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Application of Artificial Light in the Interior Design of Green Lake City Cluster East Asia Residential House in Tangerang

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Abstract.

The current residence is a primary need for humans, lighting is one of the requirements for humans to carry out an activity, therefore lighting is also needed that supports human needs in living activity. In human activities that require lighting, lighting itself is divided into two types, namely natural lighting and artificial lighting. Natural lighting is lighting that comes from the sun as a source of light, while artificial lighting is lighting that is produced by light sources other than natural light. Along with the times, artificial lighting has various types of lamps, lighting procedures, lighting color display and color temperature. So that artificial lighting is needed in order to achieve the ideal visual view for activities in every room.

Keyword. *Ambient Light; Green Lake City; Interior Design; Lighting*

INTRODUCTION

Based on this understanding, a residence can be defined as a place to live that has various functions for a decent human life (Frick, 2006). One of the important elements in the interior of a residential house is lighting, because it greatly affects the activities that take place in the house.

This journal will discuss how lighting affects the comfort of residential users. The use of residential houses as an object of research is due to the fact that residential houses are quite dominant in the use of artificial light /ambient light.

Artificial lighting is lighting that comes from man-made light sources known as lamps or luminaires. In bad weather and at night, artificial lighting is needed. The development of artificial light source technology provides quality artificial lighting that meets human needs (Subagyo, 2017).

Artificial lighting requires energy to be converted into bright light, so it requires a high cost. Efficiency is a very important consideration in addition to making artificial lighting according to human needs. Efficient artificial lighting has a focus on fulfilling lighting in the work area. (Subagyo, 2017) The factors that affect the brightness of the light are the condition of the closed or open space, the position of the lamp placement, the type of lamp used, the color of the walls.

Glare is a visual sturbance factor, namely the reduced ability to see objects due to a mismatch in the distribution or luminance range, therefore in the design of a residential project, lighting plays an important role in providing visual information, light can also affect human psychology during indoor activities as an example of lighting. minimal light will make the eyes feel comfortable because it is not too burdensome for the function of the eye, therefore minimal lighting tends to be used for a relaxing room or rest room, on the other hand when working our eyes must focus on an

object, therefore when we work we tend to need bright lighting in order to facilitate the performance of our eyes when working to focus on the object we are working on.

Lighting in residential homes is designed based on the theme, needs and user activities. In addition, lighting can also strengthen the atmosphere or ambience and aesthetics of the space. Ambience Light that is applied to a project can create various kinds of atmosphere.

Atmosphere is a direct form of physical perception and is recognized through emotional sensitivity (Zumtho, 2006). In relation to interior design, the term atmosphere refers to what the five senses perceive from a space. The atmosphere of a new space can get its meaning if it is relevantly related to the desired human condition of the user (Hidjaz, 2012). So it can be said that the atmosphere of space is an environmental condition that is absorbed by the human senses which is then perceived by humans as something that has meaning.

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Richard Kelly a lighting expert divides artificial lighting into three basic functions: (World of Shopping, 2008)

1. Ambient Light

Serves as the background or canvas of a space that will be filled by several other lighting techniques. Its main function is to fulfill general visualization in the room that supports activities according to the type/context of the room.

2. Focal Glow

A technique with direct light to emphasize specific objects, areas, and zones of a room and create a hierarchy of one's perceptions. The area you want to focus on will be emphasized with light with a certain intensity that makes a person's focus will be on the object/zone.

3. Play of Brilliants This

is a decorative lighting effect that uses colors, patterns, and dynamic changes of light to create a different atmosphere and experience for a space.

This study aims to identify and find out whether the atmosphere or ambience of the room is caused by artificial lighting and to determine the comfort of the space users in the Green Lake City Cluster East Asia in Tangerang.

METHOD

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2.1 Case Studies

Image 1 layout exsisting 1st and 2nd floor residential Green Lake City Cluster East Asia (Source: Jihan, 2021)

The picture above is the existing layout of the residential house that will be designed the size of the residential house is 8x16 m.

2.2 Object Studies

3 After observing the exisiting layout on the project to be designed we can create a furniture plan layout and ceiling plan layout as shown below.

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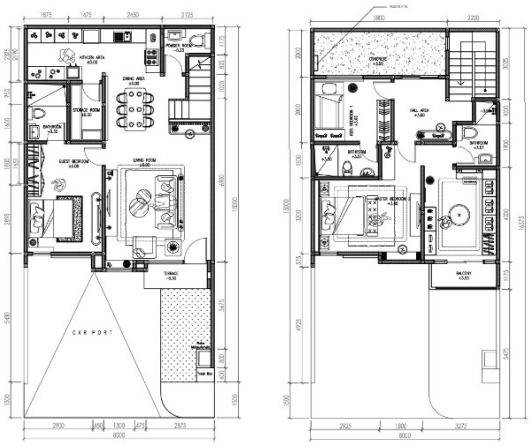

Image 2 layout Furniture 1st and 2nd floor residential Green Lake City Cluster East Asia (Source: Jihan, 2021)

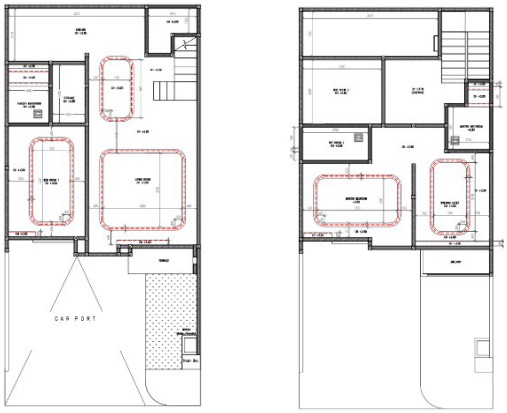

Image 3 Ceiling Plan 1st and 2nd floor residential Green Lake City Cluster East Asia (Source: Jihan, 2021)

In making a ceiling plan, we can already think about the placement of lamps which will later help strengthen the atmosphere of our design such as the placement of indirect lamps or pendant lamps.

3.1 Research Methods

In this study, researchers used the process method of designing Rosemary Kilmer

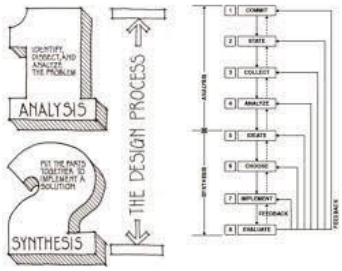

Image 4 Design Process Chart (Source: Designing Interior, Rosemary Kilmer 2021)

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- **Commit (Accept the Problem)** is the initial stage by recognizing the problem, which is the stage where researchers find out what are the main problems that often occur in lighting in a residential house in Green Lake City. The problem that must be faced is how to apply the right focal glow so that the eyes do not feel pain when they see it and still feel comfortable when in the room.

- **State (Difine the Problem**) is the stage of determining the problem that will have a direct impact on the final result. So that in this design, the formulation of the problem is obtained as follows:

  "How to create optimal lighting and a comfortable room atmosphere and in accordance with the theme of residential design"

  With the design objectives as follows:

  "To create optimal lighting and a comfortable room atmosphere and in accordance with residential design theme "

- **Collect (Gather the Facts)** is the stage after we get the problem formulation. So at this stage the following parameters are obtained:

Fungsi ruangan	Tingkat pencahayaan (Lux)	Kelompok renderasi warna	Temperatur warna		
			Warm white <3300 K	*Ccol white* 3300 K-5300K	*Daylight* >5300 K
Rumah tinggal :					
Teras	60	1 atau 2	♦	♦	
Ruang tamu	120 - 150	1 atau 2		♦	
Ruang makan	120 - 250	1 atau 2	♦		
Ruang kerja	120 - 250	1		♦	♦
Kamar tidur	120 - 250	1 atau 2	♦	♦	
Kamar mandi	250	1 atau 2		♦	♦
Dapur	250	1 atau 2	♦	♦	
Garasi	60	3 atau 4		♦	♦
Perkantoran :					
Ruang Direktur	350	1 atau 2		♦	♦
Ruang kerja	350	1 atau 2		♦	♦
Ruang komputer	350	1 atau 2		♦	♦
Ruang rapat	300	1	♦	♦	
Ruang gambar	750	1 atau 2		♦	♦
Gudang arsip	150	1 atau 2		♦	♦
Ruang arsip aktif	300	1 atau 2		♦	♦
Lembaga Pendidikan :					
Ruang kelas	250	1 atau 2		♦	♦
Perpustakaan	300	1 atau 2		♦	♦
Laboratorium	500	1		♦	♦
Ruang gambar	750	1		♦	♦
Kantin	200	1	♦	♦	
Hotel dan Restauran :					
Lobi, koridor	100	1	♦	♦	
Ruang serba guna	200	1	♦	♦	
Ruang makan	250	1	♦	♦	
Kafetaria	200	1	♦	♦	
Kamar tidur	150	1 atau 2	♦		
Dapur	300	1	♦	♦	

Tabel 1 Indonesian national standard parameters regarding lighting
(Source: Standart Nasional Indonesia,SNI 03-6197-2000)

Then there are also parameters regarding the color temperature of the lamp as follows:

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Color Temperature (Kelvin	2000K - 3000K	3100K - 4500K	4600K - 6500K
Penamaan Warna	Warm White	Cool White	Day Light
Memberikan Suasana	Nyaman, Tenang, Mengundang, Intim	Terang, Bersemangat	Menyegarkan
Aplikasi Terbaik Untuk	Lampu Gantung, Lampu dinding, Restoran/ Café, Perumahan, Lampu Meja/ Lantai	Ruang Bawah Tanah, Garasi, Ruang Kerja, Lampu Kerja	Area Pameran, Lampu Keamanan, Garasi, Lampu Kerja

Tabel 2 Lamp Temperature Color Parameters
(Source: Standart Nasional Indonesia,SNI 03-6197-2000)

Based on the parameters above, it is found that the optimal lux for the terrace is 60 lux, living room 120-150 lux, dining room 120-250 lux, work space 120-250 lux, bedroom 120-250 lux, bathroom 250 lux, kitchen 250 lux, garage 60 lux. And the use of color temperature 2000-3000k provides a comfortable atmosphere, 3100-45000k bright and vibrant, 4600-6500k refreshing.

- **Analyze** is the stage of analyzing the problems that exist in the field. In this design, the conditions in the ceiling exit are still flat, so several processes are needed to apply indirect lamps according to the concept.

- **Ideate** is the stage of issuing ideas or alternatives in the form of a schematic design.

- **Choose** is the stage of selecting existing ideas and alternatives so that they can be applied to the design project.

- **Implement (Take Action)** is the stage where ideas and alternatives are poured into the design concept, rendering, and presentation.

1. Specifications
   The specifications for the lamp to be used in the design include an LED in lite 5 watt (warm white) as ambient light (General Lighting) then there is an LED in lite 9 watt (Day light) applied to the terrace and then there is an LED Strip as a focal glow on the room.

2. Rendering and Presentation
   At this stage, pictures of the final results of the design process will be given which will later be shown to the client and wait for the client's decision.

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Image 5 Living and foyer area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 5 there is a drop ceiling in the living room and dining area as well as a pendant lamp.

Image 6 Kitchen area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 6, the lights used are only general lights, but there are indirect lamps on the furniture.

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Image 7 Kitchen area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 7 there is a focal glow on the drop ceiling.

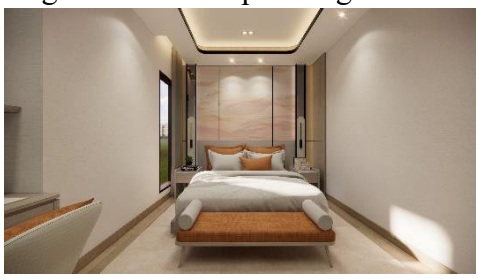

Image 8 Master Bedroom area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 8, also uses a drop ceiling accompanied by an indirect lamp.

Image 9 Walking Closet area at Green Lake City Cluster East Asia (Source: Jihan, 2021

In Figure 9, do not use too much general light because there are windows that channel sunlight.

Image 10 Kids Bedroom area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

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In Figure 10, using indirect lamps on shelf furniture is only to sweeten the room, not to be used as the main source of lighting in the room.

Image 11 Toilet area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 11 is the master bedroom toilet and the application of indirect lamps on the ceiling adds an elegant impression to the room

- **Evaluate** which is the stage where researchers review the designs that have been done and make revisions.

RESULTS AND DISCUSSION

The design of the Green Lake City Cluster East Asia project was designed with a modern contemporary theme where in the design of this residential house the dominant material with wood texture and some accents using gray mirrors. In the design of this residence, there are several areas of the room that are designed including the entrance hall, living room, dining room, kitchen, parents bedroom, kids bedroom, master bedroom, walking closet, and toilet. This time the researcher will discuss the lighting in each room which is designed according to Richard Kelly's theory of 3 techniques in lighting. First, from the living room

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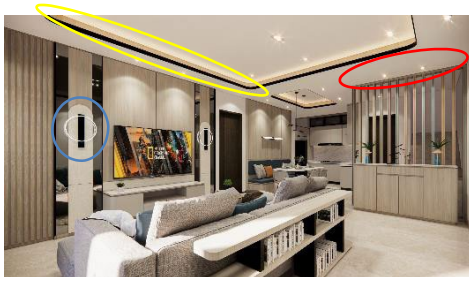

Image 12 Living and foyer area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figure 12 is a picture of the living room in the Green Lake City Cluster East Asia residential design project.

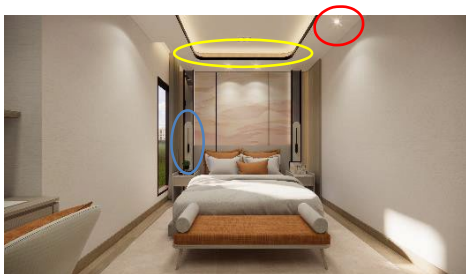

Image 13 Master Bedroom area at Green Lake City Cluster East Asia (Source: Jihan, 2021)

In Figures 12 and 13 above, there are the three 3 techniques mentioned by Richard Kelly, namely Ambient Light, Focal Glow and also play of brilliance where the application of Ambient Light (red circle) is found in general light,

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namely using the type of LED in lite lamp with a tension of 5 Watt and Warm White color temperature (3000K) and focal glow (yellow circle) are applied to the Indirect lamp on the drop ceiling then the application of Play of Brilliance (blue circle) is applied to the wall lamp on the TV cabinet panel in the living room and on the master bedroom drop bed panel. The purpose of the application of these three techniques is to create more atmosphere in the space so that space users can get the atmosphere of the room according to their mood when only one type of light is turned on.

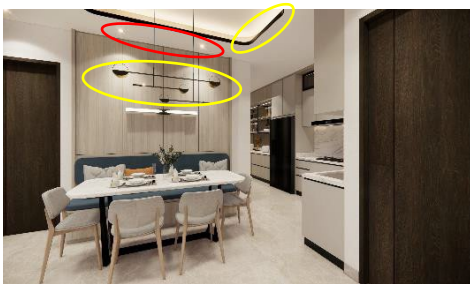

Image 14 Dining room area at Green Lake City Cluster
East Asia (Source: Jihan, 2021)

In Figure 14 there are 2 of the 3 techniques mentioned by Richard Kelly, namely Ambient Light and Focal Glow where the application of Ambient Light (red circle) is found in general light, namely using an LED in lite type with a tension of 5 Watt and a color temperature of Warm White (3000K).) and focal glow (yellow circle) is applied to the Hanging Lamp in the dining room, Indirect lamp to the drop ceiling. The purpose of applying these two techniques is also used to make the atmosphere of the room looks more lively and also to create a different atmosphere when only one type of light is turned on.

CONCLUSION

Based on the analysis that has been done regarding the optimal application of artificial light in homes so that users are comfortable and the activities carried out can be carried out comfortably, the application of artificial light can also help in creating a dramatic atmosphere. In accordance with the parameters above and also the 3 techniques said by Richard Kelly, the right and correct artificial light is very effective to support activities such as task lamps, wall lamps, pendant lamps, indirect lamps if the application is in accordance with the thing to be addressed.

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