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Safety and Delivery Selection Analysis at Sanctoo Suites & Villas Singapadu

I Wayan Dikse Pancane[1], Agus Supranartha[2]
[1,2.]Faculty of Engineering and Informatics, Universitas Pendidikan Nasional, Denpasar
Jl. Bedugul No.39, Sidakarya, Denpasar Selatan, Kota Denpasar, Bali 80224
Email: diksapancane@undiknas.ac.id

ABSTRACT

This research focuses on analyzing the types of conductors and electrical installation safety at Sanctoo Suites & Villas Singapadu, where this research aims to determine the type of conductor, current carrying strength (CRC) flowing in the conductor, protection MCB, contactor, TOR, ELCB, and Surge Arrester installed already meets PUIL standards.After this research is completed, it is hoped that this research can provide consideration to the company that the importance of the electrical installation system, especially the installation of electric power for safety and comfort, by using the installation of electrical equipment according to standards.

Keywords: *Conductor; Current Conductivity (CRC); MCB; Contactor; TOR; ELCB; Surge Arrester; PUIL.*

Introduction

Bali is a tourist destination that is of great interest to both local and foreign tourists. As one of Bali's tourist destinations, of course, it provides many facilities engaged in the service sector, both in the entertainment sector and in the service sector. Lodging is one of the industries engaged in the service sector, therefore service is the most important thing in its operations. To support good service, of course, it must be supported by good facilities and infrastructure. Sanctoo Suites & Villas is an inn located on Jalan Ulun Suwi II, Singapadu, Gianyar Regency which is engaged in providing lodging services. To keep up with market demand and increase competitiveness, Sanctoo Suites & Villas has made improvements to the comfort and safety of consumers.[1] In a building the benefits of electricity are very important, namely for lighting systems, power sources for electrical and electronic equipment such as water pumps, air conditioners, televisions, computers, kitchen equipment and others.[2]

Bearing in mind that electricity can also be dangerous and can have a negative impact on the environment, efforts are always made to ensure that distributed electricity can be carried out safely for the building, safe for the installation itself, safe for humans, and reliable in the sense of being able to distribute electrical energy on an ongoing basis. So, it can be concluded that a good electrical installation can support the satisfaction of service users both in terms of comfort and safety so that it can further increase satisfaction for service users.[3]

Therefore, the author is interested in analyzing the selection of conductors and security which aims to ensure that the security and delivery systems installed in the Sanctoo Suites & Villas building meet applicable standards so that they can increase the safety and comfort of customers/guests in the Sanctoo Suites & Villas environment.[4]

Research Methods

Data Retrieval Method

The place for data collection was carried out at Sanctoo Suites & Villas which is located on Jalan Ulun Suwi II, Singapadu, Gianyar Regency. While the object of study is the analysis of the selection of types of security and conductors used in the Sanctoo Suites & Villas building. This analysis includes the data collection process, the research preparation process, to the making of the research.[5] [6]–[12]

In completing this research, the authors used several methods, the first was the observation method, namely the authors went directly to the field to find data. Both interview methods, namely the author conducts question and answer directly to the informant at the research site. The third is the library method, namely the writer searches for literature related to research.[13]

Data source

What is meant by data sources in research is the object from which the initial data was obtained. There are two data sources in this study, namely primary data sources and secondary data sources [14]–[18]. Primary data is data obtained or collected by researchers directly from primary data sources while secondary data is data obtained or collected by researchers from various existing sources (researchers as second hand).[19]

Analysis of Research Results

Analysis of CRC and size of the conductor with the following stages:[20]

1. Get cross-sectional area data
2. Use the CRC table
3. From the table of CRC and the cross-sectional area, the CRC of the installed cable is obtained
4. Obtain the installed motor power (load) data
5. Calculating the nominal current with the equation
6. In =P/3.V. cosa
7. Determine the CRC of the conductor installed by the equation:
8. CRC =In x 125%
9. Comparing the results of the CRC of the conductor installed with the CRC that has been calculated using the nominal current at the load.

Safety rating analysis with the following stages:

1. Obtain safety rating value data
2. Using the table of rated values or the highest setting of the device
3. From the table of rated values or the highest setting of the device, the circuit breaker provisions are obtained
4. Gets the installed load power data
5. Calculating the nominal current at the load with the equation:
6. In = $\frac{P}{\sqrt{3}.V.\cos\varphi}$
7. Determine the value of the safety rating that is installed by:
8. In x circuit breaker provisions
9. Comparing the results of the installed safety rating value with the calculated safety rating value using the nominal load current and circuit breaker provisions.

Expected results

At the end of this study the authors hope to be able to contribute in the field of improving the electric power installation system at Sanctoo Suites & Villas, especially in the areas of:[21]

1. The use of a conductor to comply with the provisions/standards.
2. The use of the type of overcurrent protection used to comply with the standard.
3. The use of the type of leakage current that is used to comply with the standard.
4. The use of the type of motor safety used to comply with the standard.
5. The use of the type of overvoltage protection used to comply with the standard.

Results and Discussion

CRC and Conductor Size

The cross-sectional area of the copper cable used in the installation can be determined by finding the current-carrying capacity of the cable, CRC = 1.463 A. So the standard CRC conductor at the Mini Bar in the Sanctoo Suites Room = 1.463 A. The cross-sectional area can be determined by looking at the table in PUIL 2011. PUIL 2011 also stipulates that the cross-sectional area of the load cable for lighting installations must not be less than 1.5 mm2 and for the load cable cross-sectional area of socket installations, it must have a minimum diameter of 2.5 mm2. So that on the one line diagram in each phase it can be written that the cable pull is with NYM cable 3 × 2.5 mm.

According to PUIL 2011 - (table 7.1-3) list of installation cable construction, NYM cables are power cables that are used in dry rooms and can be installed above, inside and under plaster also on wood, installation cables may not be installed on or on the ground. NYM conductor type is a type of cable specified for use in the field.

To determine the required conductor CRC for each installed load from each area in the Sanctoo Suites and Villas, it can be calculated using the equation as above.

Overcurrent safety rating

The magnitude of the overcurrent safety rating that will be used in pulling the installation cable with the AC Server IRat load = 115% x In = 115% x 2.08 = 2.39 A, So the standard safety rating for AC Server loads = 2.39 A This current of 2.39 Amperes is a large current rating for protection such as an MCB. In the planning data on the one-line diagram written for the first pull is 16 A. But in the calculations using the above formula it is obtained 2.93 A, in using the MCB there is no MCB of 2.93 A but 6 A, because it is used for a socket, the MCB is used it must be at least 10 A. So that the MCB used is 10 A, but from the existing data a safety guard of 16 A is installed so that the safety installed has exceeded the existing capacity. So a 10 A MCB should be installed, not 16 A.

Motor Protection (Contactor and TOR)

In determining the contactor can be done with reference to the following provisions:

$IB \leq In \leq Iz = 3.94\ A \leq In \leq 4.92\ A$. Because there are no contactors with a capacity of 3.94 A to 4.92 A in the market, the contactor used is a contactor with a capacity of 6 Ampere.

Then to determine the amount of TOR to be installed, the current TOR must be set to the nominal current of the motor (ITOR = In Motor) based on the data above In Motor = IB = 3.94 A, then the TOR must be set between these amperage ranges.

Over Voltage Protection

In determining Overvoltage Protection (Surge Arrester) according to the provisions for places with a low level of risk can be installed Surge Arrester with a capacity of 20 kA and 65 kA for the highest level of risk. In general, the Surge Arrester that is installed is a Surge Arrester with a capacity of 40 kA with the consideration that the risk is not too high and not too low. The large size of this arrester capacity affects the life of the Surge Arrester unit itself, the larger the capacity, the greater the overvoltage that this protection unit can withstand thus requiring fewer replacements.

Leakage Current Protection

The amount of protection against leakage currents is: ELCB = Imax x 115% = 27.66 Amperes. So the standard leakage current protection (ELCB) installed on the Sanctoo Lift unit is 27.66 Amperes, because there is no ELCB with that capacity on the market, it is chosen with a capacity that is close to that, namely an ELCB with a capacity of 32 Ampere (with a residual current safety rating of 30 mA).

Conclusion

The standard conductor sizes used for lighting installations at Sanctoo Suites & Villas are in accordance with the regulations that apply to PUIL 2011. The load on the AC unit in the server room from field data obtained is that the capacity of the installed MCB is 16 Ampere so that the installed safety has exceeded the capacity it should be. but this is still acceptable as long as it is within reasonable limits for its use. The protection and conductors installed on the SDP and MDP are in accordance with applicable standards, the thing that needs to be considered is the level of risk from the place where the overvoltage protection unit is installed. The risk level in question is how vulnerable the installation location is to a lightning strike. In the existing provisions, if the risk level is low, the surge arrester capacity installed is 20 kA, but if the risk level is high, the surge arrester capacity installed is 65 kA. However, if the risk level is normal, it is recommended that a surge arrester be installed with a capacity of 40 kA.

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