Development of Demonstration for Hydro Power Generation

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Keywords: Demonstration, Hydro power generation, Inverter circuit

Abstract. The objective of the research were to development of demonstration for hydro power generation and study of the inverter circuit. The experiment found that development of demonstration for hydro power 220V_{AC} by using 12V_{DC} electric motor to the current and voltage to the inverter, convert current and voltage to 12V_{DC} to current and voltage 220V_{AC}, by using 24 V_{DC} water pump to suck water in a 20 liter tank. And create pressure to water in the PVC pipe, sending power to the motor rotor to rotate, generate electricity and send to the battery charger circuit, charge current and voltage from the motor to generate electricity to store in the battery. After that send current and voltage to the inverter circuit, convert 12V_{DC} battery voltage to 220V_{AC}. The results showed that the development of demonstration for hydro power generation able to produce 220 volts AC power for 25 minutes, static electricity without electricity increasing or decreasing all the time working, but the working period will be stable or decrease according to the percentage of usage.

1. Introduction

Nowadays, the number of households and residents in households has increased every year and thus increasing the demand for using electricity as well. Causing the need to produce electricity in various forms, whether produce hydro power generator, Electricity from wind, Energy from gas, Energy from coal, especially from coal, all of which can create pollution that affects the environment. [1-2]

Cause of power outage is the state in which the electricity stops flowing. Caused by the need for electricity from the electricity transmission line Excessive, short circuit in the transmission line. And problems with the transmission line, such as a falling electric pole or an explosion transformer. Which results in the inability to supply power from electricity.[3] Therefore, hydro power is an alternative energy that is possible to be used as an alternative fuel for electricity production. [4]

This research aims to design and development of demonstration for hydro power generation. It is necessary to focus on hydro power generator studies in order to be able use water energy efficiently. And maximize benefits we therefore choose to use the tap water that is used in everyday life. Because when using water in daily life, it will get electricity from using water to store it as a backup power.

2. Methodology

Starting with the study of related theories. Design a demonstration set. Providing equipment and assembling work pieces. Conducting a demonstration of demonstration for hydro power generation 220 V_{AC}. Test the operation of the demonstration. To collect the data of the working voltage

and current produced. Analyze the experimental results of the work of the demonstration for hydro power generation power and summarize results, as shown in Fig. 1.

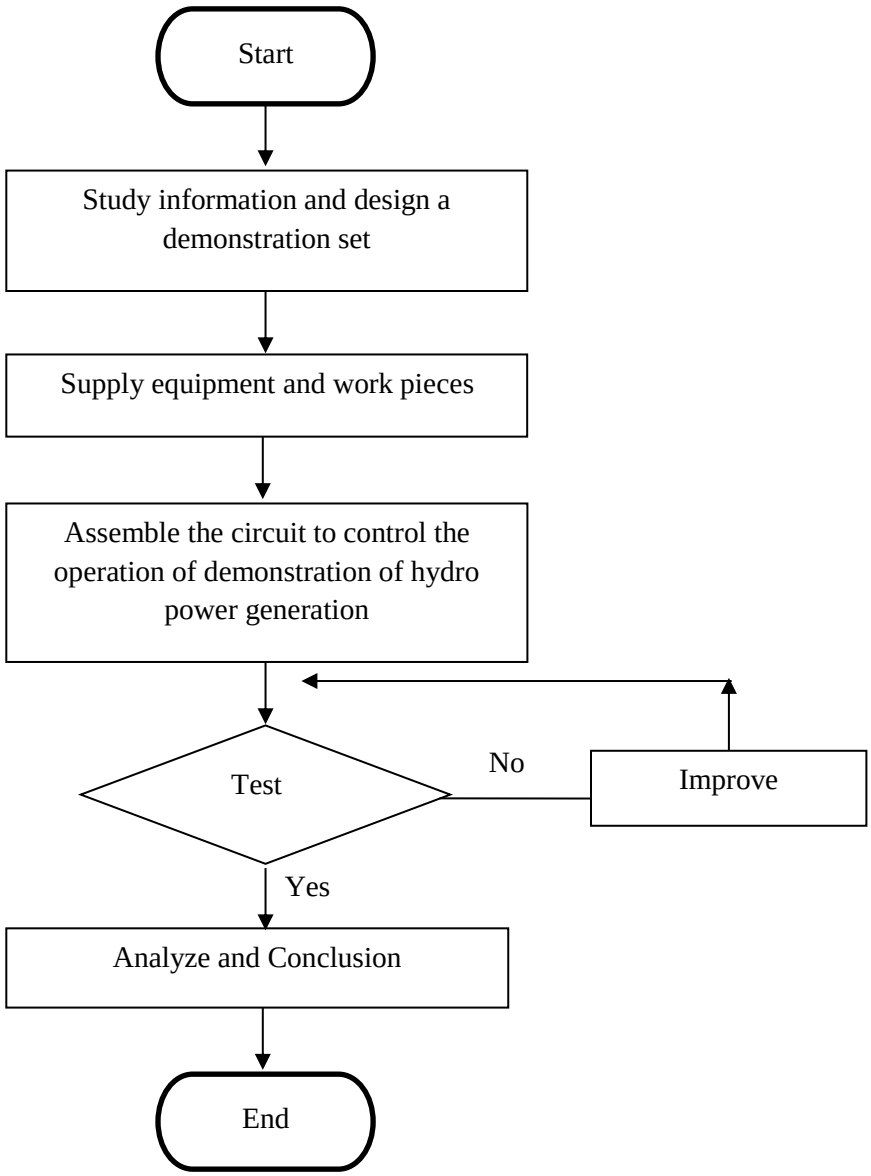

Fig. 1 The block diagram of the research concept

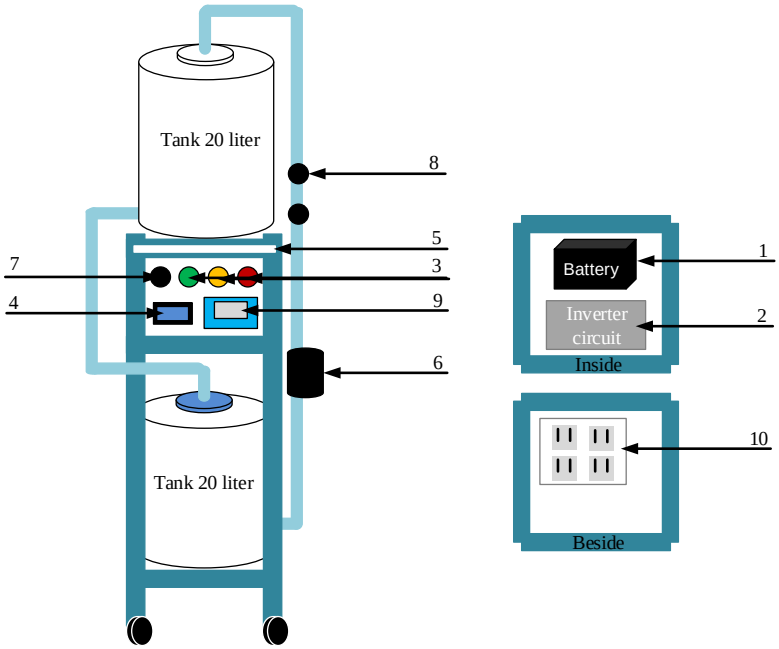

Fig. 2 Structure of demonstration for hydro power generation

Structure of demonstration for hydro power generation. The model is implemented of the design setup. The various block present in the design are mentioned below, as shown in Fig. 2.

1. Battery
2. Inverter circuit
3. One way switch circuit
4. Meter LCD digital dual display
5. LED SMD
6. Voltage regulator circuit 12-24 V_{DC}
7. Volume adjustable water pump motor 24 V_{DC}
8. Generator
9. Battery charger circuit 12V_{DC}
10. Four power plug

The work of the demonstration set starts with the battery supplying current and voltage of 12 V_{DC} to the current and voltage adjustment of 12 V_{DC} to 24 V_{DC} to adjust the current and voltage to suit the usage. Adjust the volume of the 24 V_{DC} water pump motor to get the proper water pressure flowing through the 12 V_{DC} generator. Then bring the electricity that the motor produces 12 V_{DC} to connect to the battery charge circuit. To send current and voltage to charge the battery. The battery is supplying current and voltage 12 V_{DC} to the inverter to convert current and voltage from 12 V_{DC} to 220 V_{AC} and then connect the current and voltage to 220 V_{AC} to the meter to display. Therefore will supply current and voltage to the 220 V_{AC} power plug.

3. Results and Discussion

Power generation from hydro power by using a 12V_{DC} electric motor to enter the current and voltage to the inverter, convert current and voltage to 12V_{DC} to current and voltage 220V_{AC}, by using a 24 V_{DC} water pump to suck water in a 20 liter tank and create pressure to water in the PVC pipe, sending power to the rotor in the motor to generate electricity, rotate to generate electricity and send to the battery charging circuit. Charge current and voltage obtained from the motor to generate electricity to store on the battery, then send the current and the voltage that has been given to the

inverter. Convert the voltage from the $12V_{DC}$ battery to $220V_{AC}$. Then the current and voltage obtained will be displayed via the voltmeter, ammeter, digital LCD meter, shows the electricity charge from the inverter, as shown in Fig. 3.

Fig. 3 Demonstration for hydro power generation

The experimental results show that the demonstration for hydro power generation. Experimental results that are non-load as shown Table 1.

Table 1 The test non-load experiment with a 25 minute timer.

Time (Minutes)	1	3	5	7	10	13	15	17	20	25
Voltage (V)	220	220	220	220	220	220	220	220	220	220
Current (Ah)	1	1	1	1	1	1	1	1	1	1

Table 1 shows the test non-load experiment with a 25 minute timer. The current and pressure obtained from the experiment are constant, without decreasing or increasing the current and pressure throughout the 25 minute timer. In conclusion, the demonstration for hydro power generation producing has a constant current and voltage.

Table 2 The test per-load experiment to use 4 power outlets with 5 and 10 minutes timer.

Count	1	2	3	4	5	6	7	8	9	10
Time (Minutes)	5	5	5	5	5	10	10	10	10	10
Voltage(V)	218	216	215	215	214	215	215	216	215	214
Current(Ah)	0.14	0.15	0.14	0.17	0.22	0.14	0.16	0.16	0.17	0.23
Power(W)	8.8	11.8	12.0	14.0	28.2	12.0	13.4	13.7	15.3	31.1

Table 2 shows the test per-load experiment to use 4 power outlets with 5 and 10 minutes timer. After using with different types of electrical equipment. The power will increase according to the usage time and the number of devices. The voltage is reduced by the timing and amount of equipment.

The current value will not change much. But will increase according to the amount of electrical equipment used.

4. Conclusion

The proposed of using the device to connect, load and non-load with 3 different time periods, 5, 10 and 25 minutes. To see the work of development demonstration for hydro power generation 220 V_{AC}. The current and voltage obtained from experiments that are not loaded are constant. There is no reduction or increase in current and pressure throughout the timer. And per-load experiment will increase the power according to the increasing use of the device as well as the current value, and the voltage is reduced by the amount of equipment used.

5. Acknowledgments

I would like to thank Faculty of Industrial Education, Rajamangala University of Technology Phra Nakhon fund in supporting this research study.

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