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Medan Fish Centre With Ecological Architecture Approach

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Abstract. Medan Fish Center design is a building design that functions as a fish market which is located on K.L. Yos Sudarso Street, West Medan District, North Sumatra. This design depicts a fish market center equipped with supporting facilities such as a freshwater aquarium, food court, and gallery. The application of ecological architecture to market design applied to the management of liquid waste produced by fish traders. The fish market design is expected to benefit the community not only as a means of the community's economy but also as a means of recreation and education.

Keywords: ecology, fish market

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1 Introduction

Fish Market is a fish market that sells fresh, life, and processed fish equipped with storage facilities that keep the temperature of fish products frozen/cold. The clean fish market is supported by other facilities such as drainage, sanitation, electricity, clean water facilities, and the availability of sufficient bulk ice (article 1, paragraph 3) [1].

One example of an unhygienic fish market is the Cemara Fish Market, in East Medan District. This market condition is very worrying both in terms of buildings and the environment around the market. Worrying both in terms of buildings and the environment around the market. From a building perspective, this market can be categorized as far from the predetermined standard of the fish market, and location of the market is on the edge of the sewer gives the impression of a market that looks shabby because the waste from the market is entirely dumped directly into the city canal which can pollute the environment around the market. This market condition is one of the reasons for planning a hygienic fish market development (article 3, paragraph 5) [2].

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Especially in Medan City, the hygienic fish market has not have been fully realized according to the existing regulations, so a hygienic fish market design was planning, namely the Medan Fish Center, located on K.L. Yos Sudarso Street, Medan Timur District, North Sumatra.

2 Literature Reviews

The fish market is a potential exchange arena in physical form between sellers and buyers in terms of exchange due to interest, Good image, and adequate purchasing [3]. The market serves as a place or container for services in the economic aspect of society. In terms of architecture, the market function is to show regional characteristics that display the physical forms of buildings and their artifacts that are adapted to existing thermal and climatic conditions [4]. To realize the comfort aspect of traditional market designs, the design of the buying and selling area must be by existing standards. to achieve the convenience aspect of the market design and the design of the buying and selling area must be following existing standards [5]. The stall size standard is 9m2 and 12m2, while the booth size is 6m2, the area standard of the booth without the partition used to sell meat and the like is 2m2 to 4m2 (Figure 1).

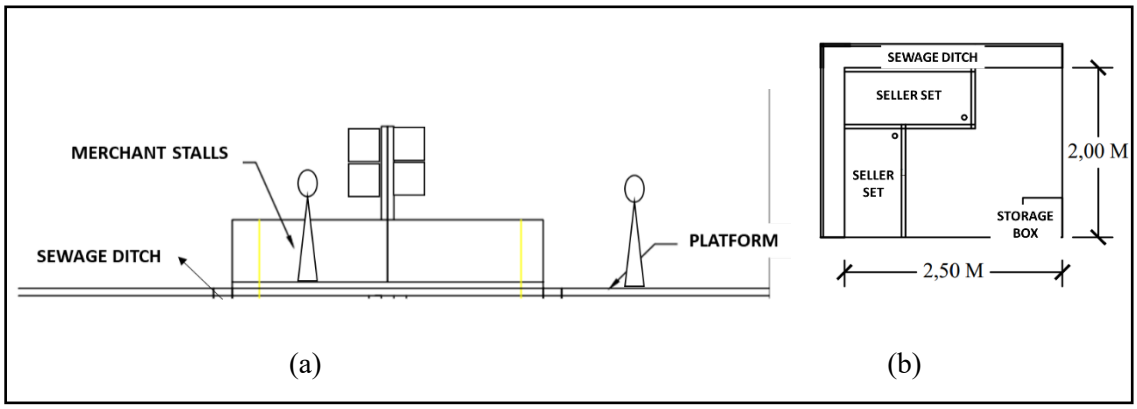

Figure 1 (a) Kiosk Size Standard, (b) Booth Size Standard

By the conditions of the surrounding environment, the application of ecological architecture is very suitable, there are several principles of ecological architecture, namely adjustment to the local natural environment, saving non-renewable natural energy sources and conserving energy use, preserving environmental resources (air, land, and water), maintaining and improving natural circulation, reducing dependence on energy and waste systems [6]. Ecological architecture also has to take into account how buildings are used, how the use of space might vary within and between rooms, and over daily and seasonal cycles, as well as following changes in occupancy patterns and outdoor climate [7].

3 Research Methods

The design method is to find the exact physical components of a physical structure [8]. In the Medan Fish Center design process, data needed for useful information in the first design steps. Require data can be classified into two categories. Primary data is the data collected directly from on-site location, existing environment, site boundaries, views, climatic conditions, existing utilities, and others. Meanwhile, secondary data is the data obtained through library reviews, analysis, and comparative studies from similar projects [9].

4 Result and Analysis

This building will be used as the center of the fish market in Medan City. According to its function as a fish market, it is necessary to pay attention to the impact of the building on the surrounding environment so that ecological architecture is applied in the planning of this building. An ecological architectural strategy is a technological or non-technological method of realizing the design goals of ecological architecture. Ecological architecture technology is a technological or non-technological method for realizing the design goals of ecological [10].

4.1 Design Location

The design site location is on KL. Yos Sudarso Street, West Medan District, Medan City, North Sumatra. Based on calculations via google maps, the project location has a total area of approximately 23,287 m2. By the Detailed Spatial Plan (RDTR), the West Medan District functions as a "K-1 Trade" area (Figure 2).

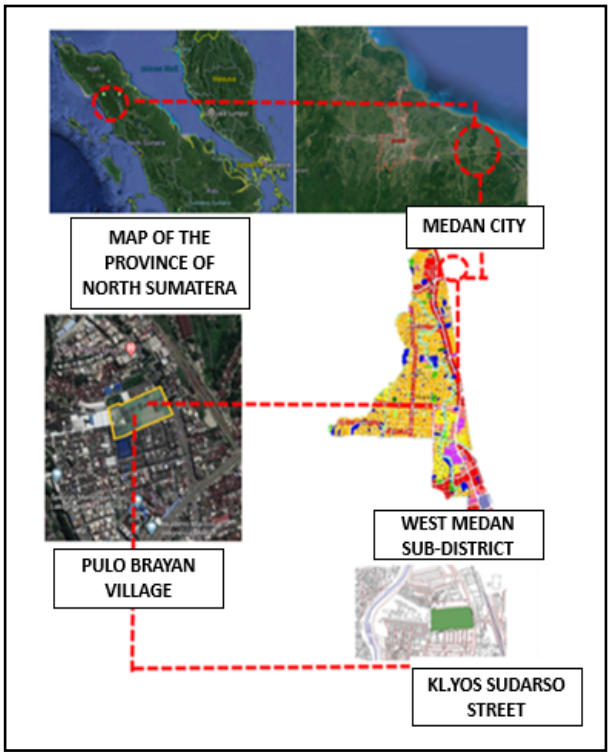

Figure 2 Design Location

4.2 Basic Building Concepts

The reason for the construction of the Medan Fish Center is to change the image of a shabby fish market into an innovative, educational and recreational fish market. This fish market is also designed with due regard to the surrounding environmental conditions, by the principles of ecological architecture, namely, energy-saving, climate responsiveness, and environmentally friendly [11].

4.3 Mass Concept

The building mass is formed from the basic shape, namely a square. Then given the volume so that it becomes a cube. Next, the cube is divided into two to maximize ventilation and lighting. After adding mass to the back, it is then given a diagonal line in the form of a roof to add aesthetics (Figure 3).

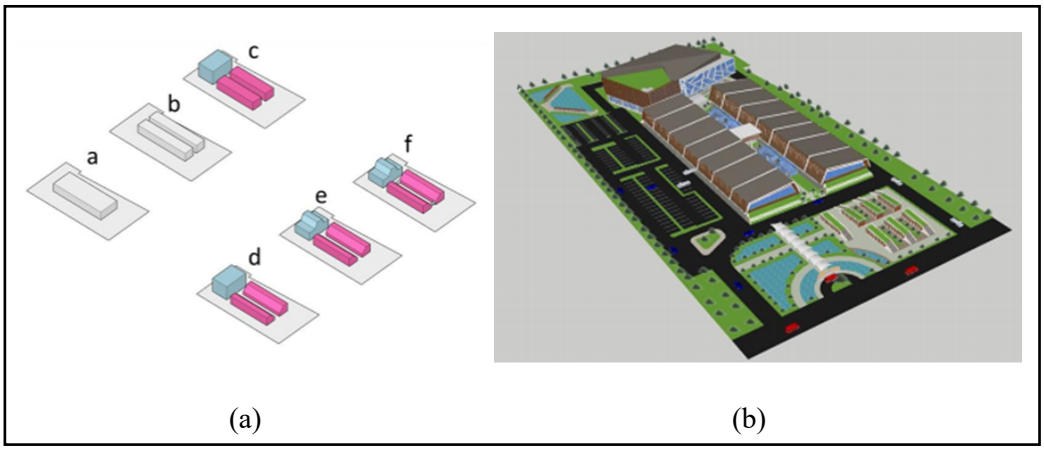

Figure 3 (a) Mass Concept, (b) Perspective

4.4 Structure Concept

This fish center terrain building uses a type of pile foundation. A selection of the foundation was adjusted to the building height, namely three floors and a building width of more than 100 meters. Foundation construction is very important in construction. In general, a foundation was defined as an underground building that transmits loads derived from the weight of the building itself and the external building work to the underground [12].

The roof structure used in the Medan Fish Center design uses a space truss structure. SpaceTruss is a type of space frame roof structure commonly used for long-span construction. The space truss system is a 3-dimensional assembly of linear elements so that the load carried will be distributed in 3 dimensions. The connection between the elements carried no moment or torque so that each element only carried a tensile or compressive axial load. This structural system is relatively lighter, easy to fabricate and transport, easy to install, and relatively shorter construction duration. The analysis was carried out on a planned sports building using a space

truss roof [13]. The application of the space truss structure is used on the roof structure of the building by the building design, namely the wide span building (Figure 4).

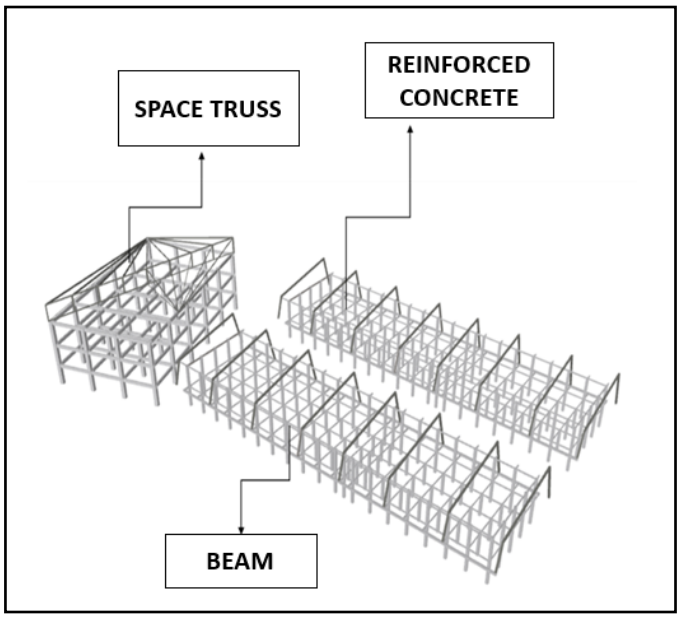

Figure 4 Structure Application

4.5 Use of Material

Medan Fish Center building applies the use of materials that support the work environment system by utilizing materials that cannot disturb natural ecosystems and can provide thermal comfort for visitors [14]. The sun shading device is used in the building envelope, and the curtain wall is used for the glass cover (Figure 5).

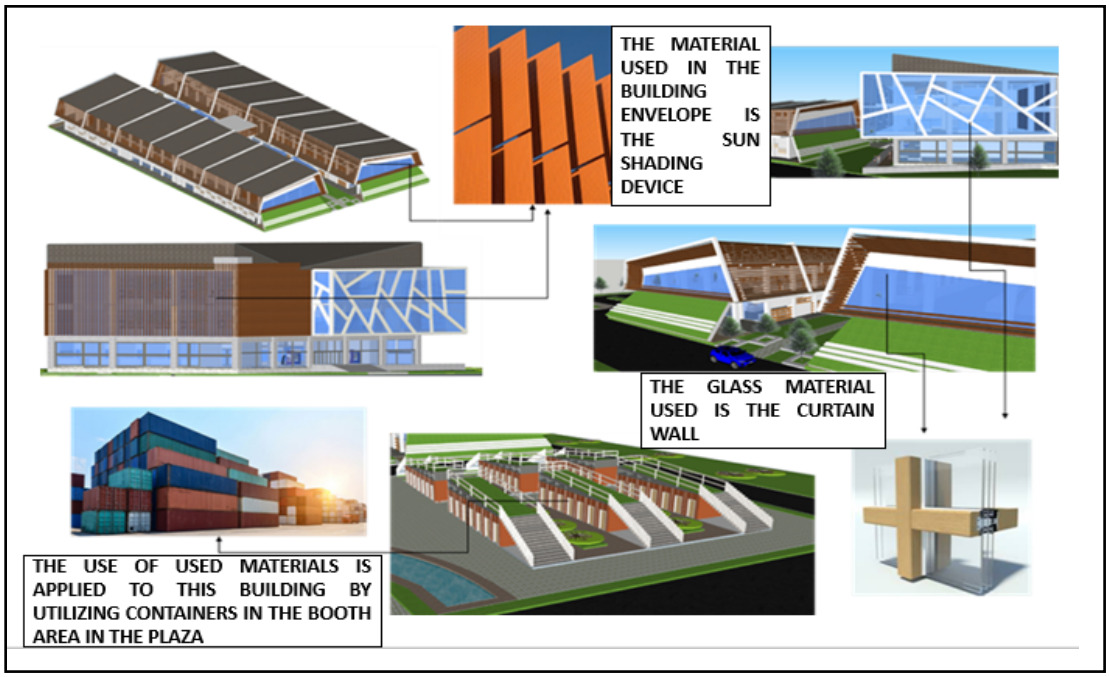

Figure 5 Material Application

4.6 Utilities Concept

To manage the results of liquid waste from utility traders used is the use of a Rotating Biological Contactor (RBC) filter. The wastewater treatment process with the RBC system is an adaptation of the wastewater treatment process with an attached culture [15]. Several modules can be installed in series or parallel to get the expected quality level of processed products [16].

5 Conclusions

The Medan Fish Center design was located on K.L. Yos Sudarso Street, Kecamatan Medan Barat, Kota Medan. The building is a fish market building that functions as a center for marine trade in Medan city. The Medan Fish Center design was used as the center of the fish market in Medan city. This fish market also has a supporting building, namely a freshwater aquarium which was used as recreational tourism for visitors. In this freshwater aquarium, there are supporting facilities such as a gallery and a food court. As a fish market center, the design of this building must pay attention to the processing of liquid waste produced by fish sellers. The wastewater treatment in this market uses the RBC (Rotating Biological Contactor) wastewater treatment system.

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