

Phases of Facility Management and Role of Facility Manager: A Building Construction Perspective

Shabbab A. Alhammadi*

King Fahd Security College, Riyadh, Saudi Arabia, Saudi Arabia;
hamadis@kfsc.edu.sa

Abstract

Objectives: Facility Management (FM) paves the way for sustainable improvements in building performance. It is a tool which allows the maintenance and operation of the buildings more effectively. Most of the designers used to design and develop all buildings without considering the requirements of FM. The main aim of this study is to analyse the importance of facility management, its phases and the role of facility manager in terms of construction perspective. **Methods:** The office buildings require some special considerations of FM during the implementation of different phases of the Facility which starts from the phases of planning and design until the phases of operation and maintenance. For this, the role of facility manager along with the phases of FM is identified. Then, the tasks and responsibilities of the facility manager along with the construction manager and the decision manager are also compared. Finally, the causes of executing the FM along with various suggestions to improve it are also depicted. **Findings:** This study identified the importance of facility manager and their role in FM during the life-cycle of the construction in order to protect them and to obtain the satisfaction among the customers. The tasks and responsibilities of the facility manager, construction manager and the decision manager are also identified. **Applications:** An extensive survey has been performed on various buildings in order to monitor and to point out the opinions about the uses of the facility manager in the design of buildings. Analysis of this survey illustrates the various advantages and disadvantages of the applications of facility manager in buildings. Finally, this study depicts the significance and role of facility manager along with the phases of FM in improving the performance of buildings.

Keywords: Buildings, Construction Manager, Development, Facility Manager, Facility Management, Maintenance

1. Introduction

The FM comprises of building various corporate buildings, inventories for the real estate spaces, various constructions as projects which involves various phases such as the design phase, construction phase and the renovation phase, its maintenance and furnishing facilities etc. It manages all the various factors that enable the available facility to become an advantageous factor for its users. The FM requires various services running

properly and more efficiently. The overall FM process depends on the skill of workers, experience of its users and, also computer based techniques in order to provide, a clear accuracy.

During recent years, the FM is not used commonly^{1,2}. In most of the cases, many buildings were only monitored and maintained, cleaned and serviced without considering the main phase of the FM. Moreover, the designers of buildings don't follow the various operations,

*Author for correspondence

timely maintenance/repair or the user's satisfaction in the buildings.

These problems are there even for the office buildings which especially require additional concerns of the FM as a safest working environment for the employees who are working over there. Making this problem worse, alterations where done in commercial buildings instead of the office buildings³. Many companies may utilize residential buildings and commercial apartments as their headquarters and offices by modifying it without considering the FM strategies. As a result, the employees who were working in these companies may usually be unsatisfied because of the design of the buildings its services. Moreover, its comfort level may also decrease due to alterations done on it.

In the era of improving the productivity and increasing the workmanship of the employees, workspace will act as significant criteria for the owners who are having the business. Office buildings cannot be flexible for integrating the commercial and residential buildings as it requires technologically sound, more comfortable, safety and energy efficient in order to propose a working environment⁴. Hence, the designers and developers must take care of these crucial issues at the stage of planning and also these should be considered at the planning and design phases. Hence, the deployment of FM and its various phases is required for an effective construction of the buildings is defined by authors in⁵. Hence, by understanding the overall process of FM, identifying the roles involved in it and the crucial factors which affects it paves the way for a practical implementation of the FM in the construction sector. This study aims to find the application of FM in the performance of buildings, its life cycle along with its phases carried out in⁶.

2. What is Facility Management

FM is the process that comprises of the combination of various areas such as planning, possession, designing, building and managing for maintaining the overall functionality of the constructed environment and to make sure it will be secure by integrating the customers

who are using the building, the place where the building is constructed, the process which is used for the construction and the technology which is applied for the construction. The FM is linked with the construction and building management. In general, the FM can be understood as the generalised building management which is inter linked with operations which takes place on buildings every day. It also includes the various long term planning, strategies and it also focuses on its users. This FM is an essential part of the first phase of investment. Various other parts and operation costs of the FM are explained in⁷.

2.1 Who is Facility Manager

The facility managers redefined as the people who were responsible for monitoring the whole maintenance and security of the constructed buildings in order to make sure that the construction is up to the standard of the employees or the users who were using it.

2.1.1 Role of a Facility Manager in the FM

- Managing and making necessary arrangements for the people who are making the agreements and service providers by managing the security, maintenance etc.
- By managing the staff members as a team which comprises of security and management activities.
- To make sure all necessary facilities, such as water and electricity and other utilities are maintained well.
- Management of financial activities and to make sure the money allocated is spent in a right way.
- Assignment of required space between adjacent buildings at the time of construction
- To make sure that the construction meets the protocols of the governing body.
- To make sure that the construction meets the protocols of the Security Council.
- To advice the users about the usage of power and to reduce the additional expense.
- Making and maintaining documents and framing suggestions.

2.1.2 Tasks and Responsibilities of a Facility Manager

Facility managers present in each and every construction company have their own responsibilities. It varies from supporting and managing the whole construction process. Their responsibilities include supporting all the tasks which are involved in the construction, managing the workers who are employed in the company etc. is depicted by. The facility managers responsible to access the FM in a construction company can be classified in to two categories such as the external facility manager and the internal facility manager. The internal facility manager is responsible for managing the internal facilities such as an employee of managerial capabilities. The main job of these employees is to identify various types of supports for FM. He manages the overall costs for running the project and also manages the files and records which are necessary for running the construction project. The internal manager is also responsible for the jobs given outside the company. The external FM manager is responsible for making policies of the FM, its administration and their strategies, making arrangements for standards, managing the KPI's,

managing the contractors and the identification of the suppliers from external entities etc.

The phases of task and responsibilities of a FM manages consists of preparation of project, design of operational projects, acquisition of buildings, final approval of the construction, usage of the construction, maintenance, repairing and Re building and the De construction of buildings etc. The responsibilities of FM manager include preparing counselling and consulting, proposing the definitions of FM, consulting and providing the counselling towards the individual type of projects, controlling the tasks and other operations within the individual projects, accepting the construction and approving it based on the documentation and testing, formation of a team, coordinating and supporting for an effective usage of the constructed buildings, calculating how the buildings can be used effectively and defining the requirements for the maintenance, repairing and Re building and De construction of the constructed buildings after the effective usage. Various tasks and the detailed responsibilities of a facility manager are shown in Table 1.

Table 1. Tasks and responsibilities of a of a facility manager

No	Tasks	Responsibilities
1	Preparation of the Project	Preparing counselling and consulting. Proposing the definitions of FM.
2	Design of Operational project	Consulting and providing the counselling towards the individual type of projects.
3	Acquisition of buildings	Controlling the tasks and other operations within the individual projects.
4	Final approval of the construction	Accepting the construction and approving it based on the documentation and testing.
5	Usage of the construction	Formation of a team, coordinating and supporting for an effective usage of the constructed buildings.
6	Maintenance, repairing and Re building	Calculating how the buildings can be used effectively and defining the requirements for the Maintenance, repairing and Re building.
7	De construction of buildings	De construction of the constructed buildings after the effective usage.

Acquisition of buildings is an important task of the FM manager. In this building acquisition, more than half of the costs allocated for operation are influenced and the manager could reduce these costs more effectively. Files and documentation is also an important aspect of the FM process which can be maintained by the FM manager.

3. Who is Construction Manager

Construction manager is a person who can supervise and guide various projects from the initial to the final stage. These managers are answerable to make, set and maintain the entire scheme. They also supervise the finances and also to check whether all the employees are working well with whatever necessary for them throughout the day. These managers are also responsible for monitoring whether the places of working are safe to the employees or not.

3.1 Role of a Construction Manager in the FM

Role of a Construction manager is common for all the jobs that are done throughout the whole project. The roles include managing the quality, cost, safety and administering the contracts etc.

3.1.1 Management of Quality

All the projects undertaken for construction have various contractors and their sub level persons. The major role of their construction manager is to monitor the working of all these peoples by maintaining all the possible resources.

3.1.2 Management of Cost

An efficient construction manager always monitors the flow of money and reduces the additional expenses by adjusting the important difficulties or issues arise.

3.1.3 Management of Safety

The construction manager is also responsible for monitoring whether the places of working are safe to the

employees or not.

3.1.4 Administration of Contract

The construction manager should make sure that all the constraints of the entire project is carried out in all parts of the project also to make sure that all the persons involved in this project are satisfied.

Apart from these responsibilities, the construction manager also maintains a good balancing relation between all the persons who were included in the project.

4. Importance of Facility Manager and the Design and Construction Manager in Enhancing FM

Construction manager is a person who can manage all the tasks which are involved in the overall generation of drawings and other related factors which are necessary for constructing the buildings. These construction managers are also called as the coordinators for design or building managers. These managers play an important role in the successful completion of the whole project.

4.1 Role of Design Manager in FM

- Managing a team for the process of design.
- Managing the process of design by applying the programmes which creates awareness among the workers.
- Managing, encouraging and supporting the clients based on his requirement.
- Maintaining and supporting the design managers and working peoples in order to obtain the best output from them with in limited timeframe.
- To make sure that the design meets the defined standard level, cost maintenance and where ever necessary.
- To check whether all the employees are working well with whatever necessary for them throughout the day.

5. Causes for Executing the FM

Various causes where considered for executing the FM. The requirements for its implementation are based on the following criteria:

- To make sure that the construction company is focussed on customers.
- In order to establish a better relationship in the overall business.
- Interchange of ideas between various departments within the organisation.
- In order to enhance the collaboration and interchange of data in between various sections within the organisation.
- In order to minimize the cost of individual.
- In order to sway the process of unwanted manufacturing.
- In order to enhance the working atmosphere.
- In order to attain the process of unification.
- In order to sway the achievement of working.
- In order to improve the process of transformation.

5.1 Suggestions to Improve the FM

- Create more facility manager post in Construction Company to facilitate the Facility Management activity in the organization.
- Improve existing Facility Management system used by organization.
- Keep using new technology and restructured organization.
- Organization should provide training to facility manager or they are compulsory to attend short course to enhance knowledge continuously monitored by the organization management.

6. Role of Facility Manager in Various Phases of FM

Phases such as planning, possession, tasks and maintenance and the delivery are the various phases which should be followed by a FM team.

6.1 Role of Facility Manager in the Planning Phase

In this phase, the team of FM executes the strategic planning process in order to fix the important goals of the company for providing the rules that allows various future plans. One of its types is the short-term planning, which can be done in order to give the facilities which are required in the construction. The short term planning consists of planning of the space, which includes the various requirements of construction space, space for the employees etc. This type of planning is not simple because it consists of the overall growth of the construction sector, growth of the company and the company's idea to allocate space needs for individual employee. Planning of the space depends on movable goods such as furniture. Initially, a master plan of the site which shows the present plan and the proposed plan, present condition of the building, costs of the operation and maintenance, costs for the repairs, modifications etc. where analysed in⁸ and included in this stage according to⁹. At the stage of conceptual planning, overall objectives of the proposed building are clearly mentioned along with financial and functional requirements. The functional requirements consist of the necessary objectives to be satisfied, the necessary services to be done for the construction, the overall structural pattern of organization and staffing, proposed policies and procedures required for the proposed operational plan etc. where discussed and analysed. The FM also focuses on the methodology to evaluate it for assigning the cost for the overall plan.

6.2 Role of Facility Manager in the Possession Phase

In this phase, various decisions regarding the acquisition such as the purchase or leasing of the building is depicted by authors in¹⁰. The decisions on purchasing or leasing the space depend on the budget of the company. It also depends on the company's policy on investing, controlling the money flow etc. During the process of acquisition and design of the building, the requirements that is necessary

for the construction is fixed along with its estimates. The design process is obtained from the acquisition and design phase. This transforms the requirements of building towards a solution for the construction which is required for the customer¹¹. It also re-confirms the scope, overall budget, time frame etc. At the stage of design, work which is to be performed is conformed and detailed drawings are drawn. At last, the documents phase analyses the detailed requirements of FM which consists of the documents required for the contractors in order to construct the building.

6.3 The Tasks and Maintenance Phase

The tasks and maintenance phase intends for making the building to be occupied by the user or the customer. In this phase, the alteration of interior or exterior can be done until it customer or the end user is satisfied. It also reuses the already constructed buildings so that it can be easily re-used more effectively. Nowadays, this process is used in majority of the buildings in Egypt so that the commercial buildings can be easily transformed in to buildings for offices. Following are the various functions of the Tasks and Maintenance Phase

6.4 Role of Facility Manager in Mechanical based Functions

Mechanical operations related to the buildings such as monitoring the heating process, ventilation technology, air condition technologies and electric fittings, etc. where managed.

6.5 Role of Facility Manager in Energy Consumption Monitoring

Energy is an important factor which is to be monitored periodically since it is costly to generate. Therefore, a device which monitors and maintained the constant usage of energy is sufficient in these buildings. Also, the buildings should be constructed in such a manner it should consume less energy.

6.6 Role of Facility Manager in Unsafe Garbage Monitoring

This function is used to monitor the unsafe waste materials which are to be monitored periodically in the case of garbage monitoring. A centralised garbage management system can be a better solution for handling the dangerous wastes. The FM manager should maintain the garbage monitoring process with the help of a trained professional.

6.7 Role of Facility Manager in Change Monitoring

Changing is the process of transforming a specific space or a machine for making it to do another function from which it is initially designed for. This change management should be done under the control of a FM manager so that whatever the changes done will be more effective.

6.8 Role of Facility Manager in Recycling Monitoring

The process of changing waste objects into new objects is called as recycling. This process can utilise the waste of objects which can be useful so that we can reduce the use of new objects. Main process in this recycling is the segregation. It can be done either by the re scale or the disposal of the materials. The FM manager should focus on arranging certain companies for making the effective use of recycling.

6.9 Role of Facility Manager in Cable Monitoring

The Communications system is a major user of space due to the presence of antennas, risers, file servers, modems, closets and wire trays and hence requires close and continuous coordination.

6.10 Role of Facility Manager in Maintenance Monitoring

This management process consists of the functionalities

which are necessary to maintain the existing construction and its associated materials as explained by¹². This process mainly consists of inspection/checking which could be done in periodically or occasionally. Works such as the adjustment of screws and bolts which are permanently fixed, applying oils in the necessary devices so that it can run smoothly, painting, cleaning and changing the damaged parts should be performed by the maintenance team of the FM.

By monitoring all the above problems, the FM team can manage the unpredicted shutdown of equipment's present in the building.

6.11 Role of Facility Manager in Security Monitoring

The process of providing security to the users in the constructed buildings is one of the main roles of the FM manager. This phase includes the functionalities to ensure the security for the users i.e. its occupants who are using the building.

7. Role of Facility Manager in the Delivery Phase

The final phase present in the Facility Management is the delivery phase which is explained by¹³. When the construction comes to the finishing stage, FM managers inspect the building for a final verification so that it satisfies the user or the customers' need.

7.1 Facility Manager at the Stage of Design

The FM has an important role in the process of designing a building. During the design phase of buildings, many crucial decisions were made. Hence, this design phase has a direct effect on the users and the facilities opted for them. In¹⁴ proposed that the FM should make sure that all the requirements which have a direct impact on the design of a building can be obtainable at the actual time of design. The points to be considered at the stage of design are as follows:

- The FM should ensure that the design which is executed can be easily maintained.
- The FM should give guidelines to the designers, about the various documents which are related to project.
- By handover of the construction facility to the user, the physical state of the construction comes to a finishing stage.

7.2 Facility Manager at the Stage of Construction

At the stage of construction, the representative of the FM should keep the given factors in mind. These factors should be kept in mind so that the representative of the FM can focus on assuming a functional building and to handover it to the user with reduced errors. Following are the factors which a FM representative should focus on

- Functions of the overall construction.
- Different ways to maintain various systems.
- Cost of functionality and management of sources.
- Maintaining the process and different steps.
- Maintaining the construction materials such as the diagrams, working and its user manuals.

8. Conclusion and Future Enhancements

Facility Management in construction is the process of providing services by the FM team in order to make sure that the building constructed using the FM application satisfies the major FM functions such as the mechanical based, energy consumption, unsafe garbage, change, recycling, cable and security monitoring etc. In general, the FM is an effective tool for maintainable and especially enhancements in office buildings. In this paper, all the types of buildings where considered for the application of FM. The major role of this work is to analyse the FM and its functionalities for effective implementation in the buildings.

A life cycle along with its various phases explaining all the important components in the application of Facility

Management is depicted. A detailed analysis on the impact of Facility Management is done on two different countries. Analysis and the findings in this paper are useful to provide a way for further analysis of the application of Facility Management in other particular buildings. Future enhancement can be done on the Facility Management, its application and its impact in particular buildings such as office or commercial.

9. References

1. International Facility Management Association. 2019. <https://www.ifma.org/>
2. Jylha T, Suvanto M. Impacts of poor quality of information in the Facility Management field. *Facilities*. 2014; 33(5/6):302–19. <https://doi.org/10.1108/F-07-2013-0057>.
3. Brinda TN, Prasanna E. Developments of Facility Management using building information modelling. *International Journal of Innovative Research in Science, Engineering and Technology*. 2014; 3(4):11379–86.
4. Wang S, Xie J. Integrating building management system and Facilities Management on the Internet. *Automation in Construction*. 2002; 11(6):707–15. [https://doi.org/10.1016/S0926-5805\(02\)00011-0](https://doi.org/10.1016/S0926-5805(02)00011-0).
5. Ekhaese E, Amole B, Martins O. Prefiguring houses in a traditional city: A case for Benin house types and characteristics. *Journal of Architecture and Urbanism*. 2017; 41(4):10–7.
6. Facilities Management practice in construction management: A case study of construction companies in Malaysia. 2008. https://www.researchgate.net/publication/259973383_FACILITIES_MANAGEMENT_PRACTICE_IN_CONSTRUCTION_MANAGEMENT_A_Case_Study_of_Construction_Companies_in_Malaysia.
7. Potkany M, Vetrakova M, Babiakova M. Facility Management and its importance in the analysis of building life cycle. *Procedia Economics and Finance*. 2015; 26:202–8. [https://doi.org/10.1016/S2212-5671\(15\)00814-X](https://doi.org/10.1016/S2212-5671(15)00814-X).
8. The Facility Management Handbook. 2009. <https://www.amazon.com/Facility-Management-Handbook-David-Cotts/dp/0814413803>.
9. Hou L, Wang Y, Wang X, Maynard N. Combining photogrammetry and augmented reality towards an integrated Facility Management system for the oil industry. *Proceedings of the IEEE*. 2014; 102(2):204–20. <https://doi.org/10.1109/JPROC.2013.2295327>.
10. Volk R. Building Information Modelling (BIM) for existing buildings. Literature review and future needs. *Automation in Construction*. 2014; 38:109–27. <https://doi.org/10.1016/j.autcon.2013.10.023>.
11. Hui ECM, Zheng X. Measuring customer satisfaction of FM service in housing sector: A structural equation model approach. *Facilities*. 2010; 28(5):306–20. <https://doi.org/10.1108/02632771011031538>.
12. Pukite I, Geipele I. Different approaches to building management and maintenance meaning explanation. *Procedia Engineering*. 2014; 172:905–12. <https://doi.org/10.1016/j.proeng.2017.02.099>.
13. Christensen LR. Practices of stigmergy in the building process. *Computer Supported Cooperative Work (CSCW)*. 2014; 23(1):1–19. <https://doi.org/10.1007/s10606-012-9181-3>.
14. Lepkova N, Uselis R. Development of a quality criteria system for Facilities Management Services in Lithuania. *Procedia Engineering*. 2013; 57:697–706. <https://doi.org/10.1016/j.proeng.2013.04.088>.