

Implementation of the Green Interior Concept in Residential at Alegria Park BSD

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ABSTRACT

Rapid population growth in urban areas has resulted in increased land requirements. Green land is converted into residential area. The function of land conversion has the potential to cause environmental degradation. This happens because the rate of population growth is not balanced with good environmental management. These problems directly impact climate change and cause global warming. The green design concept for residential interior is the answer to these environmental problems. One of the cases is a residential house in Alegria Park BSD. The type of the house is Odelyna house which will be occupied by a husband and wife. The green design concept will help them to save lighting and reduce energy use. In addition, the main thing is to improve the quality of people's health and minimize negative impacts on nature, from the manufacturing to the results. This design uses the Kilmer design method to obtain a design approach that suits the character and needs. The application of green design concept in residential can be applied by arranging furniture according to the function and user needs, adjusting the ventilation system, maximizing openings so that natural lighting can be obtained, regulating energy savings, arranging the selection of environmentally friendly building material and furniture for the room.

Keywords: energy saving, green design, interior, planning, residential

1. INTRODUCTION

The rapid population growth in urban areas has resulted in increased demand for land [1]. The increasing demand for land causes the function of land to become settlements [1]. Many green lands have been converted into residential areas [1]. However, this land conversion function has the potential to cause environmental degradation [1].

This happens because the rate of population growth is not balanced with proper environmental management [1]. Therefore, urban areas often experience traffic jams, air pollution, rising sea levels, and the potential for flooding. Excessive use of electricity and artificial lighting in residential area is also detrimental to the environment. The material used is also not necessarily long-term and does negative impact on environment [1]. These problems directly have an effect on climate change and cause global warming [1].

Alegria Park BSD is the newest cluster in BSD City in 2017 by Sinarmas Land [2]. Alegria Park was built in the east of BSD, opposite the Santa Ursula school and close to the modern market [2]. Built on an area of 3.3 hectares, the Alegria BSD is sold in limited unites of around 180 units [2]. The house that will be designed with green design concept is the Odelyna type with a land area of 7 x 12 m².

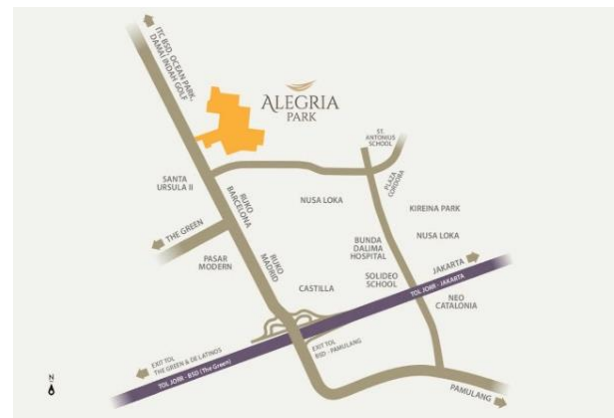


Figure 1 The Location of Alegria Park BSD

Alegria The Secret of Happiness wants to provide a residential area that brings happiness to every occupant, happiness can be realized by provide facilities that pamper residents, for example an internal club house and a close distance to various main city facilities.

Alegria Park has a club house in cluster, shopping centers such as Modern Market, ITC, Giant, City Terrace and AEON, education centers such as Santa Ursula, Al-Azhar, German School, Ora et Labora, and many more, health centers such as EKA Hospital, Bunda Dalima. Alegria Park is on strategic location, 2 minutes to the BSD

highway, close to the BSD shuttle bus and Rawa Buntu train station.



Figure 2 Odelyna Type

All types of houses have rooms on the ground floor. All master bedrooms have private bathroom.

The house will be used by a millennial couple. The husband is an office worker and the wife is a housewife. Green design is a product design concept that focuses on minimizing negative impacts on nature, from the manufacturing process to the results. According to architect Riri Noviansyah, green buildings or green designs are closely related to energy, especially those that have an impact on environment, social, community and economy.

In applying the green design concept to the interior, there are the following ways:

1. Increase openings such as windows, inner courts, open ceilings such as skylights and others [3]. This can minimize the use of lights during the day and produce smooth air circulation in the room [3].
2. Use furniture sufficiently. Excess furniture in the space can cause the space seem stacked and cramped in space [3]. We recommend choosing furniture based on function and needs.
3. Accent plants in the room. Green plants are often used in the application of green design concepts [3].
4. Using recycled materials. Utilizing used goods that are not used are converted into new goods that have new value and new functions [3].

The purpose of green design concept are as follows:

1. Reducing the bad impact of product waste that cannot be recycled from the production process to the final product. Then the product or building can minimize the waste generated and has a sustainable concept.
2. Efficient use of energy can reduce emissions that cause global warming.
3. Minimize the use of materials that are harmful to the environment.

United State Green Building Senior Researcher Council (USGBC), Martin Mulvihill stated that the chemicals used are from sources raw materials to buildings, and through decommissioning, must be safe for human health and the

environment. In addition, materials must come from reusable or renewable materials, made safely and efficiently without creating pollution or hazardous waste. Mulvihill's last option is usually known as green material. Meanwhile according to Wulfram I. Ervianto (2013), ecological or environmentally friendly materials are materials that come from nature and do not contain substances that interfere with health, such as natural stone, wood, bamboo, clay [4]. In addition, according to Frick & Suskiyatno (2007), building materials can be classified based on aspects of their environmentally friendly classification, such as building materials that can be re-cultivated (regenerative), natural building materials that can be reused (recycling), natural building materials that have undergone changes [5]. Simple transformation, natural building materials that undergo some degree of transformation, and composite building materials.

The choice of material products is a very important aspect in realizing the green design concept. There are criteria for the concept of environmentally friendly materials:

1. Non-toxic before and after use [6].
2. In the manufacturing process does not produce substances that are harmful to the environment [6].
3. Can bring humans closer to nature, which means users feel the natural impression of the material [6].
4. Can be obtained and obtained easily, close and does not require shipping costs because it saves the use of fuel energy to move the material to the location [6].
5. Can decompose easily naturally [6].
6. Contains the principles of Renewable, Reuse, Recycle and Reduce [6].

Applying green design concept into the residential of one of the house in Alegria BSD specifically helps residents of the house save the use of lights during the day and electricity. In addition, the main thing is to improve the health quality of the users and reduce the negative impact on the environment. The concept used in the design of the house also give an inspiration and insight to other residents in Alegria Park BSD about the benefits of green design concept.

The application of green design concept in the interior design of one of the houses in Alegria Park BSD is limited to the kitchen, family room, garden and master bedroom.

2. METHOD

This study took the object of research, one of the houses in the Alegria Park BSD, Tangerang with the type of house Odelyna. The method used is the design method using the Kilmer design process which consists of an analysis and synthesis process [7].

The Kilmer analysis design process consists of 4 steps, namely commit, state, collect and analyse the stage of the Kilmer analysis design process is the stage of collecting data and analysing data [7]. Then proceed with the Kilmer synthesis design process which consists of 4 steps, namely ideate, choose, implement and evaluate [7]. The stage of

the Kilmer synthesis design process is the design stage by processing data, determining the concept and applying the concept [7]. The results of the Kilmer synthesis design process are in the form of designs which will be discussed in part III.

Data collection techniques were carried out online regarding the Alegria Park BSD house in the form of 3D modelling and working drawings. Collecting data about the users of the house which is done online. Collecting literature study data on environmentally friendly concepts, green design, green architecture and matters relating to environmentally friendly concepts for interior design. The literature study data is processed and applied to the residential design on one of Alegria Park BSD houses according to the user.

3. RESULTS AND DISCUSSION

The green design concept in one of the houses in Alegria Park BSD Odelyna type is focused on large openings, the use of environmentally friendly materials and creating a garden.

The initial stage that must be considered is the problem of the design of the house itself, how the layout and shape of the building, how it is in harmony with the surrounding environment and nature. The house should have green open land for planting trees that can significantly reduce air pollution [8]. The nature of plants that suck carbon dioxide and release oxygen will be useful for improving air quality around the house.



Figure 3 Odelyna Type House Initial Plan

In the layout above, it looks like the first floor does not have a partition for the living area. Odelyna type only provided a large space without partitions. On the second floor the right window has a length of 125 cm and on the left window it has a length of 80 cm with each having a height of 180 cm.



Figure 4 Odelyna Type House with Green Design Concept Layout Plan

The layout has been designed with green design concept and maximized space function. On the first floor there is a partition to create an open garden. The family room and kitchen area are not given additional partitions following the default layout. On the second floor the length of the right window is 171 cm and the left is 130 cm with a height of 300 cm each.

The principle is to maximize the bright light of the sun and reduce the heat [9]. To reduce sunburn can be helped by making a canopy on each window [9]. The building as much as possible only receives light from indirect sunlight [9]. This can reduce the heat of the sun but still get light for natural lighting [9].

On the bulkhead in the room using gypsum material which can reduce the temperature in the room, the room will feel cool and cold without using air conditioning [10].

Electricity is the main need of every inhabited house. In the concept of being environmentally friendly, it is necessary to wisely choose power tools that have low wattage. Replace incandescent lamps with energy-saving lamps. Artificial ventilation and lighting systems are the largest source of energy in buildings, which is about 60% of the energy used in buildings [11].

All finishing use eco-labelled paint and contractor materials are purchased at shops around BSD City so as to minimize shipping costs and save fuel. Custom furniture with duco painting finishing using eco labelled paint. The material used is expected to have a long life until its useful life runs out and it can still be used.

Choose loose furniture wisely by considering furniture materials that can last a long time and choose loose furniture by considering the model that are not easily out of date so it can be used for a long time. The selection of materials for custom furniture uses materials from nature but used optimally such as wood.



Figure 5 3D Visual Results of the Living Room by Applying Green Design Concept

In the living room which can also be used as a family room, the green design concept can be seen in the materials used. The TV cabinet and side table are made of wood, from nature. Natural impression can be seen from the material and the vibes. There are existing openings from the layout of Odelyna type house which really helps natural lighting during the day so that users no need to use artificial lighting during the day and save energy. Natural ventilation and natural circulation can also occur if the user opens the window, this can minimize the use of air conditioning. Then use the LED lamp with 13 watts with 8 light points.



Figure 6 3D Visual Results View 1 of Kitchen Area Applying Green Design Concept

Living room and kitchen area are not given any partitions to separate the area, thus saving on the use of building materials. In this way, the space also doesn't seem cramped and feels wider. The warmth of the living area can also reach the kitchen area. Families can also chat with each other while the wife is preparing food for the family. Open space living and kitchen area are often used in residential concept.



Figure 7 3D Visual Results View 2 of Kitchen Area Applying Green Design Concept

The layout of the Odelyna house has been changed to the right of the kitchen. The right of the kitchen should not have any partition but we give a partition and a glass door opening to separate the room. The right side of the kitchen is used as a garden with an open roof to store green plants. The green design concept is applied in this section because in addition to natural lighting and natural air circulation, users can feel the natural impression of the plant. The concept of green is also synonymous with the existence of green plants.

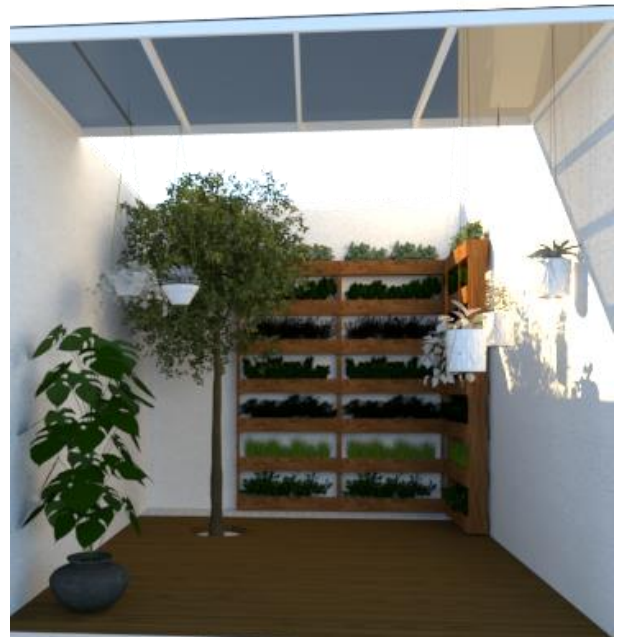


Figure 8 3D Visual Results of Open Garden Applying Green Design Concept

Garden with open roof with a canopy to prevent rainwater from wetting residents if the user wants to relax in the area. The floor uses wood parquet which is paced 2 mm apart to allow water to enter when it rains and left a width of 60 cm at the end of the garden to absorb water. The garden area is designed so that the recommended plants can improve air quality. Plants can be stored in the available cabinets. Plants that produce a lot of oxygen include sansiviera, puring, palm, bamboo and others that

have a function as anti-pollutants and can reduce the effect of pollution [12].



Figure 9 3D Visual Results View 1 of Master Bedroom Applying Green Design Concept

The green design concept can be seen from the natural lighting that enters the room by maximizing the wall opening, namely 2 large windows. So that during the day users do not need to use artificial lighting and save electricity. Large openings can be opened in the morning and afternoon so as to maximize natural ventilation and air circulation can occur while saving energy because users do not need to use air conditioning. The furniture is also adjusted to its function so that is not excessive and the space doesn't seem cramped.



Figure 10 3D Visual Results View 2 of Master Bedroom Applying Green Design Concept

The use of natural materials such as wood makes the user seem close to nature and the taupe colour makes warmth impressions. The master bedroom finishing using labelled eco painting. This is to avoid toxic materials for the environment and users. Then using the LED lamp with 13 watts with 7 light points, 6 on the front of the room and 1 for the inside leading to the master bathroom. The use of LED lights is one application of energy savings.

4. CONCLUSION

The green design concept can be applied simply to residential interior. Its application is by organizing furniture according to the functions and needs of users, adjusting ventilation system, maximizing the openings so

that natural lighting can be obtained, regulating energy savings, arranging the selection of environmentally friendly building materials and furniture for the room. Users are also expected to maximize the functions that have been designed and minimize the use of lights and air conditioners during the day. The design is also expected to give inspirations to other residents in Alegria Park BSD about the benefit of green design concept.

The advantage of this research is the researchers can go directly to the field, researcher can give direct direction to contractor who is building the interior of this house. The limitation of this study is that when the researcher is writing this research, the house has not been fully completed so that researcher could not see directly the benefits of the green design concept. Researchers did not use tools to calculate the exact level of lighting and ventilation.

Suggestions that can be given for green design concepts are to deepen the study of green design, green architecture, and others related to environmental friendliness. In addition, it deepens knowledge about lighting and ventilation system. When processing on the site, it is recommended to use a tool that can calculate the level of lighting and ventilation so that the results are more precise and accurate.

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