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The Application of Artificial Lighting in Hotel Room: Grand Anugerah Hotel and Sae inn, Kendal

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Artificial lighting is inevitable in hotel design. Even though in architecture education, we learn that natural lighting is the top priority, and artificial lighting is supporting in absent of sunlight condition. In the hotel industry, the continuity of the light environment is mandatory to support hotel services. This research aim is to identify the application of lighting types, placements, fittings, and functions in hotel rooms. The methods are literature study, observations, comparative study and analytic descriptions. The case studies were held on two most prominent hotels in Kendal Regency; Central Java named Grand Anugerah and Sae Inn hotels. The results indicated variations of artificial lighting in hotel rooms were related to their styles and functions.

Keywords: Artificial Lighting, Hotel room, Typology, Applied Technology

1. INTRODUCTION

Lighting is an essential element in architectural design. Lightings were divided into natural lighting (daylights) and artificial lighting (lamps). Both lighting systems purposed to give light so the human can see their environments (Akmal, 2006). The natural lighting source is sunshine or daylighting, which is obtained through building openings (windows and doors). The standard of Indonesia building openings for natural lighting is 1/6 of the floor area (Badan Standarisasi Nasional, 2001). In certain conditions, lamps often being part of the aesthetic element of the room. The existence of a lamp and their lights could raise the beauty aspect through placements and specific instalment techniques. Furthermore, the ambience of the room also being built by the artificial light application in proper locations (Yu and Akita, 2019).

In the hotel's room, the natural lighting element was minimized by the costumers to keep their privacy. The habit of covering the windows with curtains has maximized the demand for artificial lighting. The artificial light itself was mostly illuminated by lamps system and sometimes using the other illuminating devices (Setiawan and Hartanti, 2014; Nur Laela Latifah, 2015). The room environment can be changed into several themes just by the different applications of lamp sets in a specific spot of the room (Rees, 1999). This research was operated to identify the use of lighting types, placements, fittings, and functions in hotel rooms of Grand Anugerah Hotel and Sae Inn, Kendal. The methods are literature study, observations, comparative study, and analytic descriptions.

2. ILLUMINATING STANDARDS

Badan Standarisasi Nasional (2001) mentioned that technology in artificial lightings

had an advantage in more constant light intensity, variations of colour. Those advantages made the instalment of lamps were recommended for the hotel in a certain standard as:

Table 1: Hotel lighting standards.(source: Badan Standarisasi Nasional,2001)

Room	Minimum Intensity (lux)	Render type
Lobby, corridor	100	1
Ballroom, meeting room	200	1
Cafeteria	250	1
Bed room	150	1,2

The level of lamp illumination also affects the psychological to the human who lives on the room as described by Yu and Akita (2019) that cooler light in high intensity and the warmer light in low intensity can create a more comfortable environment. The explanation of that statement detailed on next table 2.

Table 2: Relation of Light Colour and intensity in the psychological aspect.(Source: Yu and Akita, 2019)

Intensity (lux)	Warm colour	Neutral colour	Cool colour
<500	comfort	Natural	cool
1000-2000	stimulate	comfort	Natural
>3000	not natural	stimulate	comfort

Yu and Akita (2019) also described that colour temperatures (Kelvin scale) were affected the human concentration in the rooms. More than 5500K looks so cold, 3000-5300 looks medium, below 3000K seems warm. The higher colour temperature made human fresher and highly concentrated and in opposite cold colour could bring relax conditions.

Figure 1: Temperature of light colour (Yu and Akita, 2019)

2.1 Type of lamps

There were standard lamps in artificial lighting applications related to light productions, such as Bulbs, CFL, LED. Bulb produced the light by burning the filament inside the glass, CFL (compact fluorescent lamp) used the halogen gasses inside the pressured glass and LED (light-emitting diode) using an arranged diode to emit the light as the name. The comparison of the three types of lamps can be seen in figure 2.

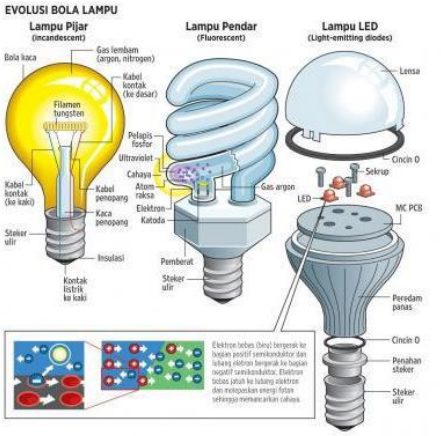


Figure 2: Bulb, CFL and LED comparisons (Yusuf, 2019)

2.2 Light projection of Lamps

There were five types of light intensity directions: indirect lighting, semi-indirect lighting, direct, semi-direct lighting, and direct lighting according to the position of the projections (Khamaira and Wahyuningrum, 2017).

a. Indirect lighting is projecting through the reflection of the ceilings.
b. Semi indirect lighting is projecting 60-

90% light through ceilings, remain light projects to work plan.

c. Direct, indirect lighting was sharing the same intensity (50:50) to the ceiling and work plan.
d. Semi-direct lighting is projecting 60-90% light to work plan, remain light projects to the ceiling.
e. Direct lighting is projecting the light to the work plan.

In other theory that being described by Darmasetiawan (1991) and Alkausar (2010) is more applicable with: downlight, uplight, backlight, sidelight, front light definitions of the position light projections.

a. Downlight is pointing to the downside of the lamp.
b. Uplight is directing to the upside of the lamp.
c. The backlight is projecting to frontside of the lamp, so the light located behind the object.
d. Sidelight is projecting to the side of the lamp, and light will be fitted in the left/right of the object.
e. The front light is bringing light to the object from the front area

Setiawan and Hartanti (2014) explain the concept of lighting function that described as several elements of general lighting, spotlighting, task lighting, accent lighting, and aesthetic decorative lighting. The definitions of those lighting are:

a. General lighting is used to give light on a large area of the room and usually installed on the ceiling area.
b. Spotlighting is directing only an area (work plan). This lighting efficiency is the highest because this lamp does not brighten the space near the work plan.
c. Task lighting has a task. Examples of these lamps are wall lamps, desk lamps, etc.
d. Accent lighting is giving assent to a specific object so the object will be the point of interest.
e. Aesthetic lighting was placed to bring more aesthetic on the room by the shape, colour, or other uniqueness.

The combination of three theories of lighting projection and function usually explains the reasons for lamp selection, placement, and instalment approach. Later, in the discussion chapter, the literature studies will be operated to identify, give meanings, and analyze for emphasizing the scientific reports of this research.

3. METHODOLOGY

This research is using a qualitative paradigm with a descriptive and comparative analysis to explain the findings. Data and information were collected by survey techniques, photography documentation, and obtained hotel files from interview results. Later, the collected data were separated into two categories:

a. Primary data

The author got this data directly from the sources. It can be named original data or updated data. This data was gained through site surveys (directly go to the objects to get valid data), interviews (the real-time discussion with hotel staffs), photography documentation (the pictures were taken by supervision and permission of hotels), as-built drawing files (hotel authorities gave the CAD room plans with a limited distribution agreement for education only)

b. Secondary data

The author got this data from related literature and internet browsing activities. The ethic of publications applied as a citation of the source references and acknowledgement.

After the data were collected, the analysis phases performed by describing and comparing the two hotels and the existing conditions with the theory or local regulation. The resume of the discussion written as conclusions at the end of this article chapter.

4. ARTIFICIAL LIGHTING DISCUSSION

Both hotels were in Kendal regency central at Soekarno Hatta street. The Sae inn is having direct access to the main road of Kendal, while Grand Anugerah is secondary access to the main road (see figure 3).

Figure 3: Location of the hotels
(source: googlemaps.com with author caption)

4.1 Grand Anugerah Building: Family Room

Grand Anugerah has 20 bedrooms, which consist of 14 VVIP rooms and six family rooms. The Family rooms are installing all the lamps on the ceilings and a desk lamp. There were five lamps installed in this room of 3 type 150lux, 3000K white lighting (see figure 4). L1 is using CFL (but in some room being alternated with LED) that fitted to the ceiling coves. The direction of the light is a direct downlight lamp. This L1 function is general lighting to the room.

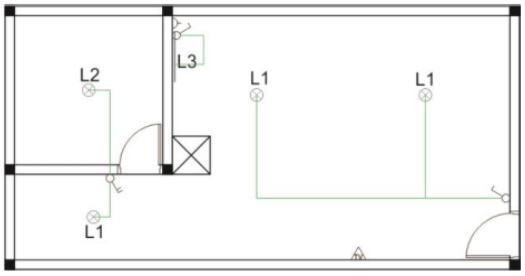


Figure 4: Lamp position plan
(source: redraw of hotel document, 2019)

The L2 is located inside the bathroom. Mostly LED was installed at each bathroom's ceiling with direct-indirect type since less than half projection was reflected via the ceiling to create a more refreshing bathroom. This L1 function is general lighting to the room, and no other lamp in this room (figure 5).

Figure 5: Lamp position in the bathroom area

L3 is a desk lamp placed in the bedroom area. The CFL or tube lamp being fitted above the mirror area to support makeup activities. This is direct downlight because of the projecting to the work plan below or the desk area (see figure 6).

Figure 6: Lamp position in the bedroom area

4.2 Grand Anugerah Building: VVIP Room

There were four lamps of 3 type lamps installed in this room with 150 lux, 3000K white lighting (see figure 7). However, those lamps were installed with a different approach. L1 is using that fitted to the ceiling coves. The direction of the light is a downlight semi-direct lamp to bring more light reflection. This L1 function is general lighting to the room.

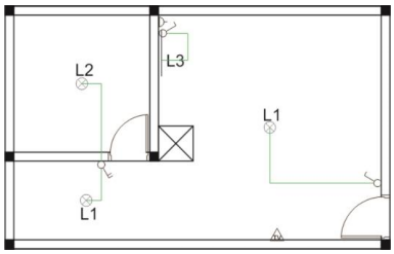


Figure 7: Lamp position plan
(source: redraw of hotel document, 2019)

The L2 is located inside the bathroom. CFL was installed at each bathroom's ceiling surface with direct, indirect type because less half projection was reflected via ceiling to create cooler bathroom by hotel staff explanation during the site visit. This L1 function is general lighting to the room, and no other lamp in this room (figure 8).

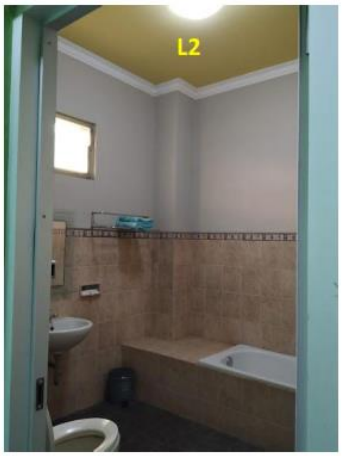


Figure 8: Lamp position in the bathroom area

L3 is a desk lamp placed in the bedroom area. The CFL or tube lamp being fitted above the mirror area to support makeup activities. This is direct downlight because of the projecting to the work plan below or the desk area (see figure 9).

Figure 9: Lamp position in the bedroom area

4.3 Sae Inn: Deluxe Room

Sae Inn has 57 bedrooms, which consist of the deluxe suite, and premiere suite classroom. This hotel is well known as the elite hotel in Kendal Regency with three stars facilities, such: swimming pools, gym, café, restaurant, ballroom, and a meeting room. There were seven lamps of 4 type lamps installed in this room with 150 lux, 2700K warm light (see figure 10). Those lamps were installed with a different approach. L1 was in the bedroom and bathroom. L1 is using an LED that fitted to the ceiling with no reflectors. The direction of the light is downlight for giving general lighting to the room (Figures 11 and 12).

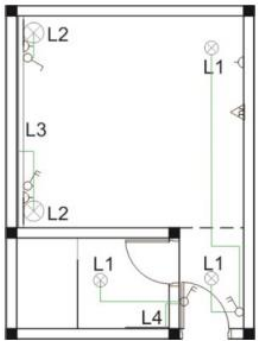


Figure 10: Lamp position plan
(source: redraw of hotel document, 2019)

Figure 11: Lamp position in the bedroom area

Figure 12: Lamp position in the bathroom area

The L2 is located on the wall. LED was installed at each side of the bed with semi-direct

type because more half projection was reflected via the ceiling, and the remain projection was pointing to the desk below. This L2 function is direct lighting to the desk. The L3 is located on the wall. LED strip type was installed behind the bed. The closed armature with uplight semidirect type because most light projection pointed to the ceiling and functioned as an aesthetic accent to the room (figure 11).

The L4 is an LED tube type installed behind the mirror. The closed armature with indirect backlight type because the lamp was hidden behind the mirror and functioned as faucet lighting and aesthetic accent to the room (figure 11).

4.4 Sae Inn: Suite Room

There were eight lamps of 4 type lamps installed in this room with 150 lux, 2700K warm light (see figure 13). Those lamps were installed with five different approaches. L1 was in the bedroom and bathroom. L1 is using LED that fitted to the ceiling and directed as a downlight for giving general lighting to the room (figure 13,14 and 15). Two types of ceiling fit this lamp: drop ceiling and standard ceiling (Harsritanto, 2016). The L4 is an LED tube type installed behind the mirror in the bathroom. The closed armature with indirect backlight type because the lamp was hidden behind the mirror and functioned as faucet lighting and aesthetic accent to the room (figure 15).

The L5 is located on the wall. LED strip type was hanged behind the bed. The closed armature with downlight semidirect type because most light projection pointed to the desk and functioned as an aesthetic accent to the room (figure 14). The L6 is an LED strip type installed on a drop ceiling. The closed armature with indirect downlight type because the lamp was pointing to the bed and functioned as ambient and aesthetic light (figure 14).

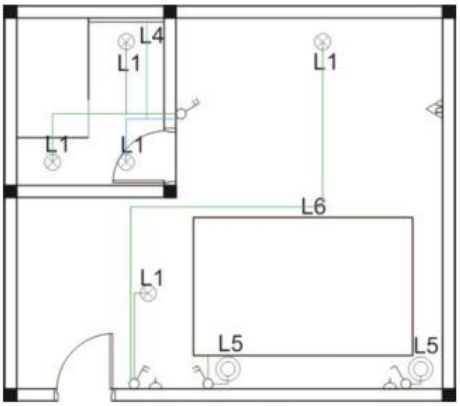


Figure 13: Lamp position plan
(source: redraw of hotel document, 2019)

Figure 14: Lamp position in the bedroom area

Figure 15: Lamp position in the bathroom area

4.5 Sae Inn: Premiere Suite Room

This suite has a living room, bathroom, and bedroom area. There is nine warm light of 150 lux lamps with variation in instalment (figure 16). L1 was in the bedroom and bathroom. L1 is using LED that fitted to the ceiling and directed as a downlight for giving general lighting to the room. L2 is a wall lamp with a downlight type on the wall above the desk. LED was installed at each side of the bed with semi-direct type because more half projection was reflected via the ceiling, and the remain projection was pointing to the desk below. This L2 function is direct lighting to the desk. The L4 is an LED tube type installed behind the mirror in the bathroom. The closed armature with indirect backlight type because the lamp was hidden behind the mirror and functioned as faucet lighting and aesthetic accent to the room (figure 19).

L6 is using an LED strip type attached to the drop ceiling. This lamp is indirect light because the projection was pointing to the ceiling, but the functions are the general lamp and aesthetic light. L7 is a chandelier lamp with ten bulbs on it. The lamps were produced inside the matte glass and reflected below (downlight type). The L7 is general lighting with aesthetic function, either. L8 is using LED, which attached to the wardrobe cabinet. The switch was combined with a door closer, so the lamp will turn on every time the wardrobe door open and the opposite way in turn off. This is a direct downlight type of lamp which only spot specific area (figure 18). L9 is using a bulb with tube shading for directing the light up and down. L9 is a spot lamp with a special switch on the box to lighten the floor area. L10 is using an LED strip type attached to the wall. This lamp is decorative indirect light because the projection was pointing to the wall, and the functions are aesthetic light. L11 is a decorative spot lamp to give direct light on the painting and seat (figure 17).

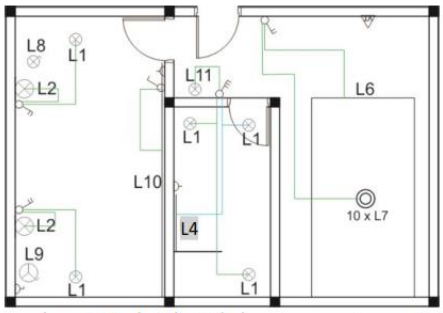


Figure 16: Lamp position plan
(source: redraw of hotel document, 2019)

Figure 17: Lamp position in the living room area

Figure 18: Lamp position in the bedroom area

Figure 19: Lamp position in the bathroom area

is using the lamp as an aesthetic function for the accentuation of 27000K colour, and the Grand Anugerah is only using the lamp as general lighting of 3000K colour (figure 20). Further study of room variation also showed that Sae inn has more room rather Grand Anugerah. This condition demanded more lighting type, especially for making the living room more comfortable.

5. COMPARISON STUDY

The locations of the lamp in Sae Inn are more vary slightly Grand Anugerah. Sae inn hotel

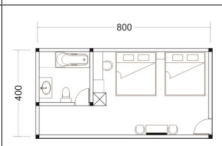
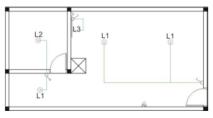
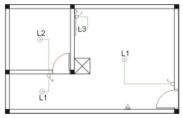
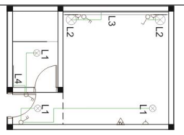
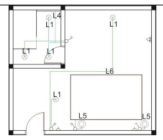
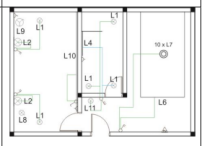
	HOTEL GRAND ANUGERAH kelas: non bintang		**HOTEL SAE INN** kelas: bintang tiga		
Tipe Kamar	*VVIP room*	*Family room*	*Deluxe room*	*Suite room*	*Premiere Suite room*
Layout Kamar					
Tipe Pencahayaan					
Lampu Dekoratif dan Aksen	-	-	aksen: lampu L3, L4 dekoratif : -	aksen: lampu L4, L5, L6 dekoratif: -	aksen: lampu L4, L6, L10, L11 dekoratif: lampu L7, L8
Tingkat luminansi dan temperatur cahaya	tingkat luminansi ± 150 lux dan warna lampu *natural white* dengan temperatur (3000K) memberikan kesan netral pada kamar		tingkat luminansi ± 150 lux dan warna lampu *warm white* dengan temperatur (2700K) memberikan kesan nyaman pada kamar		

Figure 20: Comparison of position, specification of the light

6. CONCLUSION

Each hotel room has variations in layout, which affected the typology of the instalment artificial lighting. Grand Anugerah is using the lamp for illumination purposes only while Sae inn brings the aesthetic function of the lamp. The using of 2700K warm light colour in the hotels are common because it would bring warm, comfort, and natural condition which similar to the hotel hospitality spirits.

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