HAZOP METHOD FOR ELECTRICAL K3 ANALYSIS SETTLEMENT IN THE VILLAGE JAGONG JEGET-ACEH TENGAH

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Abstract

Electrical energy is something that is very important today and is very much needed for every house or place of residence. Every house stay must have safety in electrical installations installed such as MCB, grounding, fuses, and other electrical fittings that are included in K3 electricity, so that the house can be said to be safe to live in. However, there are still many residents who do not know about the existence of PUIL for the electrical installations used and installed in their homes, as well as minimal knowledge of the importance of PUIL completeness. This study aims to determine the completeness of residents' electrical installations based on PUIL (General Electrical Installation Requirements) in Jagong Jeget village -Aceh Tengah by using HazOp so that residents' homes avoid hazards caused by electric currents. HazOp is an abbreviation for method *Hazards* and *Operability*. this research uses a qualitative method with interview, observation, and documentation techniques. The result, there are several residents' houses that are still there using a fuse as a safety installation, and there are still many residents' houses that do not install grounding, as well there are some residents who use electronic devices not following for under the power installed in their homes. So, got concluded that house residents in Jagong Jeget Village-Aceh Tengah yet fulfill standard PUIL equipment.

Keywords: *hazards, operability, K3, electrical installation*

1. Introduction

Genre electricity holds a role important inside life society. Electricity is used almost in all aspects of life people human. Electricity has Lots of benefits and functions that can help the man carry out activities every day. However, in terms of system installation electricity, and power burden in use equipment electricity is still not yet lots known by the public. Though, should the installation of electricity must follow PUIL (General Electrical Installation Requirements) and must be supervised by K3 (Occupational Safety and Health). Is done as an effort to minimize possible danger happening in no time unexpected.

The danger is often found in the use of electricity every day, like houses without a tool extinguisher firing early, tool electronic with burden exceeding KWh that has been installed, fan wind dusty, problematic AC, and installation on the floor. Problems with electricity can resulted in several frequent accidents found, like connection short current literal, stung current electricity, and frequent MCB (*Miniature Circuit Breaker*) back and forth because of excess load.

Hazards and impacts that can be identified using HazOp. HazOp is an abbreviation

for method *Hazards and Operability*. *HazOp* is a method of identifying systematic and structured hazards to evaluate the level of risk in something system frequently unsafe *conditions* found at home, such as no There is tool extinguisher fire early, tool electronics that have burden more from KWh that has installed, fan dusty wind, problematic AC, and installation on the floor. HazOp is also one method used in countermeasures disaster in safety and health work. Safety and health work is also an application technique management safety and health arranged work in Constitution Number 01 of 1970 concerning Safety Work and Act Number 13 of 2003 concerning Employment. So that, with existing HazOp, crash work can be identified in a manner more early.

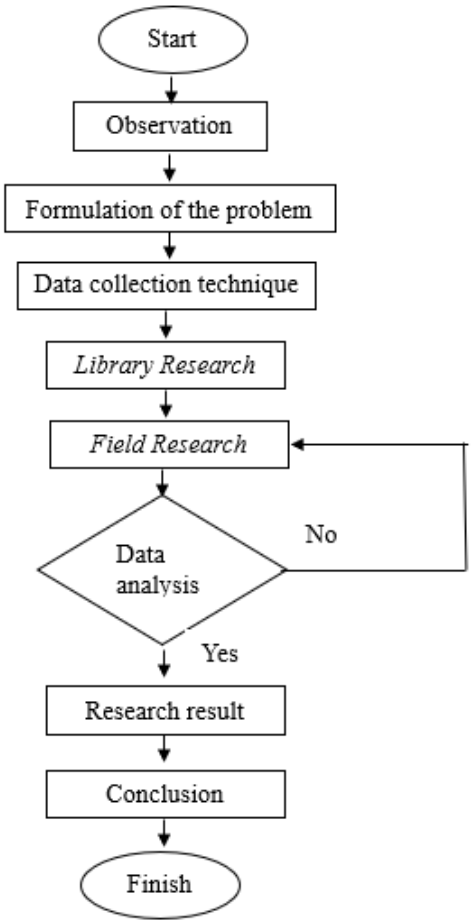
Study This was conducted in Village Jagong Jeget Aceh Tengah, with the objective for analyze the completeness condition of general installation electricity (PUIL) at home residents, as well determine factors HazOp on installation electricity as well as level risks that occur. This was done because in the village this once happen believed fire happen because the current connection was scorching short several many house residents, so resulted in a loss with enough nominal big for affected residents fire in a manner direct.

2. Method

The flow of research conducted to know the appropriateness of system installation electricity at home inhabitants or settlements showed in Figure 1. Research This adopted type of study qualitative through data collection and later analysis interpreted by following per under approach descriptive. The study uses a method qualitative based on an approach descriptive aim to describe or explain something phenomenon or social happenings in society. Use method descriptive form data collection and analysis in the field based on moderate facts happened on the spot study the. Study This was carried out in the Aceh area, precisely in Village Jagong Jeget, Aceh Tengah. subject from study This is 77 households housing units citizens, one office village, and one mosque.

The process stages study HazOp has done is as follows:

1. Observation is an activity carried out by researchers to observe electrical installations in residents' homes.
2. The formulation of the problem is the main problem that will become the title and purpose of this research.
3. Data collection techniques are methods used by researchers to obtain the data needed for research to analyze the data to produce results.
4. *Library Research* is a data search process that can be used to support research through books, journals, and important documents.
5. *Field Research* is a research process to obtain data by observing natural phenomena that occur around the scope of research.
6. Data analysis is the process of filtering the data that has been obtained to conclude.
7. The results of the research are data obtained after going through the process of searching and filtering data.
8. The conclusion is the final result of the research that has been carried out by utilizing the data that has been obtained and filtered.



Figures. 1. Research flow HazOp

Data collection was carried out in three-way, namely:

i. Interview

In doing the interview, a researcher still must have limited interesting conclusions from side conversations that took place. The interview instrument grid was conducted in Table 1.

TABLE 1 INSTRUMENT INTERVIEW

Formula Problem	Indicator	Question Items
How HazOp (Hazard and operability) can role in Engineering Electrical Installation, as well What relation to the room scope of K3 (Safety and Occupational Health)?	Know installation electricity House inhabitant or know PUIL provisions will power used at home the as well as What it's Hazop in Electrical Installation Engineering and know What it K3 (Occupational Safety and Health)	1. Is a citizen do you know about the PUIL provisions installed in the house? 2. Is there any implementation of HazOp (safeguards) in installation of electrical installations in house? 3. A whether HazOp should be in installation electrical installation homes? 4. By using the method HazOp whether a work accident or fire can be handled 5. On installation electrical installation at home relating to K3 (safety and occupational health)

ii. Observation

Observation is a systematic observation and recording of the symptoms being examined. Observations made in study This in the form of: - Equipment home installation citizen, consists of switches, sockets, and fittings; - Security type of MCB and fuse; - Circumstances physique earthing*/grounding*; and - Circumstances environment House influencing citizens security installation or no.

iii. Documentation

Besides that, qualitative method used For analysis the data was performed through four stages, namely, data collection (data *collection*), data reduction (data *reduction*), data presentation (data *display*), and conclusions.

a. Data Collection (data *collection*)

The data obtained is the result of observations, interviews, and documentation recorded in field notes. This research has a total data of 70 households in the sense that the data does not reach 100, therefore the sampling is carried out 10% - 15%.

b. Data reduction (data *reduction*)

Data reduction is the process of selecting, and simplifying data from records written in the field. Data reduction is the same as summarizing data so that it becomes a more concise summary.

c. Data Presentation (data *display*)

The presentation of data is a summary of information that has been arranged so that conclusions can be drawn. The presentation of data that is often used in qualitative form is narrative.

d. Conclusion

The conclusion is the final stage in data analysis carried out by researchers so that research is easier to understand.

3. Results and Discussion

Results obtained from the study in the form of completeness data installation electricity, security installation reviewed electricity from facet condition physical, and selection for safety installation power on house citizen. Processed data is the result data from K3 analysis of electricity in settlements residents use the method HazOp inspection installation electricity, which includes equipment PUIL 2000 at home existing residence completeness installation, type the safety in use, use of grounding or grounding that is installed or not, and the environment or condition place house is built. The result showed in Table 2.

TABLE 2 EQUIPMENT PUIL

NO	Resident name	Equipment Installation			Protection		grounding	Environment
		Switch	Electric socket	fittings	MCB	Fuse		
1	Supriyanto	√	√	√	X	√	X	√

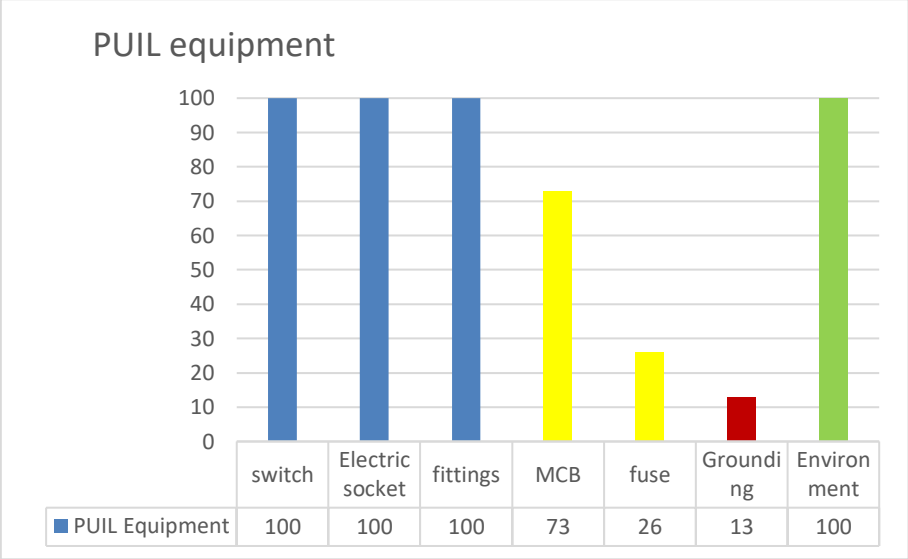
2	Agus	√	√	√	√	X	X	√
3	Mirja	√	√	√	√	X	X	√
4	Amen	√	√	√	√	X	X	√
5	Herman	√	√	√	√	X	X	√
6	Harris	√	√	√	√	X	X	√
7	Sutris	√	√	√	√	X	X	√
8	Sudir	√	√	√	X	√	X	√
9	Harry	√	√	√	X	√	√	√
10	Muhiron	√	√	√	X	√	√	√
11	Hamdan	√	√	√	√	X	X	√
12	Ani	√	√	√	√	X	X	√
13	Anisa	√	√	√	√	X	X	√
14	Village Office	√	√	√	√	X	X	√
15	Mosque	√	√	√	√	X	X	√
	Amount	15	15	15	11	4	2	15

Based on Table 2, the observation data is obtained which produces the following information:

1. The houses in Jagong Jeget Village have an average power load of 900 watt, but there is one house that has a power load of 1320 watt and there are two houses that have a power load of 450 watt.
2. For village offices and mosques in Jagong Jeget Village, each has a power load of 900 watt and 1320 watt.
3. All houses, village offices, and mosques have used *the Miniature Circuit Breaker* (MCB) protection system. The MCB used varies depending on how much power the building has. MCB C2 for 450 watts of power, MCB C4 for 900 watts of power, and MCB C6 for 1320 watts of power.
4. Not all buildings apply *fuse boxes* as an additional tool to prevent accidents, only a few residents' houses do.
5. All residents' houses have electrical equipment that exceeds the power load of the house, but these tools are never used simultaneously to prevent the MCB from bouncing or sudden power outages.

Additionally, based on results from observations and interviews, the average power installed in the house inhabitant is 900 Watt with the average household own equipment electricity with burden power exceeding installed power, so use No Can in a manner together in one time. So as with PUIL equipment. Percentage PUIL completeness shown in Figure 2 is the description from results in Table 1 with the use equation:

$$percentage = \frac{Number\ of\ parts}{Total\ number}\ x\ 100\% \qquad (1)$$



Figures. 2. Percentage of PUIL equipment

By amount sample 15 houses, then for installation house inhabitants produce 100% complete with the use of each house that has switches, sockets, and light fittings. 11 houses are using MCB with percentage 73%. Residents' homes that use protection (fuse) totaling 4 houses with a percentage of 26%. On the grounding section only there is 2 houses inhabitant by whole samples that use it, ie around 13%. Environment House stays enter in class safe because no exists barriers like trees big can annoying genre electricity to the house from system transmission as well as building house built on level ground. So, got concluded that house residents in the village Jagong Jeget – Aceh Tengah yet someone fulfills standard PUIL completeness due to still lots house citizens who don't have grounding caused by a lack of tools in installation.

4. Conclusion

The study used the HazOp method in Jagong Jeget Village-Aveh Tengah to assess the completeness of PUIL in residents' homes, and can determine the protection system that is widely used by residents. The result obtained is that none of the residents' houses in Jagong Jeget village meet the PUIL completeness standards because there are still many residents' houses that do not use grounding. This is caused by a lack of tools in the installation of grounding and the average power used is 900 watt.

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