BUILDING MANAGEMENT POWER SYSTEM (BMPS)

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INTRODUCTION

In a generation where industrial is rapidly developing and now becoming more advances especially on their building facilities are now becoming more in demand.

The latest system of the building structure is to provide safe, more energy efficient and convenient condition for a long term condition of the structure. For some buildings are more complicated requirements because of their services, like Condominium, malls, hospital and other large buildings or structure, the services offered must be in advance and it also required a higher requirement. Some of these services gain from being able to communicate with one another, share function, and be monitored at the same time.

To effectively manage and monitor many building services in terms of building management system needed. There is some several advantage of Building management system Interaction in order to develop more effective control strategies, sharing of alarms, remote assistance is available. And some of the research found that a well design Building Management System can result in power savings of up to 30% as well lower maintenance requirement.

The building management system (BMS) is a complicated device this will be the data center or the main brain of whole Building system but the BMS function well base on the building specification. But if we compare this from other programmable device the BMS is much cheaper than to others, an still can handle heavy voltage or loads.

BMS are using Magnetic contactor as a momentary switch to control the load in the circuit like lights, and motors such as an air conditioning unit, exhaust fan, HVAC, FDAS, and others. The advantage of the magnetic contactor as momentary switches to the other switches, in terms of the specification of this device magnetic contactor is durable and has a long span capability.

Regarding with the microcontroller we use MCU OF Microchip to install the Program or the protocols needed for the BMS, we also used RS 485 instead of RS232, RS485 can address up to 128 device using two wire half duplex or four wire system full duplex can transmit up to 300 meters at the rate of 10 MB/s transmission length can be extended using repeater up to 3000 meters, and also RS422 system can transmit data at rates as high as 10 MB/s may be sent on cables as long as 1,500 meters at lower rates.

This context, the use of intelligent building control provides a proven and interesting alternative or addition that is clearly set apart by its convincing cost-benefit ratio and a safe system that is functional and efficient. In addition, there are lots of emerging applications and services in support of building automation systems in the building domain. The main goal is to provide an overview of the building management system, and to

identify the new challenges from emerging building infrastructures.

GENERAL OBJECTIVE

The Main Objective of The Study Entitled "Building Management Power System (BMPS) Using Microcontroller And Direct Digital Control Module Was To Provide A Control System That Can Be Used To Monitor And Manage The Mechanical, Electrical And Electromechanical Services In A Building.

STATEMENT OF THE PROBLEM

It Sought To Answer The Following Research Question:

1. What the Advantage And Disadvantage Of Using Microcontroller In BMPS?
2. What Are The Similarities And Differences Of This Study To The Other System Present In The Market?
3. How Will It Be Efficient And Effective In The Industry?
4. What Is The Assessment of The Three Groups Of Respondents In Terms Of The Following Criteria? Are There Any Significant Differences?
    a) Functionality
    b) Usability
    c) Reliability
    d) Efficiency
    e) Maintainability
5. What claims can be derived from the developed invention

METHODOLOGY

Non-probability sampling is a sampling technique where the odds of any members being selected for a sample cannot be calculated. It's the probability sampling, where you can calculate the odds. In addition, probability sampling involves random selection; while-non-probability sampling does not-it relies on the subjective judgment of the researcher.

The odds do not have to be equal for a method to be considered as probability sampling. For example, one person could have a 10% chance of being selected and another person could have 50% chance of being selected. Its non-probability sampling when you can't calculate the odds at all. Plus, you can't calculate the confidence intervals and margins of error. This is the major reason why, if it all possible, a researcher should consider probability sampling method first.

There are six different types of non-probability sampling method that can be used; Convenience sampling, Purposive sampling, Quota sampling, Dimension sampling, Voluntary sampling, and Snowball sampling.

The researchers used the purposive sampling method. A purposive sample is where a researcher selects a sample based on his knowledge about the study and population. The participants are selected based on the purpose of the sample.

In this method of sampling, the choice of sample Items depends exclusively on the judgment of the investigator. That is, the investigators exercise their judgment in the choice and includes those items in the sample.

STATISTICAL TREATEMENT

The mean was used as the tool for evaluating the project. The formula is:

$$X = \frac{\Sigma x}{N}$$

Where,

Σ, represents the summation

X, represents scores

N, represents number of scores

Equal Variance Not Assumed

When the two independent samples are assumed to be drawnfrom the populations with equal variances (1.e., 012 ≠ 022), the test statistic t is computed as:

$$t = \frac{x1 - x2}{\sqrt{\frac{s1}{n1} + \frac{s2}{n2}}}$$

Where,

x1 = Mean of the first sample

x2 = Mean of the second sample

n1 = Sample size (i.e., number of observations) offirst sample

n2 = Sample size (i.e., number of observations)of second sample

s1 = Standard deviation of first samples

s2 = Standard deviation of second sample

The calculated t value is then compared to the critical t value from the t distribution table with degree of freedom.

Table 1. The Likert Scale was used for descriptive ratings

Rating	Scale	Interpretation
5	4.20 – 5.00	Excellent (E)
4	3.40 – 4.19	Very Good (VG)
3	2.60 – 3.39	Good (G)
2	1.80 – 2.59	Fair (F)
1	1.00 – 1.79	Poor (P)

DATA GATHERING PROCEDURE

In developing this project, the following steps were undertaken:

1. Planning and title proposal, "BMPS or Building Management Power System"

2. Researching and Planning on how building management and monitoring works.

3. Gathering data about Direct Digital Controller Module.

4. Identifying the supplies required to complete the project and obtaining quotes for all of the items.

5. After selecting the resources, the researchers do extensive research on monitoring devices and programs that will be used in the project.

6. Monitoring of device wireless progress and device delay feedback.

7. Procedure for assembling device-to-device connection.

8. Installing an application for real-time monitoring and gathering feedback from monitoring devices.

9. Resolving some delay feedback and an unresponsive device.

10. Result

SUMMARY OF FINDINGS

This chapter shows the findings resulting from this study.

SOP 1. What the advantage and disadvantage of using microcontroller in BMPS?

The study shows that using microcontroller in BMPS provides less time in performing operations. At an equivalent time, many tasks are often performed therefore the human effect are often saved. And the processor chip is extremely small and adaptability occurs. Overall it is easy to use, troubleshooting and system maintaining is straightforward.

In contrast to the above mentioned, microcontroller is generally utilized in micro equipment. In addition, it has a complex structure and has a limited number of executions. As every microcontroller does not have an analog input and output.

SOP 2. What are the similarities and differences of this study to the other system present in the market?

BMPS has the same function with the other device that can monitor and control building equipment that is available in the market but this device is locally made that makes it inexpensive.

SOP 3. How will it be efficient and effective in the industry?

Automation takes pressure to monitor data and adjust settings. The BMPS single-user interface saves time by bringing relevant information and controls together in one place. Interfaces range from basic dashboards through to full graphic workstations. A BMS can quickly translate real-time data for

rapid decision-making. Furthermore, BMPS has performance management and reporting capabilities, to meet energy consumption and star rating targets. In high-performing buildings, a good energy rating is crucial to rental income and asset value. By using BMPS energy efficiency savings is up to 15% - 30%.

SOP 4. What Is The Assessment Of The Three Groups Of Respondents In Terms Of The Following Criteria? Are There Any Significant Differences?

a) Functionality

b) Usability

c) Reliability

d) Efficiency

e) Maintainability

The following criteria were being assessed by group of Students, Professional and Community.

Table 2: Summary of Assessment of the BMPS

Criteria	Students	Professor	Community	Composite Mean	VI	RANK
Functionality	4.53	4.57	4.13	4.41	E	1
Usability	4.30	4.60	9.97	4.29	E	3
Reliability	4.33	4.43	4.00	4.26	E	4.5
Efficiency	4.33	4.30	4.33	4.34	E	4.5
Maintainability	4.20	4.50	4.59	4.48	E	2
Overall Weighted Mean	**4.52**	**4.33**		**4.48**	**E**	

Table 2 shows that the EMPS in terms of its functionality, usability, reliability, efficiency and maintainability is viewed excellent by the three groups of respondents. Looking at table, it could be inferred that the respondents rated all indicators as excellent with a composite mean value of 4.41 for functionality on

Rank 1; 4.34 for maintainabity10

Rank 2; 4.29 for usability on Rank 3; 4.26 for efficiency on Rank 4.5; 4.26 for usability Rank 4.5 with an overall composite weighted mean of 4.48.

CONCLUSION

Based on the findings of the study, the following conclusions are drawn:

A. According to the evaluation result of the functionality of the Building Management System Using Magnetic Contractor as Momentary Switch were rated as "Excellent" by the respondents. This implies that the Building Management System Using Magnetic Contractor as Momentary Switch in terms functionality accomplishes sil specified tasks and user objectives with the needed degree of precision.

B. According to the evaluation results of the Usability of the Building Management System Using Magnetic Contractor as Momentary Switch conducted by the respondents. shows that the

C. According to the evaluation results of the Reliability of the Building Management System Using Magnetic Contractor as Momentary Switch, The indicators Maturity, Availability, and Fault Tolerance were rated as "Excellent" by the respondents. This infers that the reliability of Building Management System Using Magnetic Contractor as Momentary Switch meets the needs for standard reliability under normal operation and the system is functioning and accessible when needed to be used and with a degree of tolerance to faults.

D. According to the evaluation results of the Efficiency of the Building Management System Using Magnetic Contractor as Momentary Switch the indicators Time Behavior, Resource Utilization, and Capacity was valuated as "Excellent".

E. According to the evaluation result Maintainability of the Building Management System of the Using Magnetic Contractor as Momentary Switch. The indicators Modularity, Reusability, Modifiability was valuated as "Excellent" by the and respondents. The Building Management System Using Magnetic Contractor as Momentary Switch is modifiable, achieves modularity, and is reusable in other systems.