

DESIGNING NORTH SUMATRA PROVINCIAL LIBRARY WITH GREEN ARCHITECTURE APPROACH IN MEDAN CITY

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Abstract (English)

Indonesia is one of the countries that has a low interest in reading. This is concluded from the results of the “Most Littered Nation In the World” research conducted by Central Connecticut State University in March 2016, which states that Indonesia is ranked 60th out of 61 countries regarding reading interest (Devega, 2017). In addition, according to data from Siswati (2010:124), the IAEEA publication dated November 28, 2007 on reading interest from 41 countries shows that the reading ability of Indonesians is comparable to the southern hemisphere countries of New Zealand and South Africa. According to BPS in 2006, Indonesians still do not use reading as a way to get information. They found that 85.9 percent of Indonesians would rather watch television and listen to the radio than read (23.5 percent). This means that 23.5 percent of Indonesians read to get new information. This data shows that people do not need to read. To address the existing problems, the North Sumatra Provincial Library will be designed with a green architecture approach based on information and communication technology, in order to support the library's function as an information center with recreational nuances that are expected to be enjoyed by the entire community so as to realize a modern library that can keep up with the times.

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1. Introduction

The results of the “Most Littered Nation In the World” study conducted by Central Connecticut State University in March 2016, which showed that Indonesia was ranked 60th out of 61 countries in terms of reading interest (Devega, 2017). In addition, according to data collected by Siswati (2010:124), the November 28, 2007 IAEEA publication on reading interest from 41 countries shows that the reading ability of Indonesians is comparable to that of southern hemisphere countries New Zealand and South Africa. According to BPS in 2006, Indonesians still do not use reading as a way to get information. They found that people would rather watch television (85.9%) and listen to the radio (40.3%) than read (23.5%). This means that 23.5% of Indonesians read to get new information. This data shows that reading is not yet a necessity for people.

2. Method

Design methods carried out:

1. Study Literature, which is an activity carried out by collecting data from reliable sources to collect, analyze, and concluding all data from relevant or similar written sources. Literature studies are useful in providing in-depth information related to perspectives on Islamic boarding school architecture.
2. A comparative study is a method that compares design cases that have similar functions or themes by looking for them from various sources.

3. Result and Discussion

3.1 Library

“The term “library” in Indonesian comes from the root word “pustaka”, which means book, plus the prefix “per”, which means place or facility. Therefore, in general, the term

refers to a facility or place to store books that are collected for specific purposes, such as reading, studying or entertainment. In addition, a number of terms that emphasize the meaning of library include: Of course, there is a difference between a science centre and a science museum; namely the method of presenting the collection. According to Jeff Rosenblatt, director of Science City in Union Station, Kansas, the museum tends to make visitors more passive, just come, see, and conclude. But at the science center, visitors are more active with the presentation of a collection of props that allow visitors to try it themselves and get a different experience.

3.2 Purpose Of Library

Libraries are typically used for educational, informational, recreational and research purposes. Libraries continue to function as centers of cultural and social activity as well as sources of information, even if they can be developed further. Libraries mostly serve customers who inquire about the information they contain, either by contacting the librarian directly or by searching for reading materials through the catalog. Classification Of Science Center

In general, libraries function in many ways, such as education, information, culture, preservation, and recreation.

1. Information Function

This function works when people, as users of library services, need information, which covers a variety of things and can be accessed through the library.

2. Education Function.

Libraries are not only a place to read but also a tool of intelligence for the nation. People gain a lot of knowledge from their collections.

3. Preservation Function

Libraries also serve as a way to preserve historical evidence; they have saved many historical documents, both directly and indirectly. The library performs its preservation role here.

4. Cultural Function

Libraries can serve as a medium for publicizing the culture of the place where they are located. The library's various collections provide tourists and the general public with opportunities to learn about local culture.

5. Recreation function

So that the library is not perceived as a boring building, the library management system should be focused on creative activities so that this function can be carried out properly. People will be more interested in visiting libraries if they can offer services that go beyond information. We, as users and service providers of libraries, must ensure that this function can be performed well.

3.3 Classification Of Library

"National Libraries, Local Government Libraries, Regional Libraries, Public Libraries, School Libraries, Special or Agency Libraries, Corporate Libraries, Educational Libraries, and University Libraries are some of the known types of libraries". However, various sources state that libraries fall under the following categories:

- a. International Library, This library is established by an organization consisting of two or more countries. One example is the United Nations Library in Geneva."
- b. National Library, Many printed and recorded library materials published in the country are stored in this library. One example is the National Library of Indonesia in Jakarta.
- c. Public Libraries, These libraries, whose collections cover a wide range of disciplines, are organized with public funds and function for the benefit of the public. Regional, city/district, sub-district, village, and mobile libraries are some examples.

- d. Private Libraries, They are usually managed by private institutions or individuals, and they only serve a specific group.
- e. Special Libraries, Libraries are institutions or agencies, both public and private, that help people in a particular field of knowledge acquire knowledge. overseen by departments, state agencies, research institutes, community organizations, military organizations, businesses, and private companies. One example is the Research Institute Library and the Language Institute Library.
- f. School Library, This is a library owned by educational institutions at the elementary, middle, and high school levels. It helps carry out the responsibilities of educators in schools.
- g. College Libraries, these are libraries that are under the auspices of a university and are an important part of the university as a means of supporting the implementation of the tasks listed in the Tri Dharma of Higher Education. Libraries such as UGM Library, UAJY Library, and ITB Library are example

3.3 Green Architecture

“According to the US EPA (2009), green architecture is a development concept that places emphasis on structures and processes that are environmentally considerate and conserve resources throughout a building's life cycle. From site selection to the design, construction, operation, maintenance, renovation, and demolition stages, green architecture takes into account its impact on the environment. It involves design that is economical, focuses on sustainability, and provides comfort for the occupants.” Literally, High-Tech Architecture reflects the application of advanced technology in the building design process. This approach utilizes advances in science and technology to create buildings that consider various aspects, including space, function, form, structure, materials, and other elements.

The concept of green building promotes the idea that building technologies and behavioral improvements can play a major role in addressing global warming. According to Ministry of Environment Regulation No. 8 of 2010, buildings that meet certain criteria can be classified as green buildings. These criteria are as follows:

- Use of environmentally friendly construction materials.
- The building has facilities, amenities, and infrastructure for the conservation of water resources.
- There are facilities and amenities for energy conservation and diversification.
- Use of materials that do not damage ozone in the building structure.
- The building has facilities for domestic waste water management.
- There are facilities for sorting waste.
- Maintain the welfare of the people living in the building.
- There are facilities and amenities available to manage the site sustainably.
- There are means and facilities to anticipate disasters.

3.4 Project Description

This library design project is located at “Jl. Brigjen Katamso No. 45 K Sei Mati, A U R, Kec. Medan Maimun, Medan City, North Sumatra 20159.” with a land area of 10.000 m².

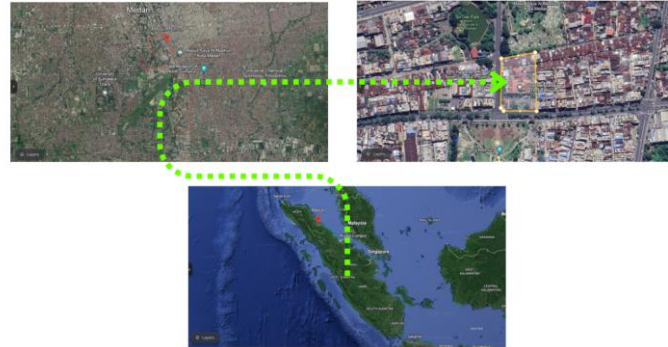


Figure 1
Location Source: Google

3.5 Mass Concept

Basic Building Form Analysis:

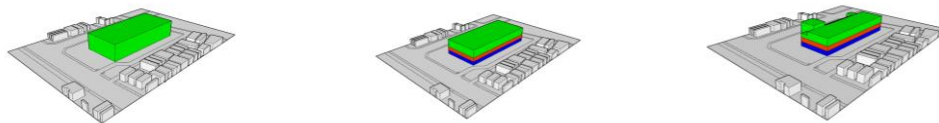


Figure 2 Basic shape of the building idea

The shape of the first building mass is rectangular according to the basic shape of the site. Then, the shapes are divided into three sections, respectively the administration section, the library section, and the support section. Then, the shapes are repeated according to the results of the analysis.



Figure 3 Massing

- Thesquare, long shape shows something pure and rational and has a clear orientation.
- The circular shape has a centralized meaning that is stable which reinforces its basic nature as an axis in accordance with the main function of this Science Center, namely the exhibition

hall and planetarium.

3.6 Basic Concept

The main idea of the design originated from the problem that people in the city of Medan, especially students, showed their ability to use technology, as seen by the increase in the use of smartphones and other telecommunication devices. However, the majority of the celndelruling community has a consumptive attitude, only as users, without any initiative or encouragement to innovate in the creation of new technologies.

This condition is not in line with the interest of the people of Medan City, who still lack knowledge of telecommunications, although the development of telecommunications and knowledge of telecommunications are related. One of the reasons is the lack of extension facilities that can enhance the exploration and development of science and technology, so it is necessary to design a science centre in Medan City with a high-tech approach. This can help people in Medan City to increase their knowledge and awareness about the development of science and technology. The high-tech approach is used because it is in line with the function of the building, which is related to technology (Figure 4).



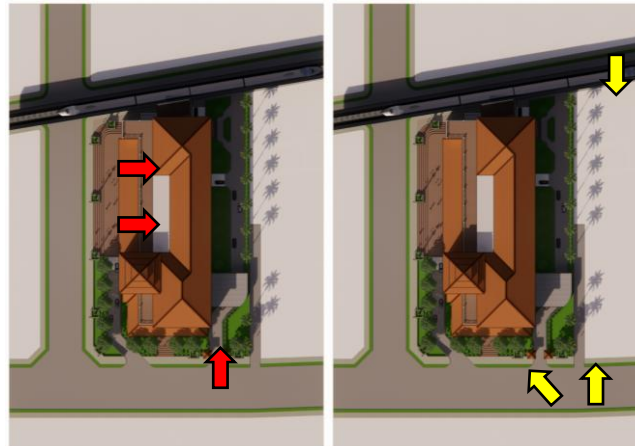
Figure 4 Mass Building

1.1 Zoning

The Science Center Design Project is located on Jalan Gagak Hitam, which is the main road and mostly consists of residential and commercial zones. Figure 5 zoning of the design area shows that only Jalan Gagak Hitam can be used to reach the main entrance. To prevent congestion outside the site and facilitate visitor access, the entrances and walkways within the site are designed with sufficient width and 60-degree angles. The configuration of the site allows for optimal parking, with the parking lot located close to the entrance. The front of the site is equipped with a canopy, providing shade and increasing pedestrian comfort (Figure 6).



Figure 5 Zoning



Pejalan kaki

Kendaraan

Figure 6 Circulation

1.1.1 Floor Plan

1.1.1.1 Ground Plan



Figure 7 Ground Plan

1.1.1.2 Second Floor Plan

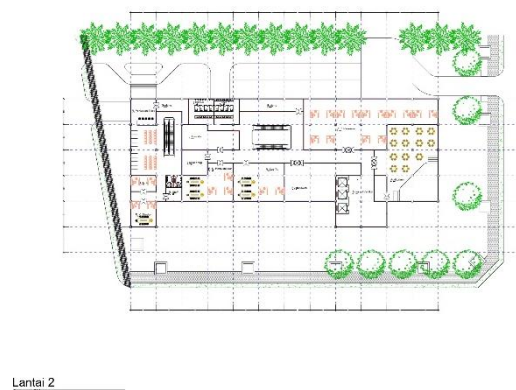
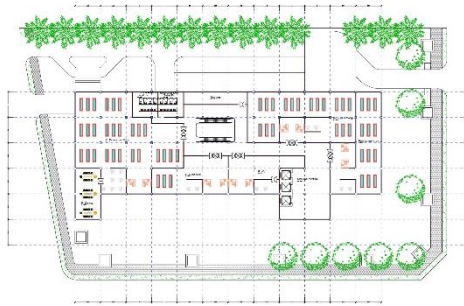


Figure 8 Second Floor Plan

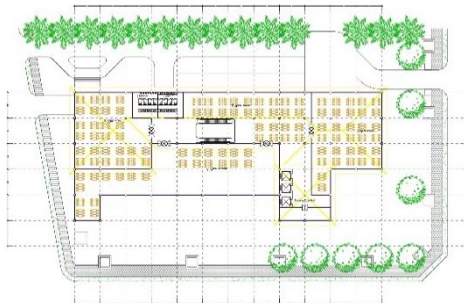
1.1.1.3 Third Floor Plan



Lantai 3

Figure 8 Second Floor Plan

1.1.1.4 Four Floor Plan



Lantai 4

Figure 8 Second Floor Plan

1.2 Theme Implementation

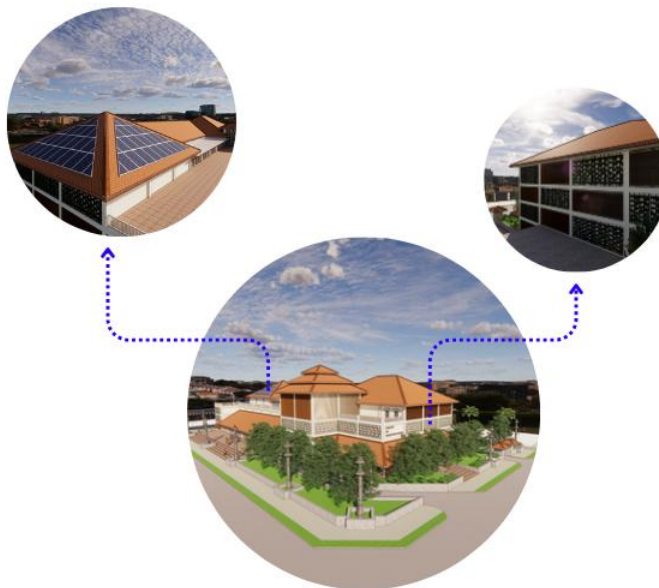


Figure 9 Solar Panel and secondary skin

The shape of the first building mass is rectangular according to the basic shape of the site. Then, the shapes are divided into three sections, respectively the administration section, the library section, and the support section. Then, the shapes are repeated according to the results of the analysis.

For the electrical energy consumption of the North Sumatra Provincial Library Design per day is estimated to consume 1,700 KW of electrical energy. While the electrical energy that can be supplied by the planned solar panels is 500 KW. So the planned solar panels are able to supply 30% of the electrical energy needs for the design of the North Sumatra Provincial Library.

Secondary skin is an additional layer applied outside the main wall of a building in green architecture. Secondary skin serves to protect the building from unwanted external environmental influences, such as heat, radiation, wind, rain, noise, and pollution.

4. Conclusion

Based on the results of identification, research, analysis and design concepts, it can be concluded that the design of the North Sumatra Provincial Library in Medan City is expected to be a choice or alternative solution for tourists in choosing a hotel in the Jalan Brigjend Katamso area.

The design of the North Sumatra Provincial Library in Medan City is located on Jalan Brigjend Katamso, where the site is a strategic area to build a library because it is included in the tourist area. From the results of the analysis, there are several historical buildings in the site. Among them, medan raya mosque, Maimun Palace, and sri deli park. Thus increasing the opportunity for people to come to visit the North Sumatra Provincial library.

In designing the North Sumatra Provincial Library in Medan City, the green architecture approach was chosen as a response to the current use of electrical energy. Some efforts that can reduce the use of electricity include applying solar panels. Some of the concepts applied to the design of the Library in Medan City are:

- Conserving Energy, Applying the use of solar panels in order to reduce the use of electricity such as heaters, air conditioners, and other electrical devices.
- Respect For Site, Redesigning the building facade as an effort to unite the building with the surrounding site, as well as increasing the existing vegetation on the site.
- Mix use building, Has several different functions and uses in one building. So that it can, Optimize distance and time.

5. References

- Ayu Sukma Wardani, I. 2022. Perancangan Interior Perpustakaan Soeman HS Kota Pekanbaru Provinsi Riau (Doctoral dissertation, ISI Yogyakarta).
- Fitri, MS, Siregar, YD, dan Abidin, S. 2021. Masjid Al-Musannif: Lambang Keberagaman di Kota Medan. Warisan: Jurnal Sejarah dan Warisan Budaya , 2 (1), 23-28.
- Hartina, S. F. 2021. Perpustakaan Wilayah di Kota Makassar Dengan Konsep Arsitektur Hijau (Doctoral dissertation, UNIVERSITAS HASANUDDIN).
<https://repository.telkomuniversity.ac.id/pustaka/142264/perancangan-ulang-perpustakaan-umum-di-kota-medan.html>
- Ilfa, Y., dan Zein, A. 2022. Pemanfaatan Cahaya Alami pada Ruang Baca dan Ruang Koleksi Perpustakaan Soeman HS Pakanbaru Riau. *REKAJIVA Jurnal Desain Interior*, 1(2), 98-107.
- Kinanti, M. Z. A. S. 2023. Perancangan Perpustakaan Umum Hibrida di Kota Yogyakarta Dengan Pendekatan Arsitektur Perilaku (Doctoral dissertation, Universitas Atma Jaya Yogyakarta).

- Lahu, K. M., Waani, J. O., dan Karongkong, H. H. 2023. Perpustakaan Umum Kota Timika Kabupaten Mimika: Arsitektur Neo Vernakular. *Jurnal Arsitektur DASENG*, 12(2), 1-12.
- Loar, Y. N., dan Setiawati, E. 2023. Manajemen Pengelolaan Perpustakaan Sekolah: Studi Analisis Pengelolaan Perpustakaan Sekolah. *Jurnal Manajemen & Bisnis*, 13(1).
- Mahendra, I. M. A., dan Juniastra, I. M. 2023. Strategi Perencanaan Kawasan Industri Dalam Tata Ruang Perkotaan. *Jurnal Ilmiah Vastuwidya*, 6(1), 45-54.
- Manalu, E. N. S., dan Haryotedjo, T. 2018. Perancangan Ulang Perpustakaan Umum Di Kota Medan. *eProceedings of Art & Design*, 5(1).
- Marhadi, M., & Dahliani, D. 2023. Perpustakaan Umum Rekreatif Di Banjarbaru. *Lanting Journal Of Architecture*, 12(1), 181-189.
- Nugraha, H. 2013. Perpustakaan dan Pelestarian Kebudayaan. *UNILIB: Jurnal Perpustakaan*, 50-62.
- Putra, R. A., Triwahyono, D., dan Fathony, B. 2021. Perpustakaan Umum di Kota Malang Tema: Arsitektur Metafora. *Pengilon: Jurnal Arsitektur*, 5(02), 379-398.
- Ramdan, W. M., dan Kustianingrum, D. 2023. Penerapan Arsitektur Hijau Pada Perancangan Taman Konservasi Tumbuhan Hutan Tropis Sherwood Theme Park Di Kota Bandung. *FAD*, 3(2), 499-508.
- Rifandy, R., Wijaya, I. N. S., dan Surjono, S. 2023. Penentuan Kriteria Pemilihan Lokasi Minimarket Berdasarkan Multi-Criteria Decision Analysis (MCDA) Di Kecamatan Lowokwaru. *Planning for Urban Region and Environment Journal (PURE)*, 12(1), 199-210.
- Sitorus, R., Fitri, I., & Indira, S. S. ISTANA MAIMUN: SEBUAH MONUMEN KEJAYAAN INDUSTRI PERKEBUNAN DI TANAH DELI.
- Suot, A. P., dan Gosal, P. H. 2017. Redesain Perpustakaan Umum Di Kota Manado. *Green Architecture (Doctoral dissertation, Sam Ratulangi University)*.
- Utomo, H., & Rahmah, N. (2019). Perancangan Perpustakaan Nasional Republik Indonesia di Jakarta Pusat dengan pendekatan arsitektur biophilic. *SKRIPSI-2019*.
- Widiati, I. R. 2019. Tinjauan studi analisis komparatif bangunan hijau (green building) dengan metode asesmen sebagai upaya mitigasi untuk pembangunan konstruksi yang berkelanjutan. *Konferensi Nasional Pascasarjana Teknik Sipil (KNPTS) X 2019*, 69-76.