



BARRIERS FOR IMPLETENATION THE PROACTIVE BUILDING MAINTENANCE IN IRAQ: BASRA CITY AS CASE STUDY

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ABSTRACT

This research aims to demonstrate a number of proposed barriers to implement the proactive building maintenance in Basra City in Iraq where the importance of maintenance needs a lot of clarification. In this study, the proposed barriers are identified from literature; their importance have been identified based on data collected from the questionnaire. A total of 27 barriers is identified and classified into six main areas which are technical, management and administration, financial, human behaviour and attitudes, spare parts, and lack of institutional and training facilities. This paper provides a review of the proposed barriers for implementing proactive building maintenance in Basra city. The identified barriers have been ranked against its importance and their effects on the implementation process.

KEYWORDS: Basra; Barriers; Construction industry; Proactive building maintenance

المعوقات التي تؤثر على امكانية تطبيق مفهوم صيانة الابنية الاستباقية في العراق:
مدينة البصرة كنموذج

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المقدمة

يهدف البحث الى تحديد المعوقات التي تحول دون تطبيق مفهوم صيانة الابنية الاستباقية في مدينة البصرة خصوصا والعراق بشكل عام في الوقت الذي يحتاج مفهوم اهمية الصيانة الى الكثير من التوضيح. ان المعوقات المفترضة تم تحديدها من خلال دراسة البحوث السابقة. اما مدى اهمية كل عامل فتم تحديدها من خلال مجموعة من الاسئلة والتي تم الاجابة عليها من قبل مجموعة من المتخصصين. تم تحديد 27 عامل مقسمة الى ستة اقسام رئيسية وهي: (1) التقني. (2) الاداري. (3) الاقتصاد. (4) السلوك البشري. (5) مواد الصيانة. (6) معاهد تعليم الصيانة. البحث يوفر رؤية واضحة عن جميع المعوقات التي تحول دون تطبيق مفهوم الصيانة الاستباقية في المياني في مدينة البصرة كنموذج. ان المعوقات المحددة من قبل البحث تم تصنيفها وترتيبها حسب الاهمية ومدى تأثيرها على تطبيق مفهوم الصيانة الاستباقية.

1. INTRODUCTION

Building maintenance is typically defined as the “work undertaken in order to keep, restore, or improve every part of a building, its services and surrounds, to a currently accepted standard, and to sustain the utility and value of the building” (McCormack, Bronzo Ladeira, & Paulo Valadares de Oliveira, 2008).

Building maintenance can be classified into two main categories. The first one is reactive and the other is proactive. There are many combinations of these two approaches in practice (Cooke-Davies & FAPM, 2004).

The reactive maintenance represents the respond to the identified problems or work only when requested. One of the main advantages of this category is to reduce the total time and cost to a minimum (especially when computer help) (Lockamy III & McCormack, 2004). It may well integrate with preventive maintenance and in some cases with proactive technologies (Michail Kagioglou, Aouad, Cooper, & Hinks, 1998).

Proactive maintenance is turning into gradually as a vital to the building management and also to decreasing total costs of building (Saleh & Alshaw, 2005). It shows clear gains comparing to the reactive maintenance that is interventions will happen only after several requested or in emergencies. Proactive maintenance of building components can aid to produce mechanisms to avoid and/or monitoring their process of becoming progressively worse by adapting some of the maintenance actions that are both practical and cost-effective (Mike Kagioglou, 1998). The implementation of the most suitable maintenance approach could lead to decreasing significantly the maintenance budgets (Haron, 2013).

Silverman (2006) stated that failure to implement good maintenance practices, such as proactive maintenance, has been influenced by a number of significant problems. According to Funso Falade (2006), these problems have become a global phenomenon faced by most developing countries including Iraq. This phenomenon, if uncontrolled, can cause potential losses to the building industry. Thus, for a start, this study aims to identify problems affecting the implementation of building proactive maintenance in Basra city in Iraq.

1.1. Iraq Construction Industry

Business Monitor International report (2013) stated that the Iraqi construction sector to raise by 8.1% every year between 2013 and 2017, considerably less than the annual average real growth rate of 22.4% during the 2008-12 period.

The report expected the construction sector to grow by 10.39% and 8.5% in 2015 and 2016, respectively, compared to a growth rate of 20.3% in 2014. The slower growth rate has been attributed to the declining effect of the positive statistical base and to the poor business environment. The report also noted that project delays, false starts, political separations, and weakening security condition continue to exhaust the construction sector. In addition, the project fails to reflect the lack of institutional capacity, the absence of coordination between federal and provincial authorities, widespread corruption, and lack on maintenance understanding. One of the inheritances of Iraq's in the last five decades experiment with previous governments is that the building maintenance has a very low priority (Das, 1983). The Baghdad government bureaucracy has a solid preference for investment in a new building at the cost of maintaining the older building (Ibraheem, 2016). As discussed above, a new facility provides more opportunities to extract bribes or engage in other forms of corruption. Probably the best example of substituting a new investment to compensate for maintenance failings is the electric industry (Eisenhardt, 2002).

According to what mentioned above, maintenance in general and proactive maintenance can play a vital role in solving this main problem and also can help construction industry to save cost only for necessary new construction.

1.2. Problems influencing the proactive maintenance implementation

Based on the literature review (Bernard & Bernard, 2012; Egan, 1998; Isikdag & Underwood, 2010; Latham, 1994; Tookey, Kulatunga, Kulatunga, Amaratunga, & Haigh, 2011; Wolstenholme, 2009; Yoshikawa, Weisner, Kalil, & Way, 2008, Ibraheem, 2016, Altaie, 2009), 27 factors were identified. These factors have been categorised into six major classes of technical problems, management and administration, financial problems human-related problems, spare parts problems, and lack of institutional and training facilities. Further information on these categories and their related factors are described [Table \(1\)](#).

Table 1. Factors affecting the implementation of proactive maintenance

No	Category	Category Description	Factors	
1	Technical problems	Problems related to the technical features of maintenance from the beginning to the end of the building life.	T1	Not considering a maintainability analysis
			T2	Not using Life Cycle Cost (LCC) technique
			T3	Usage of new material instead of original material
			T4	Usage of sub-standard materials
			T5	Poor quality control
			T6	Unavailability or poorly written operation and maintenance manual
			T7	As-built documents not reflecting actual status of building works
			T8	Data feedback about maintenance
2	Management and administration problems	Problems connected with management, planning, organisation, performance and execution of maintenance task	M1	Poor management
			M2	Method of classification of maintenance contractors
			M3	Lack of uniform specifications and codes
			M4	Lack of uniform maintenance contract
			M5	Shortage of maintenance contract period
			M6	Lack of coordination between management groups and technical groups
			M7	Non-use of facilities after completion
3	Financial problems	Problems linked with the budgeting control that objects to plan and control the use of resources to achieve the desired benefits	F1	High initial cost
			F2	Absence of maintenance cost

4	Human behaviour and attitudes	Problems related to weaknesses and human error as the experience of the workforce and their attitudes to understand the maintenance work	H1	Unavailability of experienced and skilled manpower
			H2	Lack of number of specialised experienced maintenance contractors
			H3	Importance of maintenance works not understood by public
			H5	Misuse of facilities after completion
			H5	Corruption
5	Spare parts problems	Problems related to lack of tools and spare parts required to perform maintenance work	S1	Unavailability of original spare parts and tools in the local market
			S2	Spare parts become obsolete
			S3	Lack of proper tools to perform maintenance work
6	Lack of institutional and training facilities	Problems of the inadequate institution to provide related training and incomplete training facility.	L1	Lack of qualified training institute
			L2	Lack of training manual
			L3	Lack of qualified trainers

2. RESEARCH METHODOLOGY

This research implemented quantitative approach with reference to the research undertaken by (ECLLP, 2013). In order to obtain a high response rate, the questionnaire has been written in a short and simple form. The responder will not face any difficulties in answering it. In this context, close-ended questions were enrolled in 5-point importance scale. In this research, a total of 30 questionnaires were circulated to the building manager, building executive and supervisor, technician, and other maintenance personnel within Basrah city. Out of 47 responses, 46 were found to be valuable and valid for the analysis. The demographic profile of respondents is shown in Fig. 1. The respondents have a considerable expertise in the planning and implementation of the maintenance strategy.

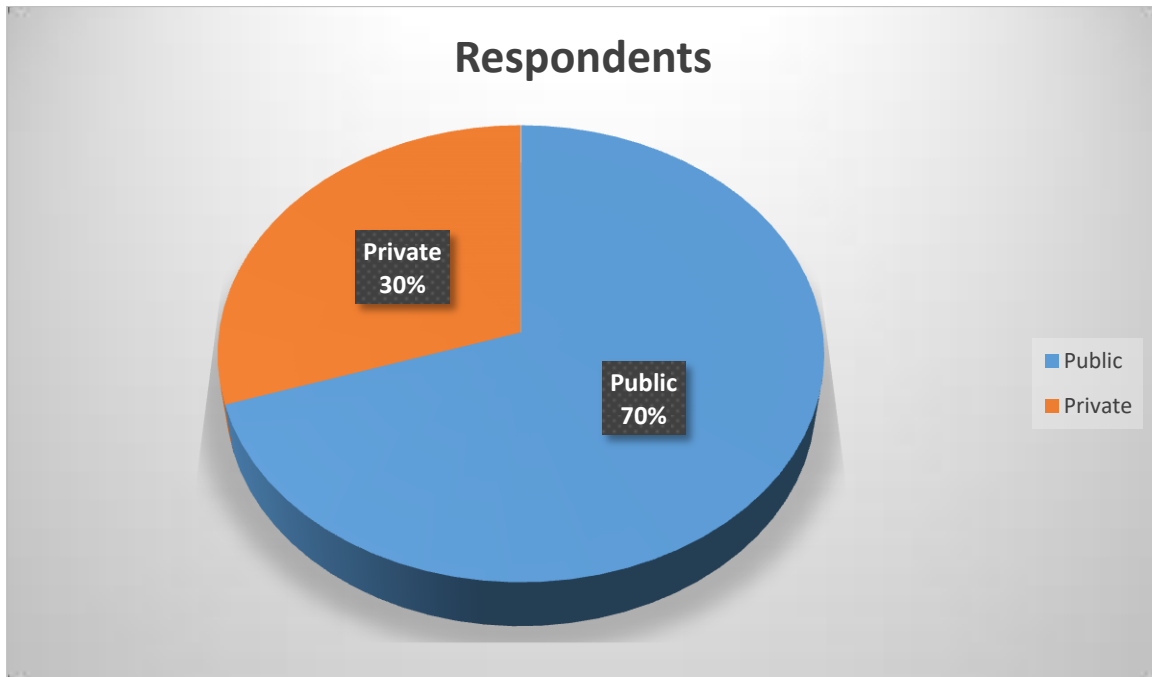


Fig. 1. The demographic profile of respondents.

3. DATA ANALYSIS AND DISCUSSION

From the collected data, principal statistical analysis has been conducted in a ranking analysis form. The mean and standard deviation for each factor are calculated and shown in a ranked order in [Table \(2\)](#). If two or more factors have the same mean value, the standard deviation was compared, so the lower standard deviation gives the higher rank. Also, If the mean values and standard deviations are both same, they were assigned the same rank.

It can be seen from [Table \(2\)](#) and [Fig. 2](#) that the top five important barriers to implement building proactive maintenance approach in Basra city are corruptions, usage of sub-standard materials, misuses of the facility after completion, the absence of maintenance cost, and poor quality control. All these barriers will be discussed in details as explained below.

Table 2. The importance of the proposed barriers to implementing building proactive maintenance

Rank	Factor	Mean	SD
1	F3 Corruptions	4.61	0.78
2	T4 Usage of sub-standard materials	4.42	1.16
3	H4 Misuse of facilities after completion	4.33	0.80
4	F2 Absence of maintenance cost	4.30	1.03
5	T5 Poor quality control	4.18	1.14
6	T2 Not using Life Cycle Cost (LCC) technique	4.11	1.14
7	H3 Importance of maintenance works not understood by public	4.00	1.18
8	M1 Poor management	3.91	0.95
9	H1 Unavailability of experienced and skilled manpower	3.85	0.96
10	S1 Unavailability of original spare parts and tools in the local market	3.79	0.95
11	T6 Unavailability or poorly written operation and maintenance manual	3.74	1.14
12	M6 Lack of coordination between management groups and technical groups	3.62	1.14
13	T1 Not considering a maintainability analysis	3.58	1.23
14	M2 Method of classification of maintenance contractors	3.56	0.91
15	L1 Lack of qualified training institute	3.55	0.99
16	H2 Lack of number of specialised experienced maintenance contractors	3.52	1.13
17	S2 Spare parts become obsolete	3.52	1.18
18	T8 Data feedback about maintenance	3.47	1.14
19	T7 As-built documents not reflecting actual status of building works	3.47	1.35
20	L3 Lack of qualified trainers	3.39	1.10
21	L2 Lack of training manual	3.36	1.10
22	T3 Usage of new material instead of original material	3.18	1.19
23	F1 High initial cost	3.15	1.02
24	M5 Shortage of maintenance contract period	3.00	1.24
25	M3 Lack of uniform specifications and codes	2.79	1.08
26	M4 Lack of uniform maintenance contract	2.79	1.18
27	M7 Non-use of facilities after completion	2.71	1.15

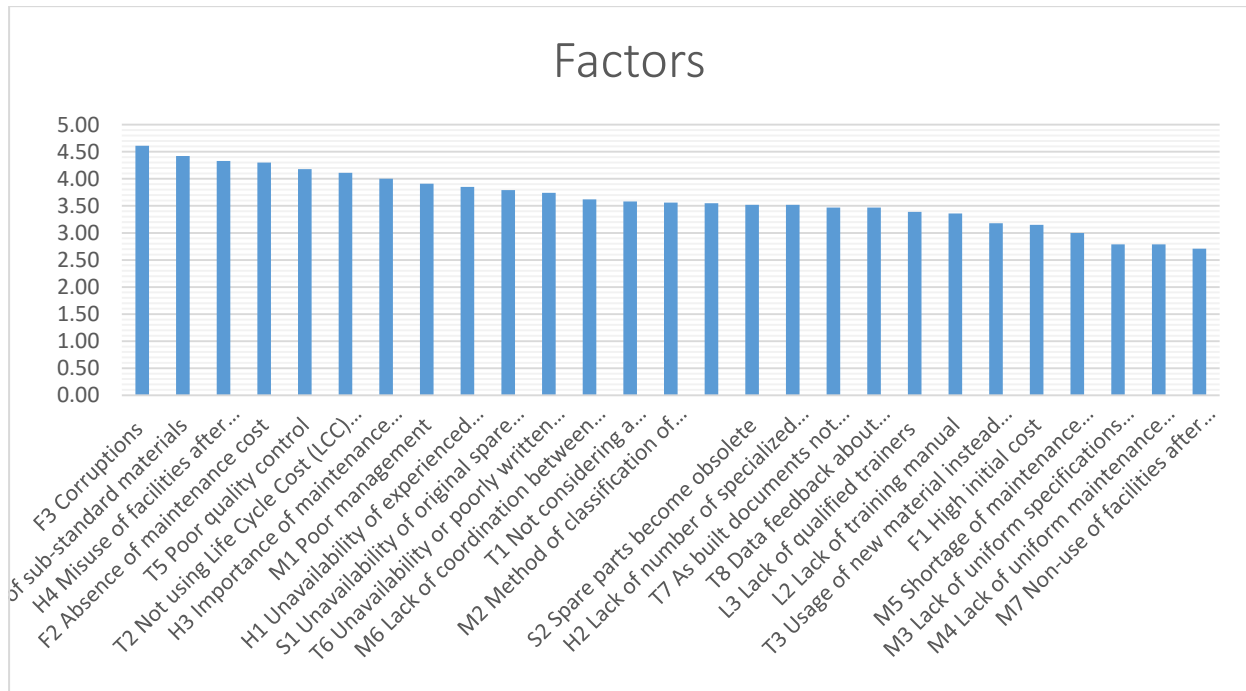


Fig. 2. The importance of the proposed barriers to implementing building proactive maintenance.

Factor No.1: Corruption

Corruption could be defined in different ways depending on the situation of the corruption itself. However, according to Oxford Dictionary corruption defined as “Dishonest or fraudulent conduct by those in power, typically involving bribery”. [Levine, Koomey, McMahon, Sanstad, and Hirst \(1995\)](#) indicated that the construction industry is the most corrupt sector around the world. The multipart and disjointed nature of the industry offer a situation for corruption, with various stakeholders in the supply chain challenging for high-value contracts ([Shammas-Toma, Seymour, & Clark, 1998](#)). Corruption could be seen in different ways within the industry, with cases of bribery to obtain planning permission, the overstating of budgets, the manipulation of payment applications, and collusion to share and divide the market. Furthermore, issues in tracking payments and varying legal regulations can enable corrupt behaviour internationally ([Adetunji, Price, Fleming, & Kemp, 2003](#)).

In addition to the factors mentioned above, construction industry in Iraq in general and in Basra city in particular, suffers from widespread corruption cases dramatically, and this is due to several reasons, including ([Cox & Townsend, 2009](#); [Morton & Ross, 2008](#)):

1. The central and the local government still weak to fight corruption in their local authorities.
2. Construction contracts have a significant weakness that can be used for corruption
3. Policy intervention directly in the industry of construction may lead to negative outcomes.

Corruption affects the proactive maintenance through government which will depend on reactive maintenance because of the fears fake proactive maintenance plans.

Factor No.2: Usage of sub-standard materials

The lowest initial cost is not essentially the most cost-effective at the end. For low-priced and substandard materials frequently need maintenance that is more regular and may have a short working life than the more costly alternative. However, the local market in Basra city is full with the substandard material because the absence of government quality control (Jones, Comfort, & Hillier, 2006). The presence of these materials makes ordinary citizens lose confidence in the maintenance work and seek to replacement rather than resort to maintenance and that needs more cost.

Factor No.3: Misuse of facilities after construction completion

The misuse of the facility after completion is one of the important factors which leads to carrying out a maintenance works in a very early stage of the facility life (Construction, 2001). These early maintenance works need more cost which probably being out of the maintenance plan. Obtaining necessary approvals for this kind of costs almost impossible in a climate where suspicion of corruption widespread. All these factors will lead to ignoring these early maintenance works which have direct effects on the proactive maintenance plan in the facility.

Factor No.4: Absence of maintenance cost

According to the current contract format which has been used by Basra local government (Nam & Tatum, 1997), there is an absence of maintenance cost in contracts, and if it is available in some cases, it does not support the proactive maintenance. In addition, the local authorities which own and operate the buildings do not have the legal legislations (Nam & Tatum, 1997) that help to provide enough sources to support the proactive maintenance including the cost.

Factor No.5: Poor quality control

The instability of the security situation in Iraq in general and in Basra city in particular and political interference in the construction industry made it difficult to apply all the quality control standards. In addition, corruption can be considered as one of the main issues which prevent quality in building industry to reach desired level.

Poor quality produces early stages maintenance in building life cycle. This type of maintenance affects the proactive maintenance plan as mentioned above.

4. CONCLUSION

This study aims to identify the proposed barriers to implement the proactive maintenance approach in building in Basra city as well as the degree of influence. 27 proposed factors identified from literature as potential barriers to implement proactive maintenance. A total of 30 questions were circulated among the building managers, building executives and supervisors, technicians and other maintenance personnel within Basrah city, asked them to priorities these factor regarding their influence. The research identified corruption as one of the main barriers that prevent proactive maintenance from to be implemented in Basra city in particular and in Iraq in general. In addition, lack of standards, quality control, and misuse of the building considered as top barriers against proactive maintenance application. Future research has suggested focusing on the solution to minimise these barriers effects.

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