I chose the craft of ceramics. Because, the craft of ceramics is the source of the most famous craft technique of Delft the glazing techniques. But as explained with the **Form brick** I didn't chose to create a school for a specialization within a craft, because students should learn the production process of a product from A to Z to become valuable craftsman. Otherwise graduated students can only do a specific part of the production chain like factory employees during the **industrial revolution**. Which as William Morris, of the **Arts & Craft** movement explains, will create a weaker relationship with the result of their labour and end product⁶⁰.

←
Why Ceramic
Bricks?, p.39

←
Industrial
Revolution, p.24



[61] Floorplan city of Delft - Illustration by Author

Pink the location of the new craft school

3a. Delft

Where in Delft?

The new craft school will be situated at the boarder of the DSM industrial site. The choice for this location is first of all the size, because the school need big elements like the **tunnel oven**, the site should be big as well. Secondly the infrastructure, which is good accessible for people (students, employees, visitors), but also for the arrival of goods as raw materials. Thirdly the character of the area, which suits the character of the factory school, which is a guiding theme in the new design. Fourth the site is located next to the **creative canal area**, in which allot of small workshop spaces and ateliers are situated, to which a connection can be made, in order to enhance the craft community in Delft.

←
Baking process,
p.50

→
Mapping the
area, p.96



3b. Existing building

Taplokaal, The Royal Dutch Yeast and Spirit Factory

Monumental building Het Taplokaal, was part of Royal Dutch Yeast and Spirit Factory. Build in the beginning of the 20th century and redesigned around 1930. The Royal Dutch Yeast and Spirit Factory was build in 1869, which produced baker's yeast. A residue of this process is raw spirit, from which Jenever was produced in the Taplokaal. Since 1998 the Taplokaal is deserted, after the DSM took over the Royal Dutch Yeast and Spirit Factory.

**KONINKLIJKE NEDERLANDSCHE
GIST EN SPIRITUSFABRIEK**





[64] Front - Picture by Author

Hand form bricks in cross bond with a light grout



[65] Tower right side - Picture by Author

Hand Form bricks in cross bond with a light grout



[68] Connection lower hall and front building - Picture by Author

Building in decay, plants growing on the roof doors and windows fall apart



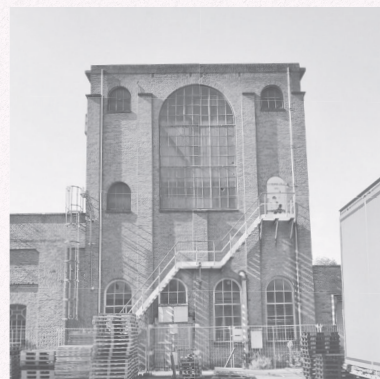
[69] Window frames - Picture by Author

Characteristic small window frames



[66] Front left building - Picture by Author

Strengpers brick in Norwich chain bond with a deep light grout



[67] Tower in the back - Picture by Author

Used as installation space with a big window opening



[70] Back door - Picture by Author

Characteristic façade with original door



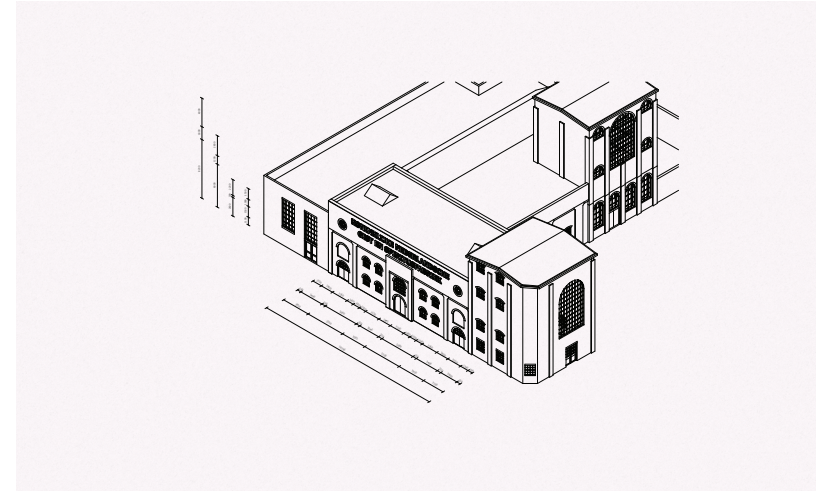
[71] Extension building - Picture by Author

Extension building and back side of the factory hold up by external sub structure

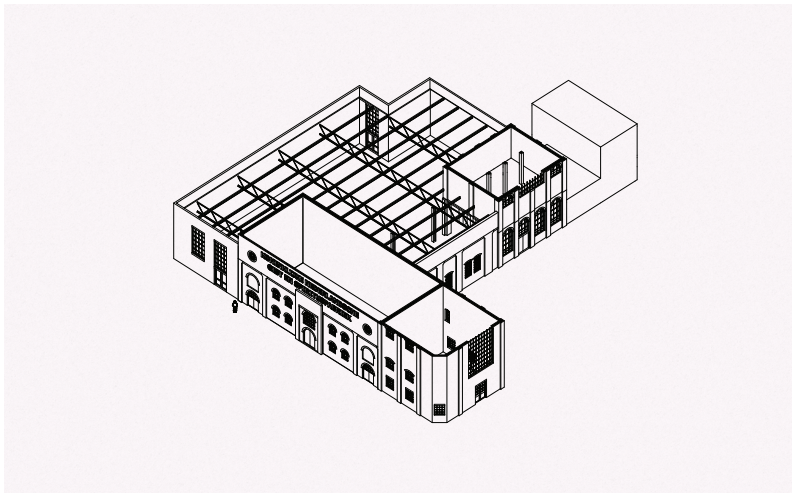
3b. Existing building

Taplokaal, The Royal Dutch Yeast and Spirit Factory

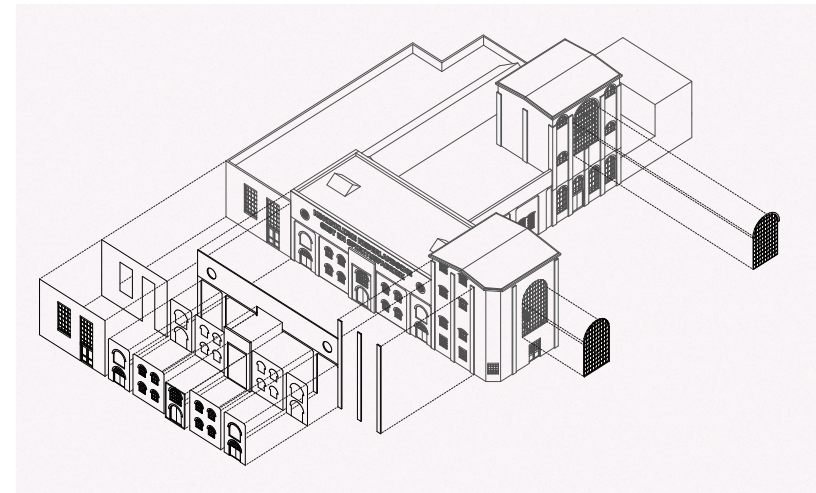
Existing building consist out of 5 parts; het main building in the centre, the two towers one in the front (without floors) and the one in the back (with the installation spaces), the in between hall with the dilapidated roof, and the extension building in the back. The main building in the front got a strong symmetry while the rest of the building parts are added later as an attachment to the main building. Characteristic are the window frames and the structure the front façade got. Interesting for the new design is how to refer to this. Huge qualities of the existing building are the big openings in the two towers on the right elevation.



[73] Dimension main façade illustration by author



[72] Spaces existing building illustration by author



[74] Interesting elements illustration by author



3c. Mapping the area

The context surrounding the site

Six mayor themes where researched while mapping the area; Aesthetics of the area, Area destination, Connection to the surrounding workshops, Demographics, Environment, and Infra structure. By doing so an overview of the context is created in one illustration. This map makes me understand how I can react to de context with the new craft school for ceramics.

Age

- 65+ (24%)
- 55-64 (24%)
- 45-54 (24%)
- 35-44 (24%)
- 25-34 (24%)

Uses

- Facebook (90%)
- Twitter (10%)

Natives/Migrant

- Native (80%)
- Western Migrant (10%)
- Non Western Migrant (10%)

Household composition

- Multi household (10%)
- Single household (90%)

Habitants: 1.160
Income: 34.000

Figure 1 consists of four donut charts arranged in a 2x2 grid, each representing a different demographic variable. The legend for all charts is located at the top right, with pink representing 'Nonnative (20%)' and dark pink representing 'Native'.

- Age:** The chart is divided into four segments. The legend lists: 18-24 (20%), 25-34 (20%), 35-44 (20%), and 45-54 (20%).
- Uses:** The chart is divided into two segments. The legend lists: Nonnative (20%) and Native.
- Natives:** The chart is divided into two segments. The legend lists: Native (20%) and Nonnative (20%).
- Household composition:** The chart is divided into two segments. The legend lists: Single household (20%) and Multiple household (20%).

Habitants: 1.070
Income: 29.000

Age

Age Group	Percentage
18-24 (20%)	20%
25-34 (27%)	27%
35-44 (24%)	24%
45-54 (22%)	22%
55-64 (7%)	7%

Uses

Use Category	Percentage
Instagram (33%)	33%
Facebook (30%)	30%
Twitter (2%)	2%
Other (2%)	2%
LinkedIn (12%)	12%
Other (21%)	21%

Natives/Migrant

Status	Percentage
Native (57%)	57%
Western Migrant (24%)	24%
Non-Western Migrant (19%)	19%

Household composition

Household Type	Percentage
Male Household (2008)	20%
Female Household (2012)	20%

Habitants: 2.370
Income: 31.000

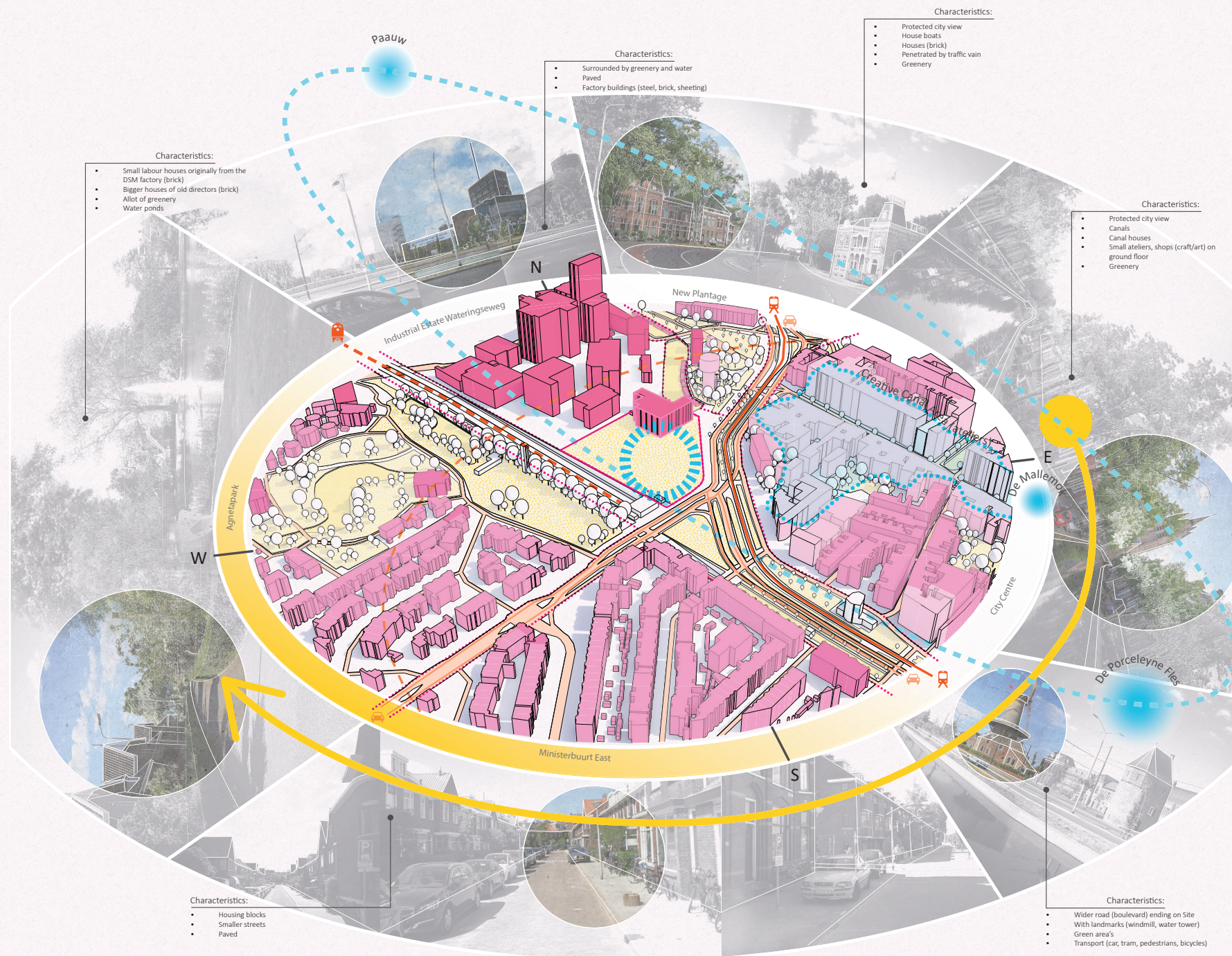
Figure 1 consists of four donut charts arranged in a 2x2 grid, each representing a different demographic variable. Each chart is divided into segments of varying shades of pink, with a corresponding legend to its right.

- Age:** The chart is divided into four segments. The legend lists the following age ranges and their percentages: 18-24 (27%), 25-34 (24%), 35-44 (24%), and 45-54 (24%).
- Uses:** The chart is divided into two segments. The legend lists: Facebook (55%) and Twitter (45%).
- Natives Migrant:** The chart is divided into three segments. The legend lists: Native (55%), Migrant Migrant (34%), and Non Migrant Migrant (11%).
- Household composition:** The chart is divided into two segments. The legend lists: Single Household (55%) and Multi Household (45%).

Habitants: 2.450
Income: 31.000

Uses

Category	Percentage
Industrial	85%
Other	15%

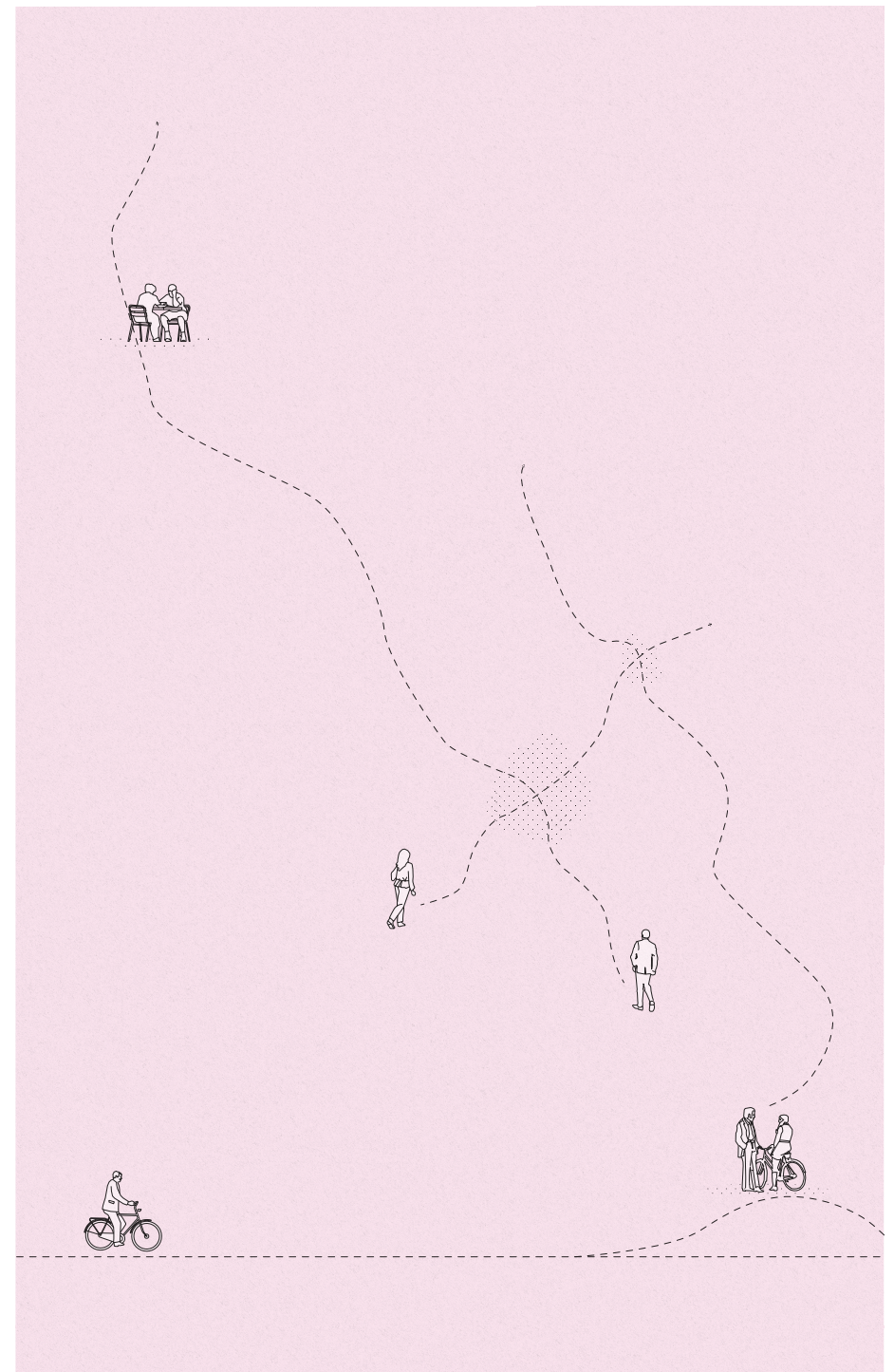


PEOPLE

Users of the new Craft school

In this chapter the target groups of the new craft school for ceramics will be discussed. In which the spatial organisation and movement within these spaces will be explained through

different moments of the day. By doing this an overview is created to see how the spaces should be designed in order to satisfy the different needs of the users.



4a. Target groups

Users of the new craft school

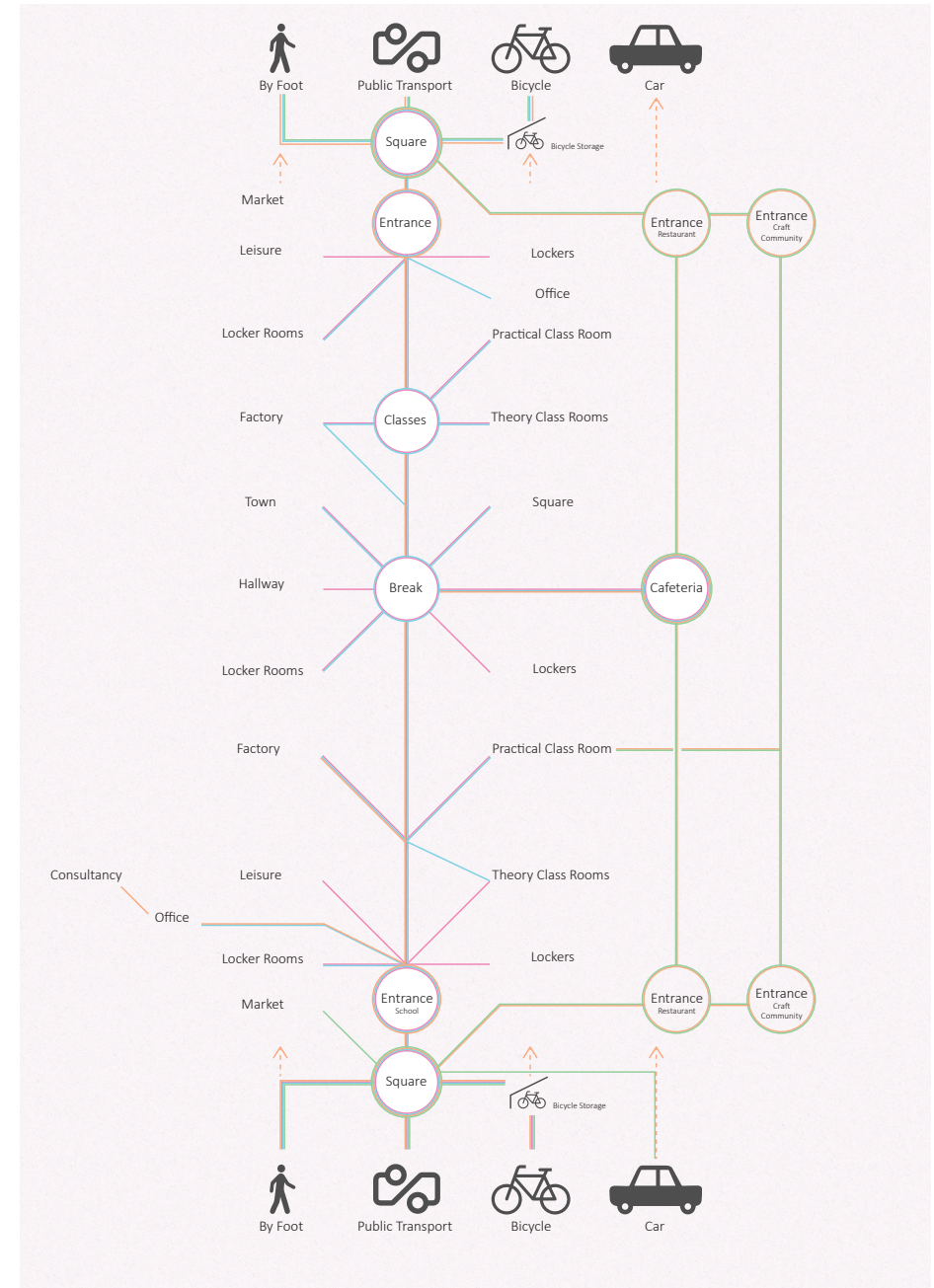
From the **positioning** towards a new craft school in Delft, four target groups came forward; the student, the employees, the visitor, and people from the **craft community**. As explained the students should be educated while working, by professionals (employees of the factory) from the work field. In which the school has an good relationship with the surrounding community and with the craft orientated workshops, ateliers, and small factories. In order to realise this the school should also operate as a physical platform for the craft community, where they have their own spaces.

←
Position, p.34

←
Mapping the
area, p.96

Students, employees, visitors, craft community

In order to find out how the different target groups interact with each other, the different spaces / functions are named which are needed in the new school building. For this 4 colours are used; pink for the students, blue for the employees of the factory / teachers, orange for the public visitors, and green for the people of the craft community. From this can be concluded that the square is an important feature of the building because everyone comes together in that space. Furthermore the in between space where people have their transition from space A to space B is important, because it is a potential place / moment for leisure and interaction between the different target groups.

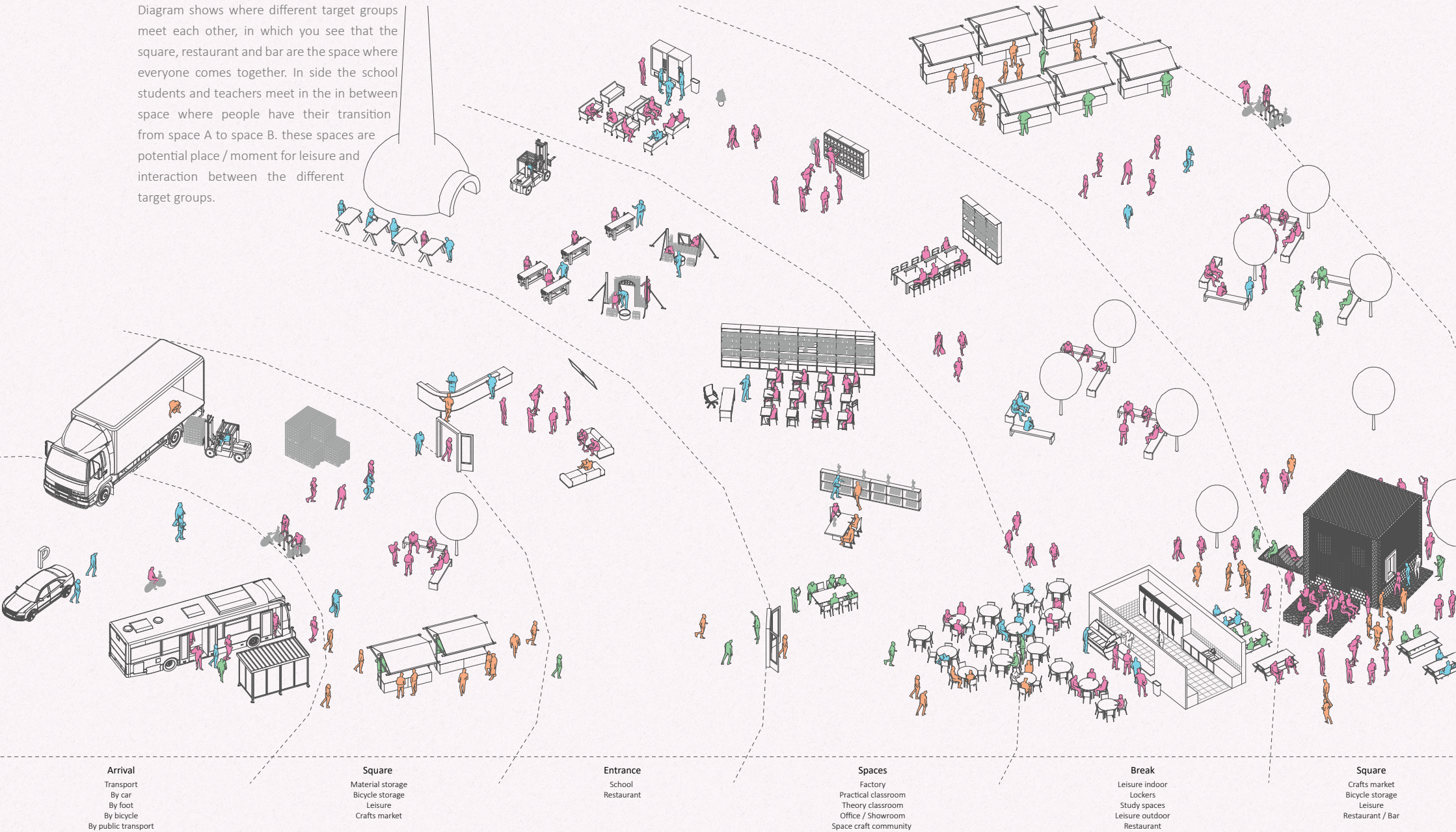


[78] Movement diagram – Illustration by Author

4a. Target groups

Spatial organisation

Diagram shows where different target groups meet each other, in which you see that the square, restaurant and bar are the space where everyone comes together. In side the school students and teachers meet in the in between space where people have their transition from space A to space B. these spaces are potential place / moment for leisure and interaction between the different target groups.

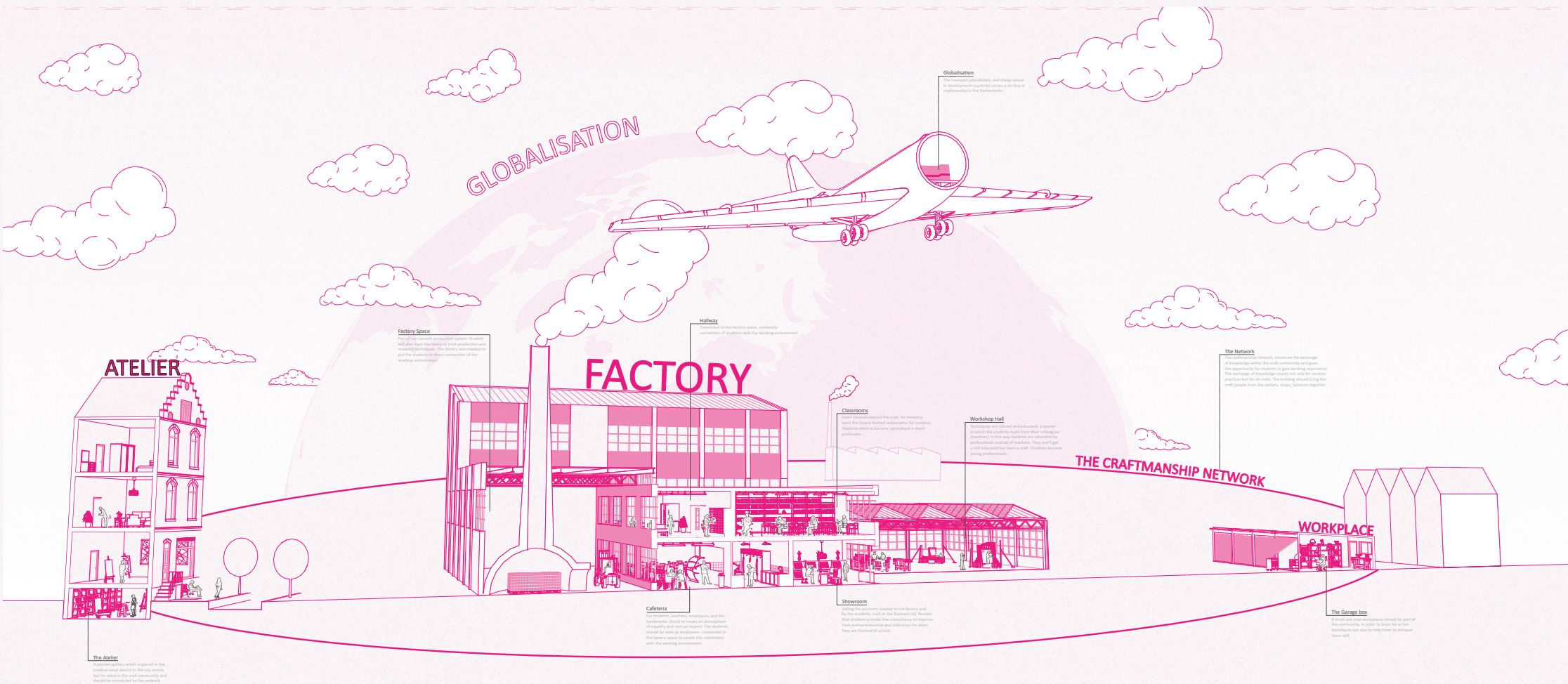


CONCEPT

The new craft school for ceramics

In this chapter the different researches to; the system, material biography, location, and the users will be combined in one concept. This will be explained by one overview and a sequence of images, explaining the different design principles.





5a. Building principles

Connection

In the new design it is important that the different spaces are connected to each other. In which the students are constantly in contact with the making of the craft and the working environment, which is in line with the **factory school**. Spaces for leisure should be attached to the practical workshops and factory hall to emphasize this. In these spaces both the employees (teachers) of the factory and the students come together.

←
20th century,
p.26



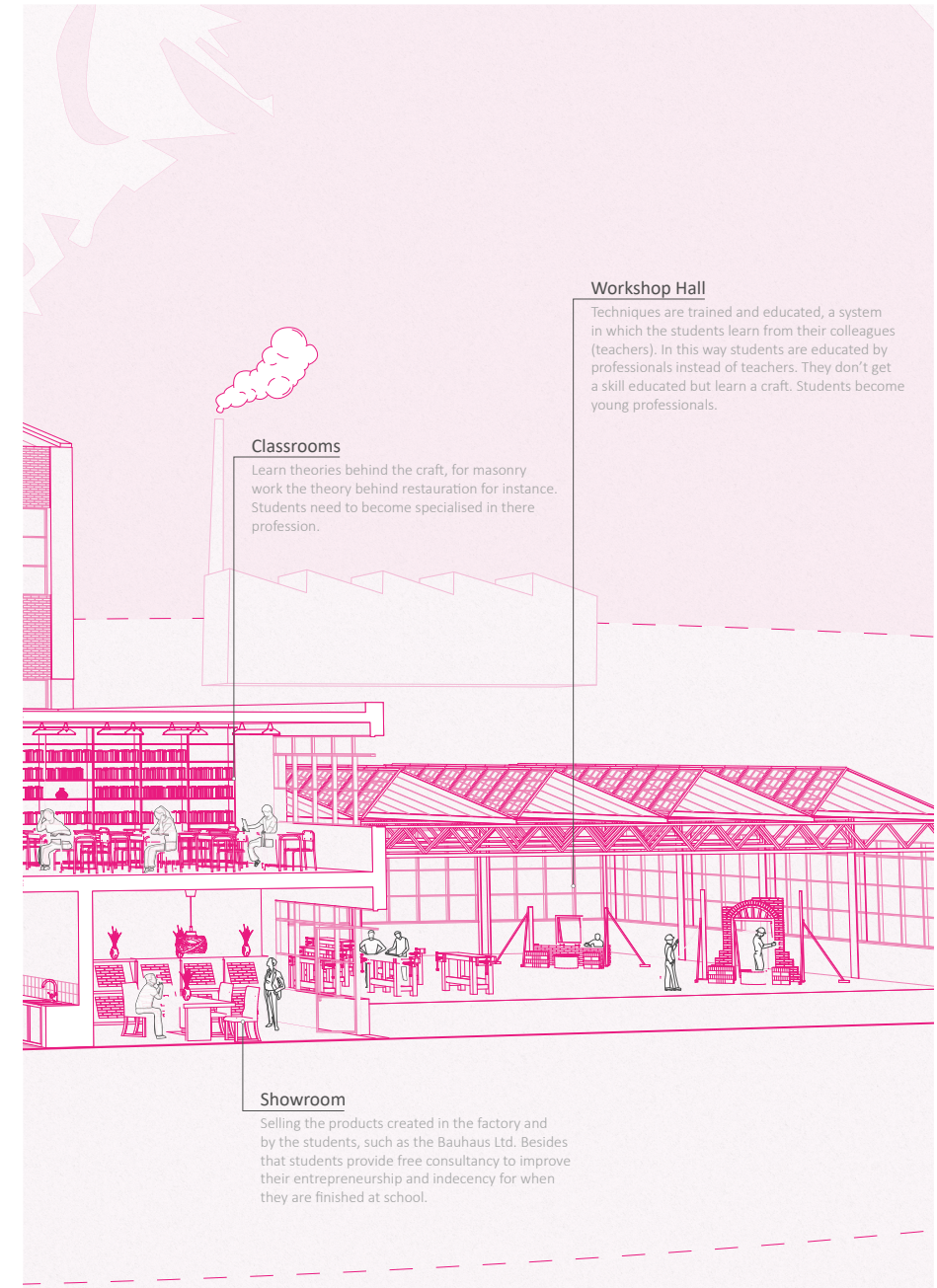
[82] Connection between spaces - Illustration by Author

5a. Building principles

Enhance professionalism

Student not only learn the practical work at the school, but they are also learned to become professionals. By selling the products created in the factory, such as the **Bauhaus ltd.** and by giving free consult to improve their entrepreneurship and independency for when they are finished at school. This all will be educated to them by professionals, who are employees at the factory and at the same time teachers at the school.

←
20th century,
p.26



[83] Enhance professionalism - Illustration by Author

5a. Building principles

Creative canal area

Next to the location of the new craft school for ceramics the creative canal area is located. Here different ateliers, such as painter, pottery and sculptors live and work. It would be nice if the new craft school can operate as a physical platform where these people can come together.

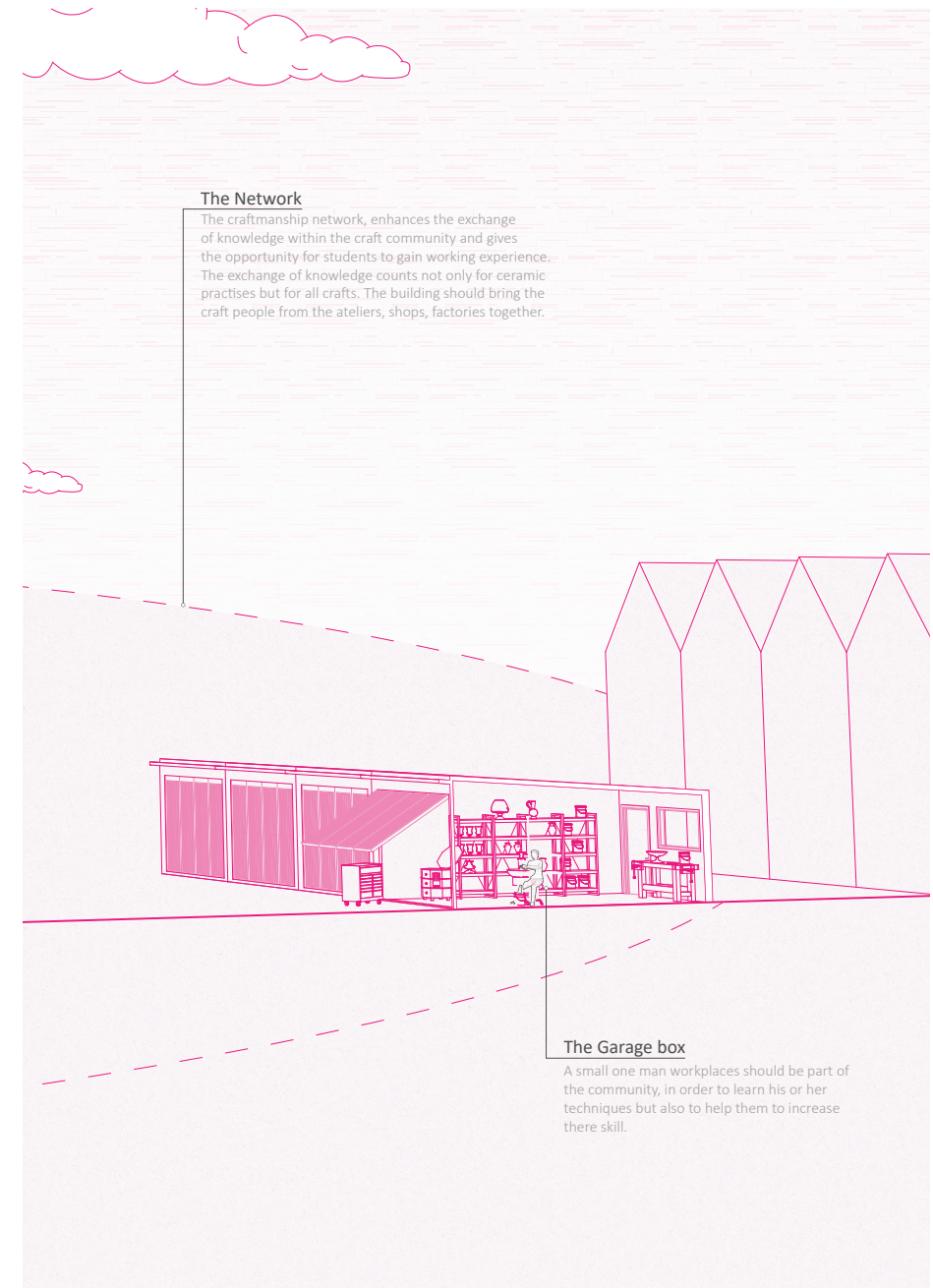


[84] Atelier creative canal area - Illustration by Author

5a. Building principles

Workshops in the area

Besides the creative canal area there are more workshops in Delft, also for these people the new craft school should operate as an physical platform where these people come together and exchange their knowledge and products. By creating this network also opportunities for the students are created, for visiting or working at these workshops.



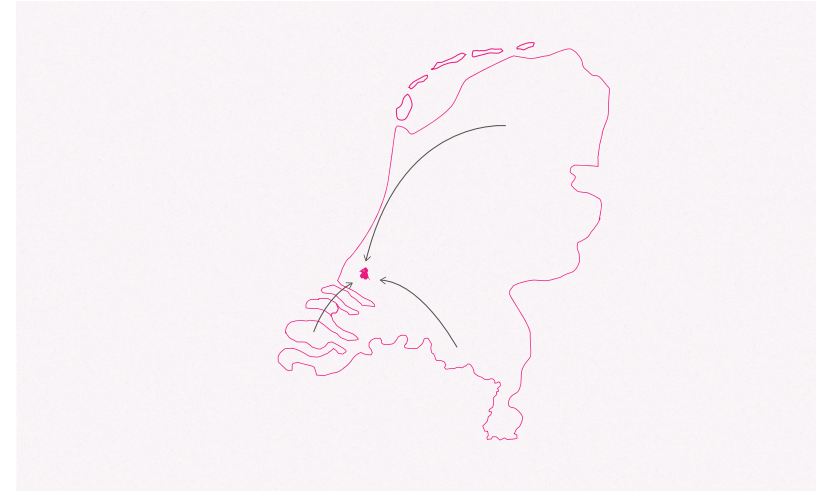
[85] Workshops in the craft network - Illustration by Author

5a. Building principles

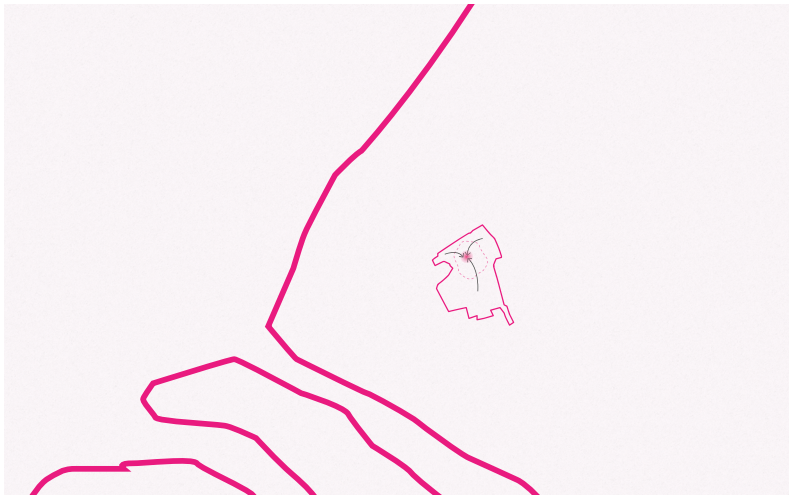
Positioning

Position wise three things are important, the new craft school should be positioned in Delft as physical platform for the craft community. In which there is space for people to come together but also sell their products, by having a **crafts market** for instance. Furthermore the school should be the marker for the ceramic craft in the Netherlands, where student from all over the country come to learn this amazing craft. Besides that the school should become known in the whole of Europe because of the high quality products the students make and the rare skill of vorm bricks the been learned. Which will be exported for renovation projects everywhere.

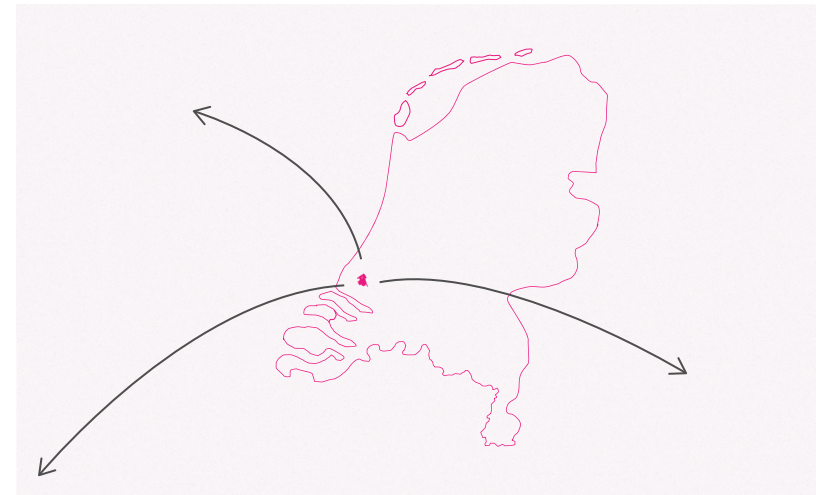
←
The Roman
Empire, p.14



[87] Dutch school for ceramics - Illustration by Author



[86] Craft community Delft - Illustration by Author



[88] Trade internationally - Illustration by Author

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In the last decades, vocational education is having difficulties due to automation and robotisation. Which results in less vocational jobs and disappearing knowledge in most craftsmanship. One of the problems is the positioning of the ROC (the current vocational schools) in the Netherlands, fenced off buildings which are not connecting to their communities or their students. To create a new vocational school I will analyse different workshop through our history. To see which elements are interesting for the new craft school. At this new craft school the craft of ceramics will be learned. Because, in my opinion, this craftsmanship is disappearing in the new buildings that are been build. Nowadays distinctive bonds are rare to be found, and most often simple bonds made from the most basic and cheapest bricks are been used in order to save money. At the new craft school the students learn specific skills but in order to learn these skills, the student should learn first the basics of producing and implementing bricks, to become valuable craftsman. in this booklet the different researches will be clarified in which the system for the new craft school will be explained, the production and implementation of ceramic bricks will be highlighted, the location will be unravelled and the users will analysed.