Borneo Engineering & Advanced Multidisciplinary International Journal (BEAM)
Volume 2, Special Issue (TECHON 2023), September 2023, Pages 28-31

Building Defects and Facility Maintenance Practices

Hassan Ismail[1]*, Rahim Ishak[2], Mohamad Kelana Juwit[3]

[1]Department of Civil Engineering, Politeknik Merlimau, 77300 Merlimau, Melaka, Malaysia
[2]Department of Civil Engineering, Politeknik Mukah, KM 7.5 Jalan Oya, 96400, Mukah, Sarawak, Malaysia
[3]Director Office, Politeknik Merlimau, 77300 Merlimau, Melaka, Malaysia

*Corresponding author: hassan@pmm.edu.my
Please provide an **official organisation email** of the corresponding author

Full Paper

Article history
Received
26 July 2023
Received in revised form
26 July 2023
Accepted
11 August 2023
Published online
30 September 2023

Abstract

Cracks, rusty surfaces, missing ceiling panels, and moisture issues are common defects in buildings. Insufficient building maintenance will result in serious defects and more expensive repair work. In Malaysia, buildings are constructed under rigorous supervision and in compliance with British Standards. Unfortunately, the building's maintenance elements are still inadequate. Therefore, the main objective of this research is to identify the building defects and provide solutions to them. This research focused on one block from six blocks in Kampung Siswa (Kamsis). Block V1 was selected to investigate the building defects occurring there. The data were collected through questionnaires to evaluate the building defects. 118 respondents were involved from 172 populations. The finding of this study shows crack is the highest score (4.39) and is considered as the main defect that occurred on the Kamsis building. From the data respondents agreed the recommendation is the management service should be improved (4.38). The building defects that occurred will turn to high maintenance cost. It can be concluded that the most common building defects occurring are cracks.

Keywords: - Building, facility, defects, maintenance, solution

1. Introduction

In this modern era, most buildings should meet few regulations. According to Vidakovic (2021) stated regulations define the basic requirements for buildings, which ensure the safety and comfort of users. The requirements are intended to protect people's safety and health in and around the buildings. But there are several issues that affect the building performance and have huge negative impact on its own user. According to Kariipanon (2019) reported in flexible learning spaces, students spend more time collaborating and interacting positively with their peers, as well as more time presenting work back to the class. This proves that flexible spaces for learning gives huge impact towards learning and teaching process. The building management should take adequate maintenance of the facility for the benefit of the students to ensure that the location is appropriate for learning and teaching (Poon, 2012). In general, maintenance refers to work carried out to retain and restore the functionality of commercial and residential properties (Gregson et al., 2009). It includes tasks such as cleaning, landscaping, and electrical system maintenance. It aims to preserve safe, functional, and comfortable environments for all users at all times. The success of a building to be used depends on both its buildings and its facilities. A building that is good to operate should cover various aspects such as in terms of safety and comfort of users. Therefore, a study on the effects of building defects and facility maintenance for the Politeknik Merlimau Melaka building was conducted. This study aims to identify the building and facility defects on the building at Politeknik Merlimau Melaka and to find the solution.

The core function of university or any educational institution is to provide education and training for students that will graduate into experts for the best future of the country. Prescilla Palis (2019), mentioned universities have a critical role to play because their core function is the

education and training of students who will graduate into experts that will drive the future of the country to prosperity. Educational buildings also should be good looking on the outside to convince the users that their building is in good condition as it should.

Many studies have been done into building and facility maintenance and found defects as a common phenomenon in construction activity. Yusoff (2020) stated building defects are a common phenomenon in the construction industry which has a negative effect on schools in terms of performance building, health, and safety aspects as well as their overall teaching and learning process. Aulich (2013) stated most of the buildings built will eventually suffer from defects and flaws over time and will leave negative impacts and affect the learning and teaching process. Politeknik Merlimau Melaka building has been operating for more than 10 years. So, it is necessary for the building to perform function maintenance. This statement also was supported by Saari (2021) who reported that to maintain the viability of old buildings, maintenance of the condition and function must be carried out with the provision of a systematic maintenance management system. Most of the defects were easy to overcome, but what makes it worse is the lack of responsibility and experts to investigate more deeply in maintenance issues. Masrom (2020) found among them are the lack of experts, the difficulty of obtaining equivalent spare parts, and attention among professionals.

2. Methodology

The method used in this study was the quantitative method. The data acquired is from a questionnaire that was distributed to the respondents. Random sampling method was applied in this study. In a simple random method, every member of the population has an equal chance of being selected. Based on Krejcie & Morgan's (1970) table for determining sample size, for a given population of 172, a sample size of 118 would be needed to represent a cross-section of the population. Table 1 shows guidelines of sample needed for population.

3. Result and Discussion

The data was collected from the questionnaire given to the respondents of V1 block residents. The data collected were analyzed using SPSS statistical software. The data were shown in table form.

Table 2 shows the demographic of respondents. All the V1 block residents are 100% male. Respondents' age with the highest percentage is 98.3 for 19 to 25 years old and the rest 1.7% belong to the 26 to 35 years old.

Table 1. Guidelines of sample (Krejcie & Morgan, 1970)

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

Table 2. Demographic of respondents (Krejcie & Morgan, 1970)

Demographic			
Demographic Information.	Sample	Option	Percentage
Respondents Gender	118	Male	100%
		Female	0
Respondents Age	118	19-25	98.3
		26-35	1.70%
		36-45	0%
		46-60	
Respondent Employment status	118	Students	100%
		Staff	0%
		Lecturer	
Respondent's Kamsis Blocks	118	V1	100%
		V2	
		V3	
		V4	0%
		V5	
		V6	
Respondent 's Year Span in the Blocks.	118	<5 Years	100%
		5 Yeaars-10 Years	
		11 Years -15 Years	0%
		16 Years - 20 Years	

Table 3 shows that the cracks defects are the highest in the list. This proves that Politeknik Merlimau Melaka Kamsis building desired maintenance. Concrete cracks commonly happen in buildings due to a lot of factors. Chitte (2018) stated building cracks are the most common type of problem in any type of building. Therefore, it is important to understand the cause and the measures to be taken for prevention. Cracking occurs when shrinkage forces become greater than the strength of the concrete. This is also true for concrete parts cannot deform. Wide cracks in concrete are best patched and sealed with concrete patching compound. Smaller cracks less than 1/4-inch-wide can be repaired with concrete caulk or liquid filler. Patching compounds typically are mixed with water and applied using a trowel. To hide the patch effect, it requires the concrete to be painted with concrete paint or a matching colour with the surface patched.

Table 3. Building defects

Building Defects	Sample	Mean	Std. Deviation	Rank
Cracks	118	4.39	0.785	1
Peeling paint	118	3.93	0.922	2
Roof defects (leaking, cracking)	118	2.84	0.847	3
Corrosion	118	2.80	1.090	4
Rust	118	2.52	0.985	5
Ventilation level	118	2.51	0.922	6
Damage caused by the user	118	2.50	1.107	7
Damaged due to the presence of Wild Animals	118	2.46	0.930	8
Decay	118	2.16	0.952	9
Disruption in electrical supply	118	2.11	0.994	10
Pipeline issues (Broken, Damaged)	118	1.90	0.919	11

Table 4 shows that the number one highest on the rank is the management services that should be improved. This is because of a lot of cases of delay in demand for maintenance for the building. The second rank is using the proper tools and materials for the maintenance process. This is because the previous maintenance services were expected to be done with poor inspection and method. Other than that, the third rank is giving a penalty to the person who committed vandalism. This could prevent vandalism from happening and damaging the building and facility elements. The last on the rank was repairing the design of the building. This is because the repair took a lot of procedures and costly. Repairing the building design also affects the environment as the building structures will be changed and the need for the materials and equipment will also be crucial to ensure the repairing process was done properly.

Table 4. Building defects solution

	Sample	Mean	Std. Deviation	Rank
Management services should be improved.	118	4.38	0.761	1
Using proper material and equipment during constructions	118	4.18	1.083	2
Giving penalty to the person who committed vandalism	118	4.18	1.129	3
Conduct a maintenance services program as a oneof steps as awareness to the user.	118	4.08	1.034	4
Asking for user feedback from the user after usingthe building.	118	4.08	1.095	5
The need for the intervention of an experienced maintenance engineer.	118	4.08	0.944	6
Inspect the condition of buildings and facilities everymonth	118	4.07	1.019	7
Give control to the building from bad weather	118	3.87	1.082	8
Add maintenance cost expenses	118	3.66	1.360	9
Control the breeding of wild animals on the building	118	3.54	1.130	10
Repairing the design of the building	118	3.26	1.470	11

4. Conclusion

In conclusion, it is found that the Politeknik Merlimau Melaka Campus suffered from defects that could be reoccur again if there are no proper maintenance method performed. The major and minor defects could be prevented if the management services improve their quality services to upkeep the building from suffering defects that could lead to building failures. In addition, the management must play their part and the building's occupants must help maintain the structure by reporting any flaws found to the relevant unit, such as the development and maintenance unit or via E-Sakups on the Politeknik Merlimau Melaka websites. Because this research has lots of benefits, especially to users and

manager, it is recommended that this study to be further extended to investigate how to improve the quality of the campus services. This is imperative because the building most used by students. A comfortable learning place stimulates the learning process and provides a suitable environment for students to live or carry out their daily activities (Moore & Cooper, 2014). Eventually, it is recommended that the manager of Politeknik Merlimau Melaka to increase the maintenance allocation budget in order to maintain and improve the safety, health and welfare of the users.

Acknowledgement

The authors would like to thank the experts and respondents for giving their opinion on this research and to Politeknik Merlimau which permitted to access the kamsis building which makes this important research viable and effective.

References

Aulich, T. (2013). The role of effective communication in the construction Industry: a guide for education and health clients. *Australasian Journal of Construction Economics and Building, The*, *13*(4), 92-101.

Chitte, C. J., & Sonawane, Y. N. (2018). Study on causes and prevention of cracks in building. *International Journal for Research in Applied Science and Engineering Technology*, *6*(3), 453-461.

Gregson, N., Metcalfe, A., & Crewe, L. (2009). Practices of object maintenance and repair: How consumers attend to consumer objects within the home. *Journal of consumer culture*, *9*(2), 248-272.

Kariippanon, K. E., Cliff, D. P., Lancaster, S. L., Okely, A. D., & Parrish, A. M. (2018). Perceived interplay between flexible learning spaces and teaching, learning and student wellbeing. *Learning Environments Research*, *21*, 301-320.

Masrom, M. A. N., & Kadir, Z. A. (2020). Cabaran Dalam Pemuliharaan Bangunan Istana Lama Seri Menanti Di Negeri Sembilan. *Research in Management of Technology and Business*, *1*(1), 647-662.

Moore, R. (2014). Nature play and learning places. Creating and managing places where children engage with nature.

Palis, P., & Misnan, M. S. (2018). A review of key factors that affect university building maintenance costs. *International Journal of Engineering & Technology*, *7*(3.25), 32-34.

Poon, J. (2012). Use of blended learning to enhance the student learning experience and engagement in property education. *Property management*, *30*(2), 129-156.

Saari, F. A., Nasir, M. R. M., Mohamad, W. S. N. W., Abdillah, N., & Apandi, S. N. A. M. (2021). Pelaksanaan Kerja Penyelenggaraan Rumah Kedai Lama dalam Zon Warisan di Kota Bharu Kelantan, Malaysia. *International Journal of Creative Future and Heritage (TENIAT)*.

Vidaković, D., Nyarko-Hadzima, M., Ademović, N., & Lozančić, S. (2021, December). Maintenance of building elements to fulfill the basic requirements buildings. In *International Conference on Organization and Technology of Maintenance* (pp. 288-309). Cham: Springer International Publishing.

Yusoff, N. B. M. (2020). *Building Condition Assessment and Defect Analysis at A Pre-School Building in Kelantan* (Doctoral dissertation, Universiti Teknologi Malaysia).