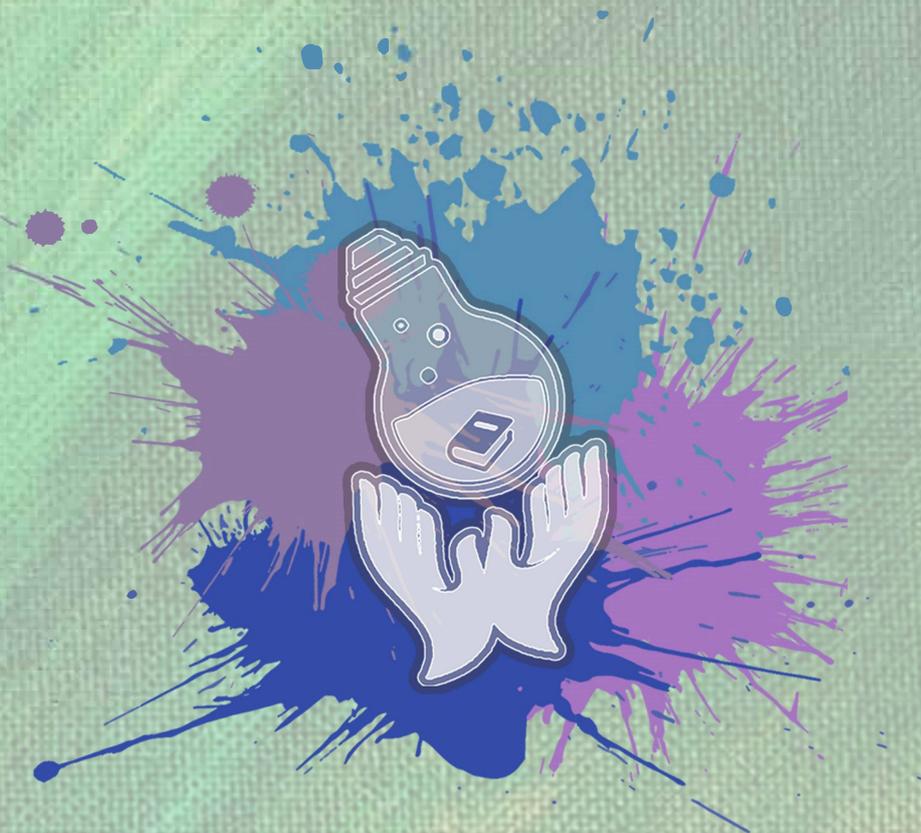




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# POST OCCUPANCY EVALUATION (POE) OF INDUSTRIAL BUILDING SYSTEMS: ANALYSIS OF OCCUPANCY SATISFACTION

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## **Abstract:**

Sustainable construction is one of the increasing areas in transforming a better field for Malaysian construction industry. Industrialized Building System (IBS) is one of the approach in achieving sustainable construction that able to deliver built-up assets to enhance the quality of life, fulfills customer's satisfaction and maximize the efficient use of resources. However, despite its benefits, there are several issues in regards to the IBS constructed buildings after it is handed over to the client. Among the issues are delivery of leads to poor workmanship and poor building conditions that leads to discomfort and dissatisfaction of the building occupants. Post Occupancy Evaluation (POE) is known as the method that able to benchmark the performance of building by incorporating occupants' feedback towards the building's poor condition. Therefore, this paper aims to determine the performance criteria and satisfaction level of occupants in IBS building towards performance improvement. Quantitative approach is used in this study where questionnaire is used as the main instrument. College Beta in UiTM Tapah campus is chosen as the sample building and the questionnaires were distributed to the hostel residents. The outcome of this study has contributed and enhanced ways towards performance improvement using POE method.

## **Keywords:**

Post Occupancy Evaluation; Building performance; Industrialized Building System (IBS),

## **1.0 INTRODUCTION**

The construction industry is widely acknowledged for its vital economic role and contribution to Malaysia's gross domestic product (GDP). According to Ismail et al. (2016), Industrialised Building System (IBS) is not new to the construction industry. IBS is defined by is defined as a construction technique in which components are manufactured in a controlled environment (on or off site), transported, positioned and assembled into a structure with minimal additional site works. According to Ali et al. (2012), the selected of assessment or diagnosis tools on IBS building maintenance affect the lifetime performance of building structures. Thus, it owes to the knowledge level of designer or contractor to determine the appropriate concepts and technologies in IBS building maintenance. Ahmad Bari et al. (2012) revealed that comparing with the conventional method that had been dealing with the construction industry for many years, this method was inherent weakness such as time consuming to completed the building and labour intensive The benefits attributed to IBS adoption are numerous and well documented, providing impetus for its implementation in the industry. It can be summarized that IBS building provides many benefits to the construction industry.

However, the occupancy stage in IBS building is still facing poor workmanship, facilities and improper functions, despite its benefits in terms of construction technology. Dealing with performance in IBS building, building performance is defined as the degree to which a building can meet any or all of these expectations (Olanrewaju et al., 2010). User satisfaction is needed to understand the perception of the users, identify their needs, wants, requests, hopes, and to lower the gap between what the provider thought as being what the users want and what the users actually want. Hence, one of the best practical ways to overcome the issues is through Post Occupancy Evaluation. POE is a tool for facility managers to identify and evaluate the behaviour of a building (Khalil et al., 2009). According to Khalil and Husin (2009), POE can be seen as a tool that can be used in solving issues and problems of building in regards

to the performance, as well as evaluating the facilities condition. POE can also be seen as a systematic way to collect data and information on a particular building, but unfortunately attaining users' feedback after the building is occupied is not a routine in Malaysia (Khalil and Husin, 2009).

Hence, this study is aimed to determine the satisfaction level of the building occupants in terms of building elements and services. As compiled from the literature, the list of building elements are finishes, window, door and staircase, while for the building services list are firefighting, water plumbing, telecommunication and electrical and mechanical services.

### 3.0 METHODOLOGY

Quantitative approach is used in this study where questionnaire survey is used as the main instrument. College Beta Universiti Teknologi MARA (UiTM) Tapah Campus is chosen as the sample building, since the hostel is made from IBS components. The questionnaires were distributed to 222 hostel residents, i.e. focussing to the Final Year students who stayed in the college. The rationale of choosing Final Year students (hostel residents) as the survey respondents are due to their adequate experience and familiarity to stay in the building.

### 4.0 ANALYSIS AND FINDINGS

Out of 222 distributed questionnaires, a total of 120 were returned. The response rate for the survey is 54.1% is considered valid and sufficient. Demographic result shows that 73% are female respondents and 27% are male respondents. The survey also found that 71% of the respondents spent more than 8 hours per day in their building (hostel).

Table 1: Descriptive percentage on the occupants' satisfaction level of building performance criteria (elements and services)

| CATEGORY OF PERFORMANCE | CRITERIA OF PERFORMANCE                 | SATISFACTION LEVEL (%) |              |               |            |                    |
|-------------------------|---|------------------------|--------------|---------------|------------|--------------------|
|                         |   | Very Dissatisfied      | Dissatisfied | Mixed Feeling | Satisfied  | Strongly Satisfied |
|                         |   | 1                      | 2            | 3             | 4          | 5                  |
| Building Elements       | Finishes Of Ceiling                     | 0%                     | 3%           | 27%           | <b>45%</b> | 26%                |
|                         | Finishes Of Floor                       | 0%                     | 5%           | 22%           | <b>50%</b> | 23%                |
|                         | Finishes Of Roof                        | 0%                     | 3%           | 26%           | <b>47%</b> | 24%                |
|                         | Finishes Of Wall                        | 1%                     | 6%           | 31%           | <b>40%</b> | 23%                |
|                         | Window                                  | 1%                     | 10%          | 27%           | <b>42%</b> | 21%                |
|                         | Door                                    | 1%                     | 8%           | 34%           | <b>38%</b> | 19%                |
|                         | Staircase                               | 0%                     | 7%           | 31%           | <b>44%</b> | 18%                |
|                         | Overall Quality of Elements             | 0%                     | 3%           | 33%           | <b>50%</b> | 14%                |
| Building Services       | Fire Fighting Appliances                | 0%                     | 7%           | 29%           | <b>48%</b> | 17%                |
|                         | Supply of Water Services                | 0%                     | 3%           | 21%           | <b>50%</b> | 26%                |
|                         | Telecommunication System                | 3%                     | 25%          | <b>34%</b>    | 33%        | 5%                 |
|                         | Plumbing System                         | 1%                     | 13%          | 28%           | <b>44%</b> | 14%                |
|                         | The Cooling System ( Air Conditioning ) | 7%                     | 10%          | 25%           | <b>42%</b> | 17%                |
|                         | Electrical And Mechanical Fittings      | 0%                     | 6%           | 31%           | <b>47%</b> | 17%                |
|                         | Overall Quality Of Services             | 0%                     | 3%           | 33%           | <b>53%</b> | 12%                |

Table 1 showed that majority of the respondents range from 38% to 53% are satisfied to very satisfied with the condition of building elements and services in their building. Only small percentage of respondents indicated dissatisfaction level but it does not constitute to majority number of respondent. Only one criteria , i.e. telecommunication system, received a majority of 34% in medium satisfaction

on the item. This showed this criteria has constituted a minor failure that does not achieve a high satisfaction to the respondents.

It can be summarised that the building performance in terms of elements and services in the IBS building achieve satisfaction and comfort to the occupant as the user of the building. However, criteria that received a low satisfaction (i.e. telecommunication system ) needs a thorough monitoring and improvement by the relevant management to ensure sustainability is achieved.

## 5.0 CONCLUSION

Analysis of the findings from their study confirms that the application of POE is relevant, effective and able to determine occupants' satisfaction level and provide recommendation to improve building performance. The approach has a great potential in analyzing building performance as it uses a strategic approach to achieve the best quality in building elements and services. The assessment integrates the building occupants' behaviour, perception and opinion as the building users

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