"Reinterpreting traditional weaving – Examensarbete"

"En omtolkning av traditionell vävning – Degree Project"

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Examensarbete inom arkitektur, avancerad nivå 30 hp
Degree Project in Architecture, Second Level 30 credits
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Thesis Question

- Is it possible to create contemporary architecture whilst integrating contextual aspects such as Kurdish weaving techniques and traditions?
- And if so, is there a way of merging the successive and vernacular qualities with contemporary leaps of technology in a mutually reinforcing manner/way?
- And at the same time staying relevant/progressive?

Statement

I am interested in experiences and knowledge that IS passed on from generation to generation, in a broad sense this is the starting point of my thesis project. I am of Kurdish descent, and I knew early on that I wanted to make a project that related to Kurdish tradition. I was specially intrigued by Kurdish weaving craft and how this particular tradition could be architecturally interpreted and used as a tectonic component. I wasn’t interested in simply reproducing traditional architecture, but rather using certain techniques and methods as a way of conceiving something new.

Formal Expression

In the Kurdish weave tradition, the warped weave frame sometimes takes up entire rooms and creates new spaces. While this is of course unintentional, due to the lack of space, in the project I’ve decided to use it as a building element. The weave frame and the weave, serve as a space dividing element, defining spaces between the different building volumes, as well as creating interior spaces. In terms of function, the weave serves as a Brie soleil producing different climate layers.

In terms of formal expression and spatial qualities, it ties together a series of detached volumes that constitute the building. And at the same time, interiorly and exteriorly giving the building an ambiguous quality, shifting between continuity and detachment, varying levels of transparency, depending on the density of the weave. The weave can also be used in the interior in a traditional way by hanging rugs on the wall, which has climatic and noise reducing benefits. The differing orientation of the perforated façade creates a continuous change visually along with the movement of the observer. When the building is lit from the interior during night-time, the perforated parts of the façade gain a depth trough the different layers of the interior. Another benefit of this is that the wall can be experienced three dimensionally rather than as a two dimensional surface. The perforations is also used to screen windows, providing not only a degree of solar and light control, but also the privacy that is needed to mask windows in this part of the world.

Climate

The climate is an important aspect of the design. Characteristic features of the climate zone in Kurdistan are very high solar radiation and very low air humidity of 10-50%. The sun is an important source of comfort but it is also a discomfiting element and there are large differences in temperature between day and night-time, and therefore some characteristics in the design are created. Such as mashrabiya (screening) integrated in walls to let in the light without heating the spaces, weaving on facades and apertures to create poche’ walls consisting of both weave and solid (concrete) for programmatic reasons and climatic, but also using the weave as an insulating element. In terms of thermal mass in summer, the concrete walls absorb heat at the surface, conducting it inwardly when exposed to the cooler air of the evening/night. By using concrete, absorbing and releasing heat continues on a year-round basis. During the colder season, thermal mass can absorb and release heat by having south facing openings.

Courtyard typology

The courtyard is an efficient modifier of hot and dry climate. The enclosed courtyard collects cool air during the night, keeping the courtyard and the surrounding spaces cool. When the air in the courtyard heats up, it rises which creates convection currents and cross ventilation, particularly when surrounding spaces have secondary ventilation openings from adjacent narrow and cool alleys. The school has an enclosed courtyard but not entirely of the building volumes but also the weave, which together creates a uniform building. The building volumes have perforated walls, which besides controlling light also increase airflow that together with openings in the roof increases cross ventilation. In terms of colour, the materials of the buildings and the courtyard have reflective properties. The aim is to have a self-regulating environment, minimizing the need of regulating the interior climate mechanically.
PRESENTATION

PROCESS MODELS
The weaving technique used in the project is a combination of traditional and digital methods. The project started with the investigation of how the two elements, the weave frame and the warp, interact with each other. The warp, which is typically rigid and non-deformable, was used as a component that could be manipulated into a flexible form. This was achieved by using different materials such as copper and yarn, which allowed the warp to become flexible both in 2D and 3D. Making the weave moldable and also making it possible to create openings became the main focus of the project.

The weaving frame, on the other hand, was altered and used as a tool to create new geometries. By using copper and thread, the weave frame became flexible and could be made three-dimensional. This was made possible by experimenting with moulding and vacuum pressing techniques. The weaving frame served as a building volume and the weave as a tectonic component. The relationship between these two elements was crucial in developing the project.

During the process, it became clear that the various components that make a weave work and what qualities they have that could be enhanced. The project aimed to develop volume and create new geometries by weaving different materials. This resulted in varying volumes and densities of weave, which gave an insight into what should be secondary or primary in the design.

Digital tools such as Rhinoceros were used to create 3D printed weave-frames for creating volume. The weaving frame and the weave tools were developed as facade perforations. The shedding tools needed to be adjusted to suit the material, and the weave frame could be used as a permanent component that enhances the weave and warp. The weave frame and the weave, two contrasting elements, one with structural properties and the other with architectural features, such as textures, colour and tectonics, were investigated. The weaving frame was used to intersect the frame to create spaces and new geometries. The weaving frame became more three-dimensional in which the weave was used to intersect the frame to create volume.

The weaving frame and the weave tools were used to develop basic techniques to fully exploit as many qualities as possible from the weave, the tools, the material properties, and the weaving process. Understanding the complexity of weaving a well-crafted weave, I began to develop basic weaving techniques that are used when weaving a Kelim. Which is the intertwining technique.

At the start of my thesis project I started to learn weaving, the same intertwining technique used in traditional weaving. The weaving frame was used as a tool to create spaces and new geometries. Intersection of angles created cavities that were later made more three-dimensional. This made it clear how I could experiment weaving different materials, which meant adapting the weaving frame and the whole process of warping a weave frame.

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THE SITE

Erbil is the capital of the Kurdistan Region of Iraq. To the east of it, bordering Iran, is the mountainous region of Kurdistan. On the west lies Syria and Turkey. Both of these countries have a sizable Christian population, a fact that affects Erbil city. The Christian community has a broad mix of ethnic and religious groups. Christians who have emigrated there because of religious persecution in their communities. The neighbourhood that has a Christian majority has in recent years enjoyed a large number of visitors. The site is situated in the district Ankawa that is located 4 km north of Erbil city centre. This makes the area attractive to new settlers in the region. There are plans to expand the existing airport, building a new business district and Investors.

Many rivers flow through the mountain ranges, which results into a fertile soil. The mountains in the Iraqi part have an average height of about 2400 meters to 3300 meters, the highest, Halgurd is located near the border to Iran and has an altitude of 3600 meters. The mountainous typology contributes to the extreme differences in temperature. During the summer months between June and September, the temperature can remain at about 40 degrees and the warmest approaching 50 degrees. During winter it is cold and humid with temperatures between 2-13 degrees.

Ankawa and Saladin, there are plans to expand the existing airport, building a new business district and Investors. The city is undergoing a major transformation where many old areas are demolished. Adjacent community has a broad mix of ethnic and religious groups.

The Diagram shows the principal function of the courtyard in terms of shading and temperature fluctuations. The Diagram shows the principal function of the courtyard in terms of shading and temperature fluctuations.

4. support structure
3. Concrete wall
2. Plastic piping
1. Timber formwork

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The sun is an important source of comfort but also a discomforting element, determining the orientation, apertures and adding of weave in front of apertures to control the sunlight transmission has been a important parameter in the design. Since buildings are predominantly closed to the outside in the Islamic regions, shading becomes an important role. Not only for sun protection but also for privacy, the chosen design of the school has this integrated in the design.

**Angled Perforations**

The differing orientation of the perforated façade creates a continuous change visually along with the movement of the observer. When the building is lit from the interior during night-time, the perforated parts of the façade gain a depth through the different layers of the interior. The resulting play of light and shadow create a shift in the perception of the façade as a two dimensional surface.

**Access to Roof**

Access to the roof is provided through a series of wooden columns and interwining weaves in two directions. This allows a continuous change of light and shadow, creating a dynamic effect. The columns also serve as support for the roof structure and provide a means for ventilation and natural lighting. The interwining weaves are made of natural materials and contribute to the overall aesthetic of the design. The roof space is used for recreational activities and outdoor learning experiences.

**Model Photos**

The model photos showcase the detailed craftsmanship and attention to detail in the construction process. They highlight the integration of natural materials and the seamless transition between indoor and outdoor spaces. The model also demonstrates the versatility of the design, allowing for various configurations and adaptations depending on the needs of the users.
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