



Pro-environmental Practices among Malaysian Construction Practitioners

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ABSTRACT

Societal interest and alarm in Malaysia is growing due to the substantial environmental impacts caused by considerable amounts of construction waste and energy consumption. Malaysian citizens are becoming increasingly concerned about how these impacts will affect their local communities and therefore are ever more attentive to the construction industry's efforts to reduce waste and energy consumption. The aim of the present study is to measure the current status of the pro-environmental practices among construction industry practitioners. Data for the study came from a sample of 375 practitioners in Malaysia's construction sector. Descriptive analysis was used for data analysis. The result indicates that overall in Malaysia, construction industry practitioners notice and implement pro-environmental practices in their construction projects at an acceptable level, yet, the results also demonstrate that some pro-environmental practices receive less attention; such as complying with industry codes of practice and considering suitable site development for the project. Findings from this study will be valuable in understanding the environmental practices that need more attention from policy makers.

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INTRODUCTION

Various serious environmental problems such as air pollution, wasted energy, and water degradation are the result of the rapid growth in Malaysia's construction industry. Greater than 50% of all resources extracted from earth are used for construction [1]. Another statistic reveals that 40% of the energy produced worldwide is consumed by buildings [2]. 12-16% of the Earth's freshwater is taken up by buildings [3]. Buildings are partially to blame for the current climate crisis as 40% of all carbon dioxide produced on Earth is generated by buildings [4]. As a result of these significant impacts, pro-environmental practices (PEP) among construction firms have received an increasing amount of attention from academics and practitioners alike.

PEP's are practices that are aimed at reducing negative impacts to the environment. These are usually specified as technology or processes that are performed, together with the development of "cleaner" and more efficient technologies. It may also be that the product itself or aspects of it are recyclable, biodegradable, or designed for reuse, remanufacture or repair, or disposability [5]. It may also be reflected in the choice of raw materials, the production of waste, the means of disposal and the amount of pollution it generates [6]. Thus, PEP in the construction industry can be conceptualised as the practices of recycling, reusing and reducing, which include involving people in pro-environment activities and motivating others to protect the environment.

At the country level, stricter environmental regulations have put pressure on construction industry players to take a more responsible approach to the environment in order to sustain their existence and stay competitive [7]. In addition, clients are becoming more demanding, critical, sophisticated and value-driven in their choices [8]. The basic and fundamental principles of a construction product are no longer sufficient. House buyers, for example, aspire to settle in higher quality accommodation that supports local eco-cycles, reduce energy use, make use of renewable energy sources and recycle materials. This has prompted the launch of Bursa Malaysia's Business Sustainability Programme for corporate Malaysia which aims to assist publicly-listed companies in integrating environmental, social and governance issues into their everyday business operations.

At present there is no concrete evidence emerging from the literature as to whether the above mentioned challenges and government programme have translated into the adoption of pro-environmental practices in the

construction industry [9]. Little is actually known about the way practitioners in the Malaysian construction industry respond to the environmental agenda of the project. The best practice in construction should include responsibility for the environment and emphasis on protecting a sustainable future. Therefore, at the individual level, the practitioners in the construction industry need to have a sense of empathy to connect themselves to, and see themselves as part of, the environment [10]. This study attempts to answer the question of, what is the current status of PEP among practitioners in Malaysian construction firms? Establishing the current status of PEP is a crucial aspect for continuing the progression toward promoting PEP among construction industry professionals.

Methodology:

Quantitative survey with a structured questionnaire was employed in the present study. The items measure practitioners' pro-environmental practices in their construction projects. The items were measured using 5-point scales ranging from 1 (never) to 5 (always). The construction firms' practitioners (architect, engineer, and contractor) constitute the population of the study. The respondents' addresses were obtained from the Board of Architects (LAM), the Association of Consulting Engineers Malaysia (ACEM) and Master Builders Association of Malaysia (MBAM). The questionnaire survey was administered face-to-face within the respective firms that operate in Penang, Malaysia. The state of Penang was chosen as a case study because it is the most active state in Malaysia in terms of construction activities. Of the 1000 surveys dispersed, a total of 384 replies were obtained. Four replies were incomplete, and five participants were thrown out in data cleaning. A total of 375 usable responses remained, representing a response rate of 37.5%. To evaluate the level of PEP among construction industry professionals in Malaysian construction firms, descriptive analysis was employed.

RESULTS AND DISCUSSION

(i) The Sample:

The last extant sample consisted of 176 (46.9%) engineers, trailed by 137 (36.5%) professional engineers, 33 (8.8%) directors, and 29 (7.7%) others. The bulk of the firms (68.6%) have fully foreign-based ownership, but have been operating in Malaysia for more than 10 years (72.5%). Pertaining to relevant experience in the construction industry, most of the respondents have less than 10 years construction industry experience (62.7%). The size of the firms with respect to their number of employees was measured and the numbers showed that 75.7% of the firms have fewer than 50 employees.

(ii) Pro-environmental Practices:

The results of the descriptive analysis of pro-environmental practices was presented in Table 1. The respondents were asked to rate their frequency of practicing PEP in their projects in a five point Likert scale ranging from 1 (never) to 5 (always). The highest mean value was (3.96) for considering the energy use of the projects, followed by (3.93) for minimizing the resource consumption of the projects, considering the effect of water pollution of the projects, and maximizing the reuse of resources. The lowest mean value was (3.51) for complying with industry codes of practice that address environmental issues, followed by (3.61) for considering sustainable site development in their projects and (3.66) for taking steps to reduce the environmental impact of transport associated with construction projects. Overall the mean value of pro-environmental practices in Malaysia is high (3.79).

Summary:

Extraordinary growth in construction projects in Malaysia has had harmful and potentially catastrophic effects on the environment including the rapid depletion of natural resources. A solution to many environmental issues could be found in pro-environmental practices (PEP). Although there is no doubt about the importance of PEP in addressing environmental concerns, the promotion of PEP remains a challenge. The aim of this study was to investigate the frequency of applying pro-environmental practices by practitioners in construction projects, in order to determine the current status of PEP among practitioners. The results show that the mean value of total pro-environmental practices in Malaysia is high; which demonstrates that stricter environmental regulations, consumer demand, and that the government programme has successfully translated into the adoption of pro-environmental practices in the Malaysian construction industry. However certain PEP's need more attention from practitioners such as complying with industry codes of practice that address environmental issues, considering sustainable site development in their projects, and taking steps to reduce the environmental impact of transport associated with construction projects. These findings can help decision makers in the respective firms to recognize the PEP's that are less frequently used by practitioners in projects. For example, at the firm level, the firms need to be innovative to overcome the constraints that create a resistance to adopt PEP [11].

Table 1: Pro-environmental Practices.

Items	Mean	Std. Dev.
I comply with industry Codes of Practice that address environmental issues.	3.51	0.98
I consider the environmental impact of materials I use/specify in my projects.	3.78	0.96
I use Site Waste Management Plans to ensure that waste is managed effectively throughout construction projects I'm involved in.	3.69	1.01
I take steps to reduce the environmental impact of transport associated with construction projects.	3.66	0.91
I considered sustainable site development in my projects.	3.61	0.98
I consider energy and water efficiency in my projects.	3.75	0.97
I consider sustainable material use in my projects.	3.72	0.93
I considered indoor environmental quality in my projects.	3.71	0.92
I minimize resource consumption.	3.83	1.02
I maximize the reuse of resources.	3.93	0.90
I use renewable or recyclable resources.	3.75	0.90
I protect the natural environment while doing my work.	3.82	0.89
I consider the environmental effect of the projects I'm involved in.	3.80	0.90
I consider the effect of land pollution of the projects I'm involved in.	3.88	0.89
I consider the effect of air pollution of the projects I'm involved in.	3.85	0.93
I consider the effect of water pollution of the projects I'm involved in.	3.93	0.91
I consider the effect of noise of the projects I'm involved in.	3.89	0.91
I consider the energy use of the projects I'm involved in.	3.96	0.93
I minimize the resource consumption of the projects I'm involved in.	3.93	0.93
I reuse water in the projects I'm involved in	3.74	0.99
Total	3.79	0.94

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