International Journal of Architecture and Urbanism Vol. 07, No. 01 (2023) 83 – 96

International Journal of Architecture and Urbanism

Journal homepage: https://talenta.usu.ac.id/ijau

Design of Ulos Weaving Handicraft Centre in Samosir Regency with Green Architecture Approach

Cathrine Tantya Febiola Sihotang[1*], Hilma Tamiami Fachrudin[1]

[1]*Architecture Department, Faculty of Engineering, Universitas Sumatera Utara, Medan, Indonesia*

*Corresponding Author: tantyacathrine@yahoo.co.id

ARTICLE INFO

Article history:
Received 01-12-2022
Revised 15-12-2022
Accepted 31-12-2022
Available online 08-01-2023

E-ISSN: 2622-1640
P-ISSN: 2622-0008

How to cite:
Sihotang, CTF and Fachrudin HM. Design of Ulos Weaving Handicraft Centre in Samosir Regency with Green Architecture Approach. International Journal of Architecture and Urbanism. 2023. 7(1):83-96.

http://doi.org/ 10.32734/ijau.v7i1.11692

ABSTRACT

Indonesia is famous for its rich culture, especially the traditional fabrics of each region. North Sumatra is one of the contributions to that cultural heritage. Weaving Ulos or 'Kain Ulos' is an ancestral cultural heritage that is a symbol of the Batak Toba community in the form of long scarves whose existence decreases dramatically and can experience extinction. The lack of a place or container to preserve Ulos is one of the issues to consider. The design of this ulos weaving craft center must pay attention to the facilities, design concepts, and application of green architecture to the building. The aim is to design suitable support facilities for ulos weaving craft centers, making the ulos weaving craft center as one of the containers to preserve ulos weaving to improve the economy of the surrounding community and apply green architecture to the design to preserve the surrounding environment as well. The process of design approach used in this design is qualitative descriptive. Method by analyzing data collected through field observations to the location of craft centers and literature studies. Energy savings become important points that will be applied to the design of the craft center, such as utilizing sunlight, rainwater and also minimizing artificial air conditioning. Samosir is a strategic and supportive location to apply a green architectural approach in the design of this craft center**.**

Keywords: crafts, green architecture, Samosir, Ulos

1 Introduction

Indonesia is famous for its rich culture, especially rich in traditional fabrics from each region. According to Hawkins (2012) [1], culture is a complex that includes knowledge, beliefs, art, morals, customs and other abilities and habits possessed c humans as part of society. North Sumatra is one of the contributors to this culture. Ulos weaving or Ulos cloth is an ancestral cultural heritage that is a symbol of the customs of the Toba Batak people in the form of a long scarf. Ulos is made from natural ingredients such as threads and natural dyes. According to Niessen (2009) [2], a Dutch anthropologist, explained about ulos as the first clothing of the Batak people in North Sumatra, especially Tapanuli. Since the beginning ulos was made as a creation and necessity, so ulos is also made in many varieties and names according to its To set the style in whole manuscript, simply use this template and follow the instructions. We provide some predefined template styles, which can be accessed quickly and conveniently using the style menu in toolbar (see Figure

1). To format a paragraph, authors (writer) can click on the appropriate style name in the style toolbar. function. Therefore, ulos became part of the aspects of regional social culture and the Batak ethnicity.

According to Simarmata (2016), the ancestors of the Toba Batak tribe originally lived in mountain areas and always cultivated crops with low temperature conditions and needed something to warm their bodies. They make a shawl-like cloth called ulos to keep their bodies warm. Until now, ulos has become a legacy from the ancestors and has become an important symbol that is always present in every traditional ceremony of the Toba Batak tribe. The types of ulos are very diverse and each type has a different motif or pattern such as live yeast ulos, hotang yeast, sadum, maratur star, sibolang, accompanying, situhu tuho, bolean, ropes accompanying napirsunaan and others. Generally, women who become ulos weavers, be it mothers or their daughters [3].

North Sumatra, especially the Samosir Regency area, is one of the birthplaces of Ulos cloth. Samosir Regency has the potential to spread the unique wealth of its region because Samosir is one of the tourist destinations that is being developed in Indonesia. Samosir is also the area where the Toba Batak people live. Samosir has the potential to introduce Batak Toba traditional culture and until now it is still very rare for a ulos weaving center to directly show how the process of making ulos weaving is.

According to Niessen (2009) [2], in his book entitled Legacy in Cloth: Batak Textiles of Indonesia, a Dutch anthropologist who has researched ulos for 30 years, ulos is the first clothing of the Batak people in North Sumatra, especially Tapanuli. Since the beginning ulos was made as a creation and necessity, so ulos is also made in many varieties and names according to its function. For this reason, ulos is part of the aspect of regional and ethnic Batak social culture. However, the ulos weaving craft has experienced a drastic decline and can become extinct if no efforts are made to preserve it. The government is also making efforts to preserve this ulos weaving and started to make Samosir, especially the Lake Toba area a tourist center in North Sumatra. Most of the tourists who come for tours can only see the process of weaving ulos directly in the settlements of residents who are still producing ulos for sale. And with the stipulation of Lake Toba as a tourist destination that is being developed in Indonesia, Ulos from Samosir Regency has a great opportunity to be increasingly known nationally and internationally.

With a very beautiful panorama, the Samosir area, especially the Lake Toba area, can not only develop the preservation of ulos woven fabrics but can also take advantage of the beautiful panorama as an attraction. Simanindo Sub-district as the 2nd largest sub-district in Samosir Regency after Pangururan Sub-district is a strategic location in the development of tourist destinations that are being considered by the government. Several ports which are the entrance gates for tourists to Samosir Island are in Simanindo District which will make tourists obliged to cross this area. The Ulos Weaving Craft Center is certainly one of the destinations that is included in the list of the closest destinations that tourists can visit while passing through Simanindo District.

The Ulos Weaving craft center with a Green Architecture approach will bring visitors who come not only to see the weaving of ulos cloth but also to feel the nature around it so that the beautiful panorama that exists can be utilized as an added value. This Green Architecture theme approach will also help weavers in the Poultry process, namely the enlightenment of Ulos woven cloth using rice that is melted and then rubbed with a brush then the threads that have been poultry have to be dried in the open or in the sun. The use of direct sunlight can be applied with the Green Architecture approach as well as for other energy savings such as lighting which is very much needed in the exhibition area. Energy savings such as the use of air conditioning will also be applied to the Ulos Weaving Center building because the ventilation in the exhibition area must always be dry through natural ventilation. The application of this green architecture can also contribute to maintaining the surrounding environment which is still beautiful and valid for the long term.

2 Literature Review

2.1 Craft Center Study

According to Yanto (2012), the handicraft center can be interpreted as an area or a special place for handicrafts, either for its production activities or the handicraft exhibition [4]. According to Fred Lawson (1981), the requirements and criteria for the space needed for the Ulos Weaving Center Room are [5]:

Eye sight distance: The visibility of the visitor's eye with the object of the exhibition must meet a comfortable standard for visitors who come. A comfortable view for the human eye to look at visual objects is 30^o up, 30^o down, and 30^o to the side where the eye can recognize colors well (see Figure 1).

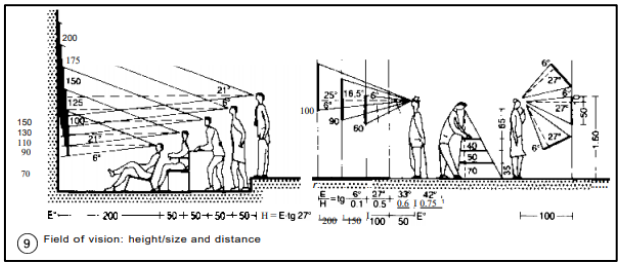

Figure 1 Visibility of the Human Eye with Visual Objects

Protected from interference, strict security level, keeping the area moist, dry (air) and also protected from dust. The Ulos Weaving Center, especially the showroom, must be protected from disturbances caused by humans or unexpected disasters such as fires. Showrooms must also have a strict security system to prevent theft. The placement of visual objects must also be clean, the humidity level of the area is minimal and free from dust.

Sufficient lighting: The lighting of the exhibition space must be considered properly so that visitors can see visual objects comfortably. Lighting can be artificial lighting from lighting (Figure 3) or natural lighting from skylights (Figure 2) or openings in the room.

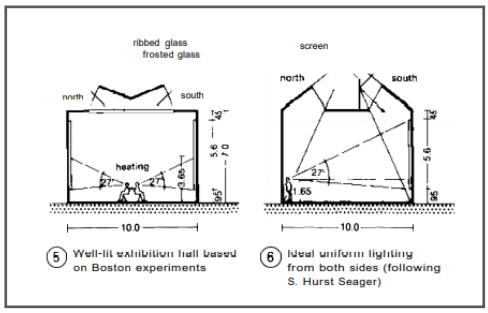

Figure 2 Natural lighting

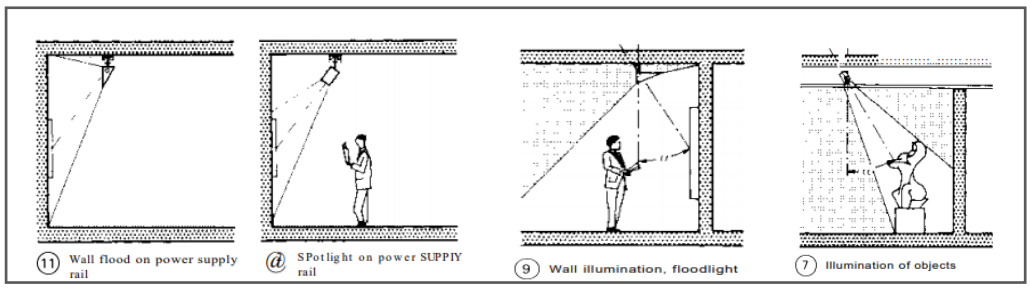

Figure 3 Artificial Lighting

Space flexibility: The rooms at the Ulos Weaving Craft Center must be able to accommodate according to the planned number of visitor capacity. Interconnected spaces to make it easier for visitors to access the entire area.

Good ventilation: Especially in showrooms, ventilation is an important factor that must be maintained. The air in the showroom must be dry so that the woven collection of Ulos is protected from mold that can damage Ulos Weaving. Air conditioning in the room will affect the comfort level of visitors while at the Ulos Weaving Center.

2.2 Ulos Weaving Study

According to Ulos Indonesia (2017), there are several stages of making Ulos weaving, including: Making yarn, coloring, Gatip, Unggas, Ani, Tonun and Sirat. Based on the process of making Ulos Weaving, the space required for the manufacture of Ulos are obtained, among others : Cotton spinning room, Ulos coloring room, Unggas Room, Ulos drying room, Manganic room and Ulos weaving room [6].

2.3 Green Architecture Study

According to Jimmy Priatman (2002) in the journal "ENERGY-EFFICIENT ARCHITECTURE" PARADIGM AND MANIFESTATION OF GREEN ARCHITECTURE, Green Architecture is an environmentally friendly architecture and is based on concern for the conservation of the natural global

environment with an emphasis on energy efficiency, sustainable patterns and holistic approach (holistic approach). There are 6 main principles in green architecture, including [7] : Energy Utilization: Energy use for the operation of buildings must be done sparingly both before and after the building is established, Local Environmental Climate: Adaptation of building design must be adjusted to the local climate to keep the building environmentally friendly, Use of Recycled Resources: Minimize the use of new materials. In addition, the use of resources that risk endangering natural ecosystems should be avoided, The Role of Buildings Can Be Optimal: Buildings have an optimal role for their residents related to safety, comfort, and health factors. Green architectural buildings must have a positive influence on the surrounding environment, meeting the needs of residents: This building is able to meet all the needs needed by its residents. Therefore, the architectural form needs to be adapted to the needs of each occupant in it, Overall Implementation: The application of the above principles must be done thoroughly. So green buildings should not just be limited to paying attention to benefits and saving energy without neglecting the natural and environmental impacts.

3 Methodology

The methods used in the approach to solving the problem of designing the Ulos Weaving Craft Center use descriptive qualitative methods, which describe related data, described in detail and described. Data obtained through several approaches, namely: (1) Study of literature on the function and theme of similar buildings related to the Ulos Weaving Craft Center. This literature study can be obtained through journals, books, references or websites available discussing the Ulos Weaving Craft Center; (2) Study site analysis to obtain site data such as physical data, site problem analysis, site potential and boundaries. Site analysis is obtained by direct survey to the location to be used as the site of the Ulos Weaving Craft Center. The survey was conducted to get the site data needed in the design of the Ulos Weaving Craft Center such as physical data, problems found on the site, site potential etc.; (3) Learn the needs of Weaving Crafts Center users to get the facilities needed. This data is obtained through literature reviews, books, references and websites related to the needs of users of the Ulos Weaving Center and what facilities? Just what the building needs; (4) Survey the site to find out the problem on the site more deeply then respond to it by looking for a solution for the site. The site location survey has been selected as the location of the Ulos Weaving Center to find out what problems are on the site and provide responses or solutions in the design of the Ulos Weaving Craft Center.

4 Results and Discussion

4.1 Design Location

Located in a subdistrict in Samosir Regency, namely Simanindo District with a total of population of Simanindo village according to 2017 data reached 20,409 people with a population density of 103 people/km2 [8]. Ulos Weaving Center is located on the Tuktuk Ring Road, Tuktuk Siadong Village, Simanindo Subdistrict, Samosir Regency, North Sumatra Province, Indonesia. The site of ± 1.5 hectares (ha) is in a tourist area and is on the road of a secondary area near Lake Toba. There are many other tourist

attractions around the site including Batak Museum, Bukit Beta Tuktuk, Sigale-gale Dance Performance and also close to Tomok Port and Ambarita Port.

4.2 Outdoor / Site Design Concept

The shape of the site chosen is a rectangular shape to be more focused and easier to determine the shape of the building (Figure 4). The shape of the site chosen is also based on solar analysis is the shortest side of the design site facing East and West while the longest side of the site faces north and south.

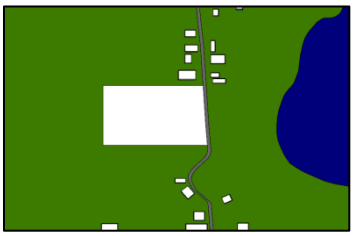

Figure 4 Site Design Form

Ulos Weaving Center is a single building with zoning division. The outdoor space is divided into three, namely the parking area, the Green Open Space (RTH) area and the Ulos Central Building weaving craft itself.

Parking area

The parking area for the bus is on the east side of the building, which is in the front area (Figure 5). Bus laying area parking for visitors at the front so because the location of the lobby and entrance ticket is located on the east side while parking for cars and 2-wheeled vehicles is in the basement either for visitors or employees. However, there is also a special 2-wheeled parking for employees who are present on the north side of the building close to the employee entrance located on the west side of the building.

Green Open Space

Green open space on this site is about 20% of the total land area of the site in accordance with the design with the provisions applicable to the W-5 area, namely the Integrated Tourism area in RDTR Simanindo Subdistrict. The green open space on this design site is a garden that can be accessed by visitors who want to enter the Ulos Weaving Craft Center or visitors who only enjoy the green space (see Figure 5). In this area there is a sitting area with vegetation such as grass and some shade trees that serve as rainwater absorption areas. This green open space area is also one of the public photo spots.

Ulos Weaving Center

This is the main building that will be designed on this site. This ulos weaving craft center is several types of spaces in it such as exhibition areas, namely galleries, workshop and seminar areas, hall shows, management areas, other supporting facilities such as canteens, souvenir shops, ATM centers etc., service areas and technical areas (Figure 5).

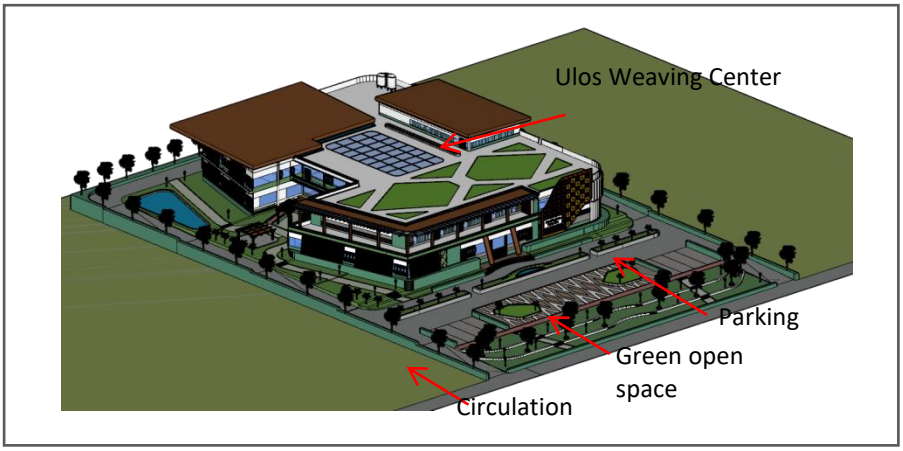

Figure 5 Division of Outdoor Space

4.3 Interior Layout Concept

The spatial concept in the Ulos Weaving Center is divided into several main areas, namely:

Entrance

The entrance area of the building faces east, leading to tuktuk Ring Road. There is a ticket counter where visitors must buy tickets in advance, an ATM center is also located in the lobby area and there is also a building information center if any visitors want to ask about building information.

Exhibition Area

This exhibition area is the main area of this building. The exhibition area contains a Lobby/Lounge that can accommodate up to 100 visitors, the Ulos Gallery which exhibits the entire collection of fine Ulos weaving in the form of Ulos fabric or handicrafts with Ulos base materials, a History Gallery that exhibits all articles, documentation on the origin of ulos and historical items from the Batak tribe, weaving tool gallery contains Ulos looms from time to time (Figure 6).

Figure 6 Exhibition Area

Workshop and Seminar Area

The workshop area shows the process of making Ulos weaving from the beginning to become a ready-to-use Ulos fabric. The indoor workshop room contains weavers who are weaving Ulos fabric which later visitors can also try to weave themselves while the outdoor workshop area contains weavers who are coloring and drying Ulos fabric (see Figure 7). The Seminar Room is located on the 2nd floor of the building with a capacity of 100 people. This seminar room used for certain events such as seminars or weekly meetings.

Figure 7 Workshop Room

Manager Area

The building manager's office is on the 2nd floor of the building. The manager's room is placed separately from the exhibition area because it is private and only the manager can access this area. Employees can pass through a special employee ladder located next to the toilet on the 1st floor with special security such as scanning the worker's ID card when opening the door of the special employee stairs.

Performance Hall

This performance space is used for certain events such as regional music performance dance competitions, fashion shows with Ulos woven fabrics and others. In the performance hall area there is a door that can be accessed by visitors to the balcony facing the east side, namely the view of Lake Toba. In the performance hall there are many openings that are like glass but combined with green walls so that visitors from inside the hall can enjoy the view from the east side without leaving the building.

Creation Spaces

In this area, visitors can enjoy, view or design the ulos color options available using digital features. This area is located on the 2nd floor. Visitors must first purchase tickets before entering the gallery area.

Supporting Facilities

Supporting facilities at the Ulos Weaving Craft Center such as a canteen that can be used to accommodate 100 visitors, a souvenir shop weaving ulos (Figure 9) and also a souvenir shop of delicious food that sells snacks typical of Samosir located close to the lobby, ATM center, and a small mosque are on the 2nd floor of the building. The cafeteria is near the lobby due to the nature of this room open to the public (Figure 8).

Figure 8 Cafetaria

Figure 9 Souvenir Room

Technical Room

This room is a technical building control room. This area is private only accessible to authorized employees.

Service

Toilets that can be accessed by visitors, managers and weavers located in each floor area of Ulos Weaving Center. There is 1 toilet area on the 1st floor located on the west side next to the technical room (Figure 10), a special staircase for employees and also a cafeteria, while the toilet is on the 2nd floor there are 2 areas, namely on the east side near the seminar room and also on the West side next to the management room (Figure 11).

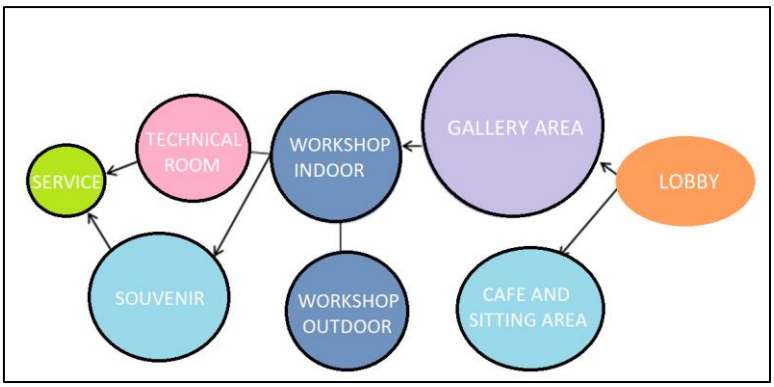

Figure 10 Layout 1st Floor

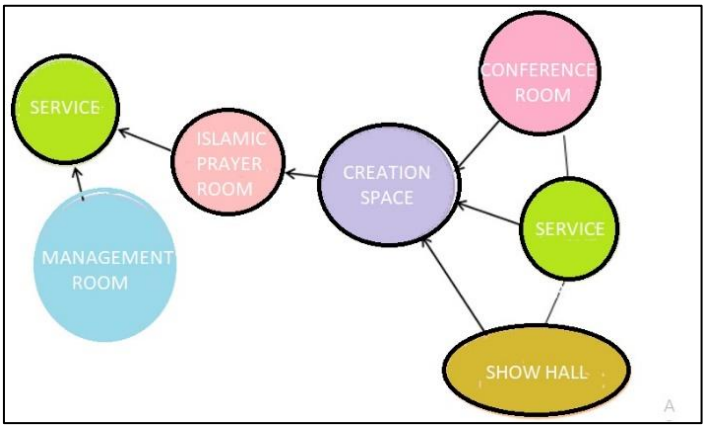

Figure 11 Layout 2nd Floor

4.4 Theme Application Concept

Natural Lighting

The application of the concept of natural lighting is not absolutely applied to every room in the Ulos Weaving Craft Center (Figure 12). Most rooms are still combined with artificial lighting because there are rooms that must get high lighting such as rooms that are technical in nature. The procurement of skylights is in the middle of the building which is one of the largest light entrances into the building [9]. The skylight is above the innercort which is a small garden in the middle of the building. The number of openings is also greater in the North and South directions of the building using active windows or curtain walls (see Figure 13). In gift shops and gift shops, food has glass walls covered with secondary leather on the outside. In the exhibition area and indoor workshops also get natural lighting and additional artificial light.

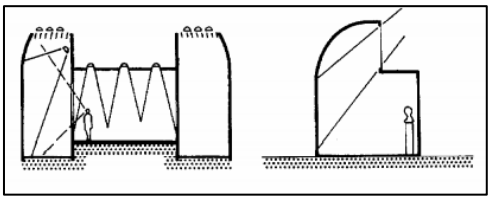

Figure 12 Concept of Natural Lighting with Skylights

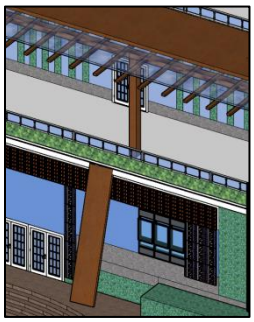

Figure 13 Active use of curtain walls and windows

Artificial Lighting

Artificial lighting is also needed in this building, especially in room techniques that require a lot of light (Figure 14). The use of energy-efficient artificial lighting is using LED (Light Emitting Diode) lights with energy saving capabilities of up to 80% compared to CFL incandescent lamps or regular incandescent lamps. The use of LED lights can also be used in the long term because it can last longer which is up to 25 years compared to incandescent lamps for only 18 months which also means minimizing costs [10].

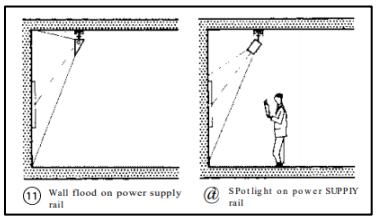

Figure 14 Artificial Lighting

Natural Air

Natural ventilation is obtained from many planned openings. The design of sites that have cold temperatures with low pollution levels is a consideration in the concept of natural ventilation. The building will implement a cross ventilation system so that indoor air exchange can occur (see Figure 15). Natural ventilation is applied to the seating area, lobby/lounge, workshop area, management room area, service area and support facilities, as well as the performance hall. Natural ventilation uses rosters on all sides of the building as well as active windows located on several sides of the building (Figure 16) [11].

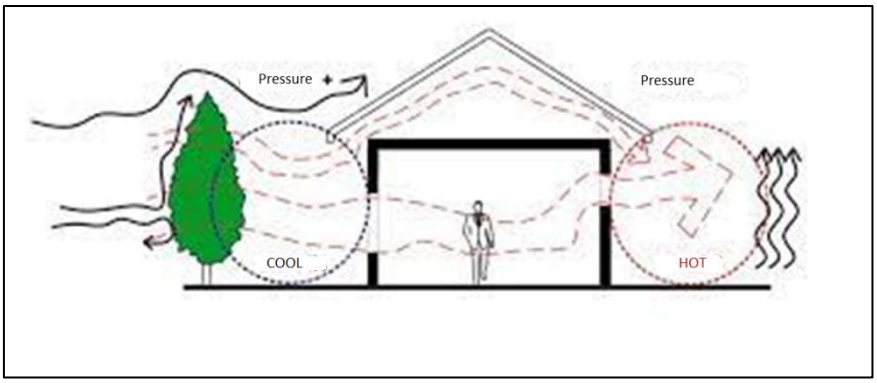

Figure 15 Natural Air

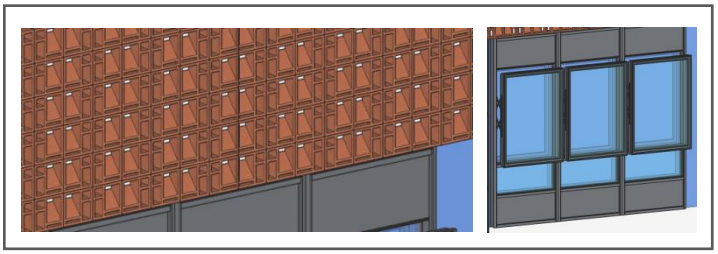

Figure 16 Use of Roster and Window

Solar Panel Usage

The use of solar panels can save electricity used for the operation of the Ulos Weaving Craft Center building. The use of solar panels has been seen on lampposts located on the east side of Tuktuk Ring Road right in front of the design site. A similar concept will be applied to the building.

Rainwater Utilization

High rainfall in Samosir Regency is one of the things that can be used to save energy. The utilization of rainwater is used for needs in certain spaces. Rainwater flowing on the roof will be accommodated in the rainwater channel located just under the sloping roof. Rainwater is piped through pipes which are then passed to the reservoir. Rainwater in the reservoir is channeled into a special room to be filtered and the results will be distributed to all rooms.

Use of Secondary Skin

Sedondary skin serves as a buffer for sunlight that enters the building excessively. The use of secondary leather will be applied to the side of the building facing west. The east and south sides of the building also have a small amount of secondary leather (Figure 18). On the east side, there is a large secondary leather covering the gallery area on the 1st floor and the toilet area and seminar room on the 2nd floor. This ulos-patterned secondary skin can be directly visible both from close and far and becomes an icon in the building and becomes one of the photo spots for visitors. The material used on secondary leather is used wood that is shaped like a ulos motif to provide locality value to the building. The use of Ulos motifs on secondary skin also adds artistic value, namely ulos-shaped shadow play in certain spaces when light passes through the secondary skin (Figure 17).

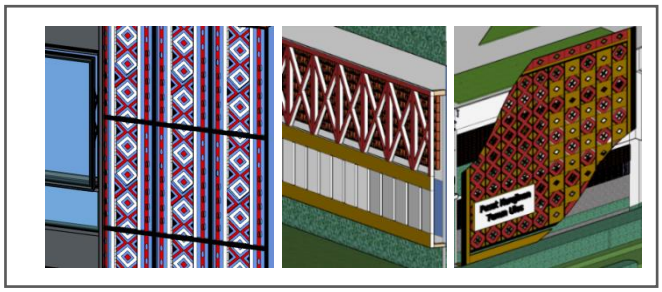

Figure 17 Secondary Skin

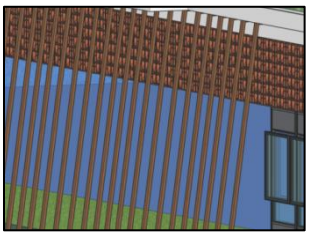

Figure 18 Secondary skin on the south side of the building

The use of green walls on the façade of the building becomes one of the alternatives in lowering the temperature of outdoor spaces and inside the building, the nature of plants that are able to absorb and barely re-emit heat makes green walls a modern solution in lowering the heat of outdoor and inner space

temperature [13]. The application of green walls is found on most sides of the building, namely on the lower side of the wall and also the side that gets excess sunlight (Figure 19).

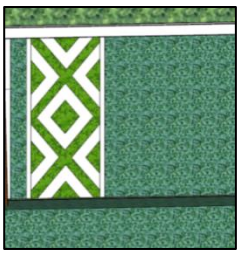

Figure 19 Green Wall

Vegetation Planting

According to Carpenter (1975), vegetation in RTH acts as a control of views, barriers, climate controllers, erosion controllers, animal habitats, and aesthetics [14]. Vegetation also acts as a buffer for incoming sunlight and excessive heat. This type of shade tree is used in areas exposed to afternoon sunlight, namely the area behind the building and is also placed in the eastern area of the building, which is a park area that is one of the places for visitors to see the view towards the lake, but in small numbers. On the roof floor, there is a garden and vegetation because it applies a green roof that can be accessed by visitors. . A green roof is the part or entire roof surface of a building covered by vegetation and planting media planted throughout a waterproof layer/membrane [15].

5 Conclusion

This Ulos Weaving Center not only applies a theme approach to its design but also the application of cultural elements. The concept of Mass Composition is based on location analysis and also the implementation of ulos which has 2 ends. There is an empty space in the middle of the composition being one of the largest entrances of sunlight into the building. The application of the Green Architecture theme was chosen in the design of this Ulos Weaving Center so that the nature around the design location can be maintained its beauty, considering the Samosir area is still very well maintained nature and the surrounding environment. The use of excess energy that can have a negative impact on the surrounding environment can be overcome by the application of the green architecture theme. Ulos Weaving Craft Center applies the principles of Green Architecture including the orientation of the building, namely: the longest side of the building facing north and south, water conservation is the use of rain water and the management of ulos staining waste into recreational ponds, natural ventilation using rosters and windows, natural lighting using curtain walls and skylights, the use of solar panels, buildings that follow the contours of the design site, and pay attention to the needs of users in the building. Batak cultural elements are also found in the application of building design such as on secondary skin with ulos pattern so that there is a shadow playing with the ulos pattern when the light of the sun passes through the secondary skin, there is a staircase that leads to the main entrance as the embodiment of the stairs that lead to the main door of the Batak Toba traditional house, and also the outdoor

workshop area located lower than the surrounding area which is the embodiment of the weaver mother who is weaving under her house.

REFERENCES

[1] Didik Prihantoko. (2021, August) Scribd. [Online]. https://www.scribd.com/document/520813248/Pengertian-Budaya

[2] S. A. Niessen, "Legacy in Cloth : Batak Textiles of Indonesia," in *Legacy in Cloth : Batak Textiles of Indonesia*. Leiden, Netherlands: KITLV Press, 2009, 2009, p. 568.

[3] Janner Simarmata. (2018) Simarmata.or.id.

[4] Asad Fajar Muhammad, "Perancangan Pusat Kerajinan Tangan Daur Ulang Sampah Plastik di Kota Bandung," *Perancangan Pusat Kerajinan Tangan Daur Ulang Sampah Plastik di Kota Bandung*, p. 78, October 2019.

[5] Fred R Lawson, *Congress, convertion and exhibition facilities: planning, design and management*, illustrated, reprint, revised ed. Ann Arbor, Michigan: Architectural Press, 2000, 2000.

[6] Ulos Indonesia. (2017, March) Ulos Indonesia. [Online]. www.ulosindonesia.com

[7] Jimmy Priatman, ""ENERGY-EFFICIENT ARCHITECTURE" PARADIGMA DAN MANIFESTASI ARSITEKTUR HIJAU," *"ENERGY-EFFICIENT ARCHITECTURE" PARADIGMA DAN MANIFESTASI ARSITEKTUR HIJAU*, no. Vol 30 No 2 (2002) : December 2002, p. 9, June 2004.

[8] (2020) Badan Pusat Statistik Kabupaten Samosir. [Online]. https://samosirkab.bps.go.id/publication/2020/09/28/15dd6a3fc4b3001df9d6d17f/kecamatan-simanindo-dalam-angka-2020.html

[9] Ernst Neufert, *Data Arsitek Terjemahan*. Jakarta, Indonesia: Erlangga, 1998.

[10] Bambang Winardi, "Penghematan Biaya Listrik Dengan Memanfaatkan Lampu LED ," *Penghematan Biaya Listrik Dengan Memanfaatkan Lampu LED* , Februari 2018.

[11] Ir. I Nyoman Sudiarta, "Penghawaan Alami," *Penghawaan Alami*, 2016.

[12] Archifynow. (2020, April) Archifynow. [Online]. https://www.archify.com/id/archifynow/mengenal-secondary-skin-dan-fungsinya-pada-bangunan

[13] Gregorius Vincent, "Efektivitas penggunaan Green Wall pada Facade Bangunan terhadap Suhu dan Kelembapan Ruang Luar dan Dalam Bangunan," *Efektivitas penggunaan Green Wall pada Facade Bangunan terhadap Suhu dan Kelembapan Ruang Luar dan Dalam Bangunan*, 2020.

[14] Siti Nurul Rofiqo Irwan, "Fungsi Vegetasi pada Ruang Hijau dan Hutan Kota untuk Pengembangan Lanskap Ecopesantren ," *Fungsi Vegetasi pada Ruang Hijau dan Hutan Kota untuk Pengembangan Lanskap Ecopesantren*.

[15] P2KH. (2016, July) P2KH. [Online]. http://sim.ciptakarya.pu.go.id/p2kh/knowledge/detail/mewujudkan-konsep-green-roof-pada-atap-bangunan