BPD 4252/42502
FACILITIES MANAGEMENT FOR CONSTRUCTION

Learning Modul
1st Edition

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DEPARTMENT OF CONSTRUCTION MANAGEMENT
FACULTY OF TECHNOLOGY MANAGEMENT AND BUSINESS

Internal Circulation only

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INTRODUCTION

This module generally is a student learning guide for the course BPD 4252/ BPD 42502 Facility Management for Construction offered in the Faculty of Technology Management and Business, Universiti Tun Hussein Onn Malaysia. This course covers the theory, practice and current issues of Facility Management in the construction industry. It includes an introduction to Facility Management, FM practices, FM life-cycle retention of internal service versus outsourcing, change management, implication in human resource management, design-build cycle, and maintenance and operation.

AIM

This module aims to provide an understanding and knowledge of the importance of professional ethics to be practiced in organizational management and construction technology.

LEARNING OUTCOME

At the end of this module, student will be able to:

1. Plan and apply the basic facilities management in the construction work.(C4, PLO-2)
2. Able to apply the knowledge of the characteristics of the job and skill required for facilities management in the construction industry (P4, PLO-4)
3. Able to efficiently communicate orally and in writing through discussions, information sharing, analysis and decision-making team (A2, PLO-3)

SYNOPSIS

This course contains an introduction to facilities management, practice facilities, the life cycle of facilities, maintenance of internal vs. outsourcing services, management of change, the implications for human resource management, design-build cycle, operation and maintenance.

ASSESSMENT

   1. Assignment   :   20%(CLO2)

   2. Test   :   15% (CLO1)

   3. Group Project   :   25% (CLO1 ; CLO2 ,CLO3)

   4. Final Examination   :   40%

        Jumlah (Total)   :   100%

REFERENCES

List of references is stated at the end of each chapter.

CHAPTER 1

INTRODUCTION TO FACILITIES MANAGEMENT (FM)

1.1   INTRODUCTION TO FM

Facility management is an interdisciplinary field primarily devoted to the maintenance and care of commercial or institutional buildings, such as hotels, resorts, schools, office complexes, sports arenas or convention centers. Duties may include the care of air conditioning, electric power, plumbing and lighting systems; cleaning; decoration; groundskeeping and security. Some or all of these duties can be assisted by computer programs. These duties can be thought of as non-core or support services, because they are not the primary business (taken in the broadest sense of the word) of the owner organization.

The definitions of professional bodies are used here. Those definitions are intended to clear the shape of facilities management by people who have become aware that they are the professionals.

1.   BIFM (the UK)

Facilities Management is the integration of multi-disciplinary activities within the built environment and the management of their impact upon people and the workplace .

2.   IFMA (the USA)

Facility management is the practice of coordinating the physical workplace with the people and work of the organization. It integrates the principles of business administration, architecture and the behavioural and engineering sciences .

3.   JFMA (JAPAN)

Facility Management is the integrated managerial activities of planning, administrating, and using of every kind of the building and the environment in organisations .

Figure 1.1: Definition of FM

In Fig 1.1, it is the role of the facility management function (whether it is a separate department or small team) to coordinate and oversee the safe, secure, and environmentally-sound operations and maintenance of these assets in a cost effective manner aimed at long-term preservation of the asset value, and also other janitorial duties such as making sure the environment is properly cleaned and sanitised for its tenants.

In those cases where the operation of the facility directly involves the occupants and/or customers of the owner organization, the satisfactory delivery of facility-related services to these people will be an important consideration too; hence, the term "end-user satisfaction" is often used both as a goal and a measure of performance.

Figure 1.2: An overview of FM

In Fig 1.2, the term facility management is similar to property management although not exactly the same. While both manage the day to day operations of a facility the property such as cleaning, maintenance and security, similar to Janitors, one must not confuse it with such a title. The property manager has an expanded role which includes leasing and marketing activities whereas the facility manager role focuses on existing tenants who usually are owner occupants.

An important feature of facility management is that it takes account of human needs of its tenants in the use of buildings and other constructed facilities. These softer factors complement the harder factors associated with the maintenance and care of engineering services installations.

Figure 1.2: Varieties of facilities in a building

Figure 1.4: Varieties of facilities in a building

Fig 1.3 and 1.4 show the varieties of facilities. It is depend on the building itself and the uses of the building as well as the objective of the building. Moreover, the facilities provided should sustain an operational environment and providing support services to meet the strategic needs of an organization.

1.2   THE RATIONALE FOR FM

In the past 30 years has FM become a recognized and required process of organisation throughout the world of organisation that expend resources on people, their work environment, and the ways they work.

> In US – FM started in the 1970's
> IFMA set up 1980 – training and manage staff involved at the interface between the workplace, staff and processes.
> Euro- In 1990 's
> BIFM - In 1993 (British Institute of Facilities Management)

For many years, universities, colleges and major corporations, as well as government agencies with numerous large facilities, extensive maintenance and operating budgets and scarce capital budgets have been developing and using management practices and procedures that are now widely accepted by professionals.

1.3   THE APPROACH TO FM

There are common themes and approaches to facilities management, regardless of the size and location of the real estate, although these may not necessarily result in common solutions. In some cases, real estate services are outsourced (for example, contracted out) and in others retained in house, for good reason in each case. Some organisations operate what might be described as a mixed economy, where certain services, even the same ones, are outsourced as well as retained in house. There is no general rule, rather a need to define the thinking, practice and procedures that will lead to best value for an organisation.

FM has been defined by the delivery of non-core services, numerous broad provision types have been developed by which firms can contract out some or all of their activities.
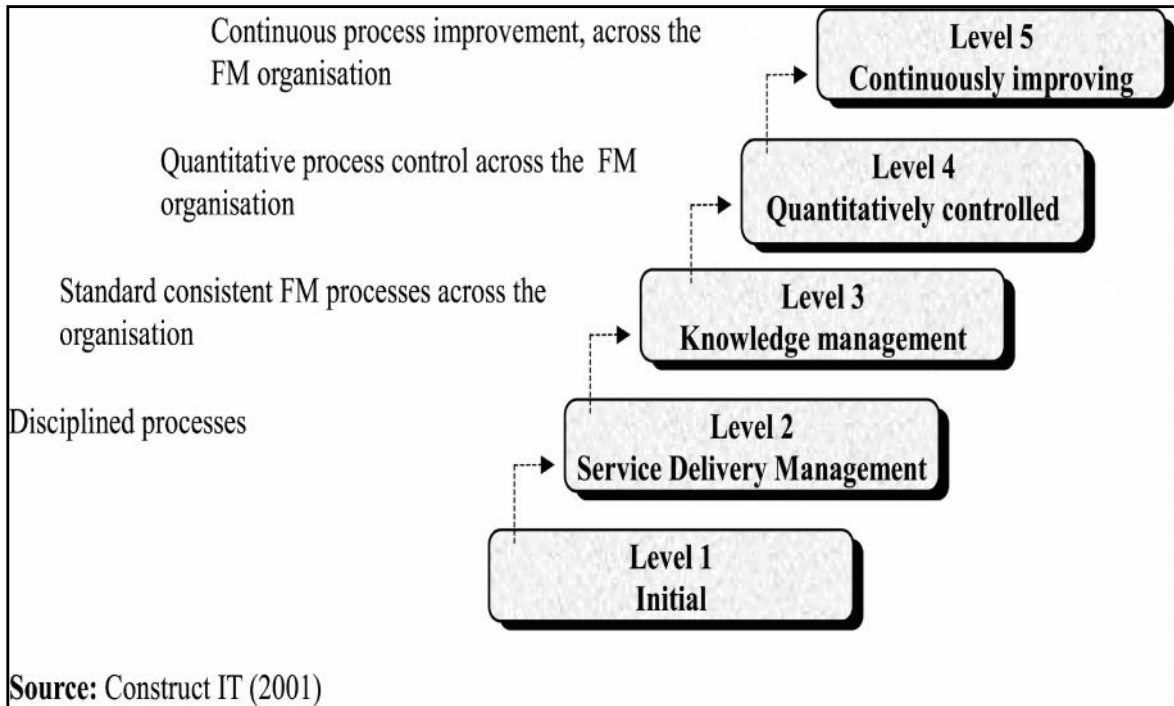
Figure 1.5: Approach to FM

In Figure 1.5, it shows the approach of an organization in FM. Accordingly, The BIFM have defined five distinct areas of FM;

1. Large companies with in-house facilities teams that manage contracts with outsourced suppliers
2. External management suppliers which offer a range of outsourced services as a total one-stop shop
3. Smaller individual supplier providing specific contracts for services such as cleaning or pest control
4. Product suppliers

5. Consultants

Moreover, it can be divided into 2 services, namely:

➢ Single service provision = Focus on the delivery of one particular type of service, such as cleaning, security, catering and maintenance.

➢ Multiple or package service provision = Companies are now also providing an extensive range of services as a package. This means that a security firm may supply manned guards, burglar alarm systems, and/or electronic entry systems all as part of a single package, rather than for example, manned guards alone.

1.4 CLIENT'S FUNCTION

FM has been defined by the delivery of non-core services, numerous broad provision types have been developed by which firms can contract out some or all of their activities. The client/customer needs, wants, and expectation must be defined and planned for and a system designed to deliver the particular service. Organisations must think strategically if they are to do more than simply survive in today's increasingly competitive marketplaces. This thinking applies to both core and non-core business. In the case of the latter, facilities management has a pivotal role to play in support of the core business and must be closely coupled with the organisation's strategy overall. Facilities management has developed in the past decade into a major, thriving business sector and discipline and continues to grow in many countries. The term facilities management – or facility management if one adopts a US perspective – has become accepted by

governments, the business community, educationalists and researchers as an essential component of today's business world.

Facilities management is of significance to organisations of all kinds and, as an emerging discipline, it has become the focus for the important issues of best value and customer satisfaction within the management of supporting services. Well-managed services enable an organisation to function at its most efficient and effective level, offering real added value improvements to the organisation's core business. Facilities management is being elevated to a strategic level of importance and is therefore being given the task and opportunity to contribute to business success and to aid the delivery of competitive advantage. Indeed, in recent years, the range of services covered within the remit of facilities management has become more complex, as facilities management has moved into the core operational functions of client organisations. It is necessary for facilities management service providers and their customers to acknowledge the role of facilities management in the organisation's strategic operations.

Facilities management can accordingly be summarised as creating the optimal environment for the organisation's primary functions, taking an integrated view of the business infrastructure, and using this to deliver customer satisfaction and best value through support for and enhancement of the core business. Thus, facilities management can be described as something that will:

- ➢ deliver effective and responsive services;
- ➢ enable changes in the use of space in the future;
- ➢ sweat the assets, i.e. make them highly cost effective;
- ➢ create competitive advantage for the organisation's core business; and
- ➢ enhance the organisation's culture and image.

Therefore, the classifications of client/customer must be clarified in order for FM to be fully experienced:

1.5   MAIN ISSUE OF FM IN CONSTRUCTION INDUSTRY
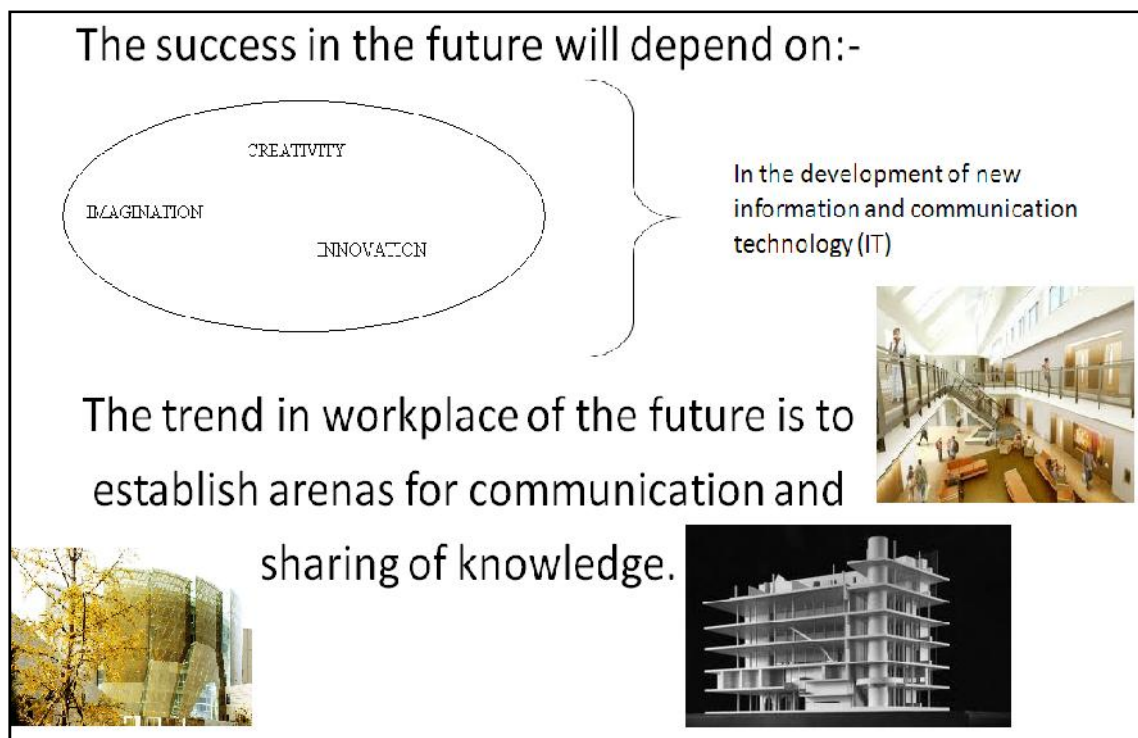
Figure 1.6: Future trend

In Figure 1.6, it shows the trend in workplace of the future and there are four generic facilities management trails to the future;

1. The financial trail (business)
2. The human resource trails (people)
3. The physical resource trails (property)
4. The knowledge resource trail (information)

Moreover, the main issues for Facilities Management are:

1. Shifting boundaries
2. Workplaces of the future
3. Technology infrastructure
4. Real estate transformation
5. Demographics
6. Digital economy
7. Sustainable business

With regards to the main issues, FM should consider:

There are 4 key questions to be taken seriously;

1. Productive workplace

    What is the impact of the quality of environment and support services on organisational effectiveness and business success?

2. Innovative workplaces

    How can we assimilate new workplace technologies, processes and systems to enable flexible working?

3. Knowledge workplace

    How do we create good workplaces for knowledge work taking into account organisational issues and relations, information and the physical layout/design?

4. Sustainable Workplaces

    How we ensure the are minimise the adverse effects of the business on the environment and the local community?

Therefore, workplace of the future should consider:

Innovation:

Design to stimulate innovation and the rapid sharing of knowledge

Creating a sense of belonging and physical frameworks that respect each employee's individuality and integrity.

Functionality:

As modern communication technology promotes networks rather than a hierarchy.

The office will be open and democratic receptive and varied.

The building must be readily adaptable to changes in demand and framing conditions, enhance the company's requirements for functional flexibility.

Environmental responsibility

The construction will reflect the company's ambitious to contribute to sustainable development.

The construction process will be based on keen awareness of ecological challenges and will have a positive impact on the local environment.

Preservation and development of nature and the cultural landscape will always be kept in focus.

Profitability

Reduced operating costs

Increased return on the company's intellectual capital

Profiled arena for customer contact will help strengthen the company's profitability.

1.6   CONCLUSION

Facility management (FM) is an interdisciplinary field devoted to the coordination of space, infrastructure, people and organization. Moreover, FM facilitates the business on a much wider range of activities than just business services and these are referred to as non-core functions. Many of these will be outlined at each chapter in this book.

LEARNING ACTIVITIES

(1)   FM by the International Facility Management Association (IFMA) is:
"A profession that encompasses multiple disciplines to ensure functionality of the built environment by integrating people, place, process and technology."

In relation to the above statement, elaborate the role of FM in building?

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CHAPTER 2
FM CHARACTERISTICS

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Describe the FM characteristics
(2)   Explain the quality in FM and its relationship with organization

2.1   INTRODUCTION

In business, facility management (or facilities management) is the management of buildings and services. The services are sometimes considered to be divided into "hard services" and "soft services." The term "facility management" is similar to "property management" but often applied only to larger and/or commercial properties where the management and operation is more complex. In this chapter, it covers the quality in FM and further elaboration of FM.
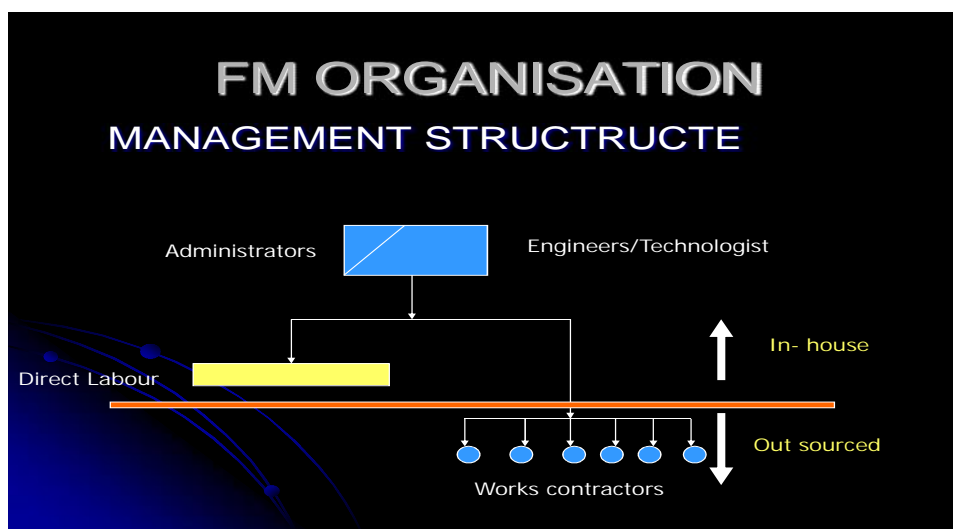
Figure 2.1: FM Organization 1
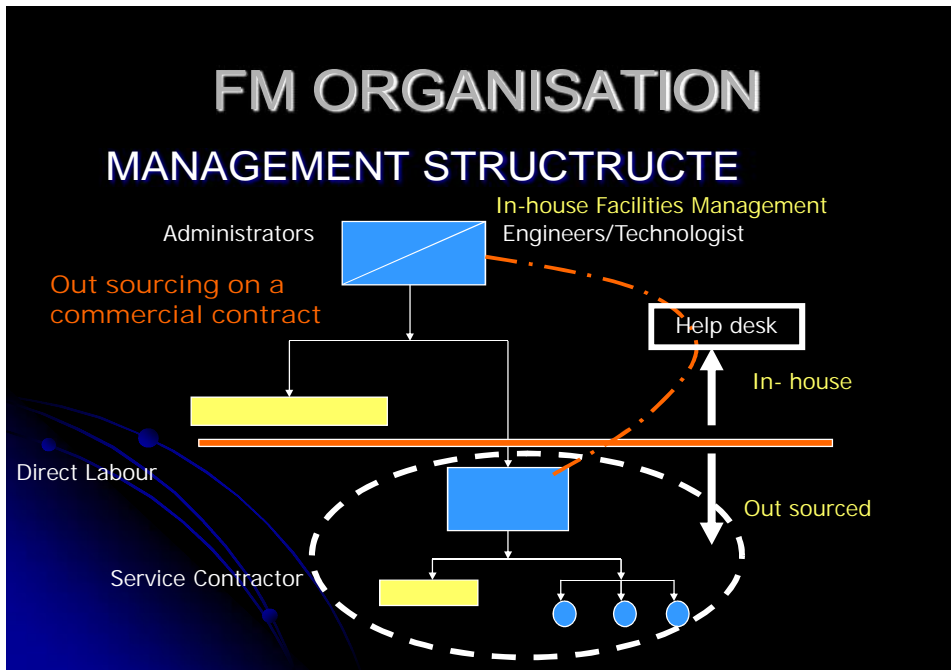
Figure 2.2: FM Organization 2

Both figure 2.1 & 2.2 depict different structure; however the characteristics are fundamentally the same. The structures are in accordance to:

- ➢ Formulating and communicating a facilities policy
- ➢ Planning and designing for continuous improvement of service quality
- ➢ Identifying business needs and user requirements
- ➢ Negotiating service level agreements
- ➢ Creating service partnerships
- ➢ Systematic service appraisal –quality, value and risk.

With regards to the Figure 2.1 and 2.2, the Facilities Managers duties are as follows:

- ➢ Purchase – dealing with planning and purchase of facilities depending on the suitability and needs of the organization.
- ➢ Distribution – dealing with planning in the distribution of facilities depending on the location, needs and logistic.

- Installation / Placement – dealing with planning of installation/placement of facilities. It is in accordance to the suitability and needs of the organization in the building.
- Inventory – dealing with the planning of inventory of facilities in which it looks on the usability, purchase and storage.
- Maintenance - dealing with the planning of maintenance and repair of the facilties
- Storage – dealing with the planning of the storage of facilities.
- Disposal – dealing with the planning of the disposal of facilities. It looks on the end use of facilities.

2.2   FM PHILOSOPHY

Once upon a time, the main job of a building manager or superintendent was to make sure the air conditioning was on in summer and the boiler was on in winter. The primary responsibility of the interior environment has not change, but it has grown. The trend in the 1980s to outsource this responsibility to third parties led to the creation of the facility manager as a job title and the subsequent formation of supporting professional associations such as the Building Owners and Managers Association International (BOMA), the Facility Managers Association (FMA) and the International Facility Management Association (IFMA). Hence, Facility Management Philosophy in general:

- Safety is always the first concern; legality is a close second
- Someone should be directly responsible for every physical asset and function.
- There is a cost ownership of facilities; it is task to ensure that management understands that cost.
- The responsibility to management is well known; concentrate on responsibility to the employees.
- Be cost-effective in everything to do, but capture all cost in analyses.
- If something looks like a good idea, try it; if it doesn't work, change it.

- A good, commonsense decision beats "paralysis by analysis." Avoid excessive dependence on quantitative measurement.
- A budget is a management tool. Put effort into its preparation and format, then monitor its execution.
- Every physical asset should be under life-cycle maintenance
- When outside consultant is used, define the requirement
- As the design-construct cycle proceeds, changes become costlier and less effective. The facility manager must retain control of the design-construct cycle.
- In the planning of major projects, engineering requirements are nearly always understated.
- Plan for flexibility and redundancy in building systems
- Plan with care, but always retain the capability to react.
- Cultivate long-term relationships. Remember that the successful facility management organisation is a team (staff, suppliers, contract, consultants)

Today's commercial and institutional buildings have grown increasingly sophisticated so facility managers must be able to understand the underlying automation systems of the buildings.

2.3   FM MAIN THEME

The emergent field of facility/facilities management (FM) requires a philosophical basis, where philosophy refers not to esoteric, academic abstraction, but to the basic theory and general principles of knowledge that underpin everyday activity. Argues specifically for generation of a philosophy of "the workplace"; the separate but related social, physical, technological and organizational contexts of work; the centre stage of FM activity, in order to: first, provide a knowledge base that critically engages with the complexities and ambiguities of these diverse but

interconnected contexts of work; second, engage with some of the failings of FM knowledge to date, hence:

Level 1

> *Corporate;*

- Senior managers with responsibility for Facilities must contribute to serve planning, formulate policy and undertake scenario planning.
- This requires a full understanding of the corporate culture and the level to which responsibility and authority are developed

Level 2

> *Strategic*

-Managers carry responsibility for effective business planning of the facilities services, leadership of the team and the development of proposals for developing facilities.

Level 3

> *Tactical*

-The facilities manager ensures services quality managers value and implement risk management strategies.

-The Facilities manager ensures operational control through auditing and monitoring performance.

Level 4

> *Operational*

-Facilities manager is responsible for the operation and maintenance of buildings and for the delivery of the services.

2.4   FM QUALITY MANAGEMENT

Facilities management is total quality approach to sustains an operational environment and providing support services to meet the strategic needs of an

organization. Moreover, Facilities management – the process by which and organization delivers and sustains services in a quality environment to meet strategic needs. Quality means basic character or nature or in several literature reviews:

- ➢ Conformance to requirements (Crosby ,1979)
- ➢ Fitness for use (Juran, 1979)
- ➢ Continual improvement (Deming, 1982)
- ➢ As defined by the customers (Ford 1984 & 1990)
- ➢ Loss to society (Taguchi, 1987)
- ➢ Six sigma (Harry and Stewart ,(Motorolla 1988)
- ➢ Zero defects (Crosby, 1979)

It is often linked to objectives such as 'high or low' to quality or benchmark levels of achievement.

*But on its own the….'quality' is strictly not a para*meter.

Total Quality Strategy

STRATEGY : A clear and well-communicated statement of the organization's position and goals on customer service.

SYSTEM : Organizational programs, procedures, resources designed to encourage, deliver, and assess convenient and quality services to the customer.

PEOPLE : Employees – In ALL positions- who possess the capacity and desire to be responsive to customer needs.

OVERALL OBJECTIVE: Achieving customer satisfaction, Giving everyone responsibility ,making continual improvement

STRATEGY

CUSTOMERS

SYSTEM

PEOPLE

Figure 2.2: Total Quality Strategy

In Figure 2.2, for modern time it has come to be used more and more frequently as a word indicating a degree of excellence or superiority. Therefore, Quality management in facilities dependent upon a willingness by top management to accept the contribution appropriated facilities to the productivity of the core business. Therefore to develop the culture of quality:

Be Friendly

A friendly atmosphere between managers, employees and customers will do wonders toward quality service.

Keep Everyone Informed

Information generates knowledge and knowledge generates sound decisions. Communication must be both top-bottom and bottom-up.

Keep Together Through Mutual Cooperation, Consideration and Openness
Focus Win-Win Situations.

Make Decisions Based On Fact, Not Opinions
Decisions should be made based on quantifiable data instead of opinion or hearsay.

Keep Procedure Simple and Non Bureaucratic
Used the KISS (Keep it simple and short)

Manage By Example
Quality is not the responsibility of one individual or even one department. It is the business of every employee.

Management's responsibility here is to manage the quality process by;

➢ Building a quality infrastructure tied to the internal management structure

➢ Linking quality to existing management systems such as

- ➤ Strategic planning
- ➤ Performance management
- ➤ Recognition, reward, and promotion
- ➤ Communication.

Everyone's responsibility is to;
- ➤ View all work as a process
- ➤ Anticipate changing customer needs, wants, and expectations
- ➤ Make incremental improvements
- ➤ Reduce cycle time
- ➤ Encourage and gladly receive feedback –without fear.

2.5 QUALITY THRUST

The application of W. Edwards Deming's ideas to revitalize productive systems to make them more responsive to the customer, more democratic, and less wasteful organizations. Make Continuous Improvement a Way of Life and by understanding the word Kaizen: a Japanese word meaning continuous improvement (quality is an endless journey). Therefore, there are always venues for continuous improvement:
- ➤ consistent product and service quality
- ➤ Faster cycle times.
- ➤ Greater flexibility.
- ➤ Lower costs and less waste.

Hence, below are steps that promote quality in FM:
1. Commitment ;
   - ➤ Commit to improving quality and providing the resources
   - ➤ To make improvement possible.

2. Delegate

- ➢ Designate a person or establish a unit reporting directly to the top.
- ➢ Look at everything as if you were dealing with customers or clients on one-on-one basis.

3. Customer information
   - ➢ Develop a comprehensive marketing information system through utilization of rational database management

4. Internal Assessment
   - ➢ Conduct internal assessment to determine how capable your organization is of delivering quality service.
   - ➢ Own research will reveal employees perceptions of how well they are doing, organizational commitment to quality, organization performance standards, how employees view customers, and what they believe their customers believe.

5. Action
   - ➢ Initiate a feedback system and the information to adjust operation to respond to customer needs, wants and expectations.
   - ➢ Change procedure and even long-held policies, if necessary and set more vigorous performance standards.

2.6 CONCLUSION

In the Facility Manager role, it is important to be a persuasive supporter of your company as well as your staff. It is essential that the Facility Manager understands the characteristics of FM and can clearly undergo its functions.

LEARNING ACTIVITIES

(1) Alexander (1996) specified four levels of Management in FM organization. Explains each level briefly?

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CHAPTER 3

FM LIFE-CYCLE

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Explain the concept of FM life-cycle.
(2)   Identify the important issues of life-cycle in FM
(3)   Discuss and justify the whole scenario in relation to construction industry.

3.1   INTRODUCTION

This chapter discusses the topic of FM life-cycle. The Approach of effective FM life cycle is as follows:

- ➤ Framing the requirement – qualitative feasibility study to define needs and outcomes
- ➤ Scoping the decision- often made in a project study.
- ➤ Panning and design- analytical decisions made in the detailed design stage to review options.
- ➤ Implementation, delivery and operations
- ➤ End of usable life

Facilities life- cycle approach by RICS – (Royal Institution of Chartered Surveyors) should be able to;

- ➤ Earn higher rents and prices
- ➤ Attract tenants and buyer more quickly
- ➤ Cut tenant turnover
- ➤ Cost less to operate and maintain;
- ➤ Benefit occupiers.

Life-cycle from FM perspective;

> *Does not begin at building handover, but at the initial briefing stage where decisions on funding, operability and life cycle are determined.*

Figure 3.1: Diagram of FM life-cycle

Figure 3.1 shows that the professional discipline that is considered to be part of the greater discipline known as Facility Management and that involves working with, in or on any aspect of planning, delivering, operating or supporting for one or more Facility Items or any and all solutions put in place to deal with such Items throughout the entire Facility Life-cycle as in Table 3.1.

Table 3.1: Key project stages

Key Project Stages	Opportunities for influencing FM issues in a project
Define needs/ briefing	Sustainability objectives Funding availability –ring-fenced monies Co-ordination with corporate responsibility agenda

Feasibility studies	Sustainability impact appraisal of alternatives; • Routes, sites, technologies • New-build versus re-use • Demolition Life-cycle cost studies Selection of advisers and design team
Decision to construct	Brief writing, including sustainability goals, targets, etc. Stakeholder engagement.

3.2 MASTER PLANNING AND REAL ESTATE

A real estate master plan is a roadmap to the future with respect to a specific real estate location or parcel. There are many different definitions for describing a Master Plan. Real Estate Master Plan's should provide the client with:

- ➢ A detailed, short-term, medium-term and long-range plan that determines how the specific real estate parcel will provide services to the community in the coming years and plan for future growth.
- ➢ Identify all positive and negative features and attributes of the specific parcel and how it best fits into the needs and requirements of the community.
- ➢ The economics, and feasibility of the proposed real estate master plan.

- ➢ Address issues such as environmental, physical facilities/city services, which will be required during the coming years. i.e. water, wastewater treatment, fire, police, environmental studies/impact of subject parcel, present and future regulatory requirements, and project funding.
- ➢ Review and analyze a city's existing planning and zoning laws/regulations that impact, or may affect the specific parcel.

A Master Plan is a written and a schematic drawing depicting your present real estate site and any buildings and facilities, as well as parking, trees, topography, creeks/water features, overhead power lines, easements, streets, and any other environmental features, and the owner's "vision" or future plans for expansions, utilities, streets and buildings are overlaid. The plan also shows phasing of future expansion, for example: when the worship attendance reaches 400, expand the sanctuary and add classrooms. Moreover, Master Planning, for example:

- ➢ Five-to ten years plan (seldom done effectively)
- ➢ Three- to five years plan
- ➢ Eighteen –month to three years plan
- ➢ Space forecasting (macro-level organisation)
- ➢ Macro-level programming (Organisation wide)
- ➢ Financial forecasting and macro-level estimating (organisation wide)
- ➢ Capital program development.

Moreover, in terms of the Real Estate Acquisition and Disposal, it involves:

- ➢ Site selection and acquisition
- ➢ Building purchase
- ➢ Building lease
- ➢ Real estate disposal

3.3 DESIGN

According to IFMA, One-half (54%) of all FM divisions are structured as a separate department of the organization, 42% are part of a larger department (usually Administration, HR, Finance, Operations, or Real Estate), and 4% are split across various departments. Two-thirds (64%) of FM departments use a functional design, which means they are organized according to the types of services being offered, such as engineering, property management, security and planning.

FM departments tend to be flat in organizational design, with typically four or fewer levels from top to bottom. The head of the department most often reports to a member of senior management. Facility management departments most frequently include maintenance and operations (91%), facility planning (88%), space management (75%). One-half of facility management departments also include environmental health and safety (58%), real estate management (56%), and administrative services (52%). Only 8% of departments directly supervise the information technology function.The development of project plans, specifications, inspections and reviews are readily provided by Facilities Management professional staff.

Moreover, the issues related to Workplace Planning, Allocation, and Management are important. Those then can be break into topics in which need to be carefully establish as in:
- Workplace planning
- Workplace design
- Furniture specifications
- Equipment specifications
- Estimating
- "As built" maintenance
- Code compliance

3.4 CONSTRUCTION AND COMMISSIONING

When a building is initially commissioned it undergoes an intensive quality assurance process that begins during design and continues through construction, occupancy, and operations. Commissioning ensures that the new building operates initially as the owner intended and that building staff are prepared to operate and maintain its systems and equipment. Assuring the quality and conformity during the construction, installation and commissioning phase is critical to the success of your project. Quality issues during fabrication and site assembly can hinder compliance with relevant standards and regulations.

Commissioning Process Overview

Pre-Design Phase
- Select a commissioning lead
- Pre-Design Phase commissioning meeting
- Begin developing *Owner's Project Requirements*
- Develop initial *Commissioning Plan* outline

Design Phase
- Design Phase commissioning meeting (If Pre-Design meeting didn't occur)
- Perform commissioning-focused design review
- Update *Commissioning Plan*
- Develop commissioning requirements for the specification
- Begin planning for verification checklists, functional tests, *Systems Manual*, and training requirements

Construction Phase
- Construction Phase kick-off meeting
- Review submittals, monitor development of *Shop and Coordination Drawings*
- Review *O&M Manuals*
- Perform ongoing construction observation
- Perform verification checks
- Perform diagnostic monitoring
- Perform functional testing
- Develop *Commissioning Report* and *Systems Manual*
- Develop *Recommissioning Plan*
- Verify and review training of owner's staff

Occupancy and Operations Phase
- Resolve outstanding commissioning issues
- Perform seasonal/deferred testing
- Perform near warranty-end review

Figure 3.2: Commissioning Process Overview

In Figure 3.2, the Commissioning & Completion can be elaborated as below:

Definition:

Commissioning verifies that the Works and all relevant systems, equipment and assemblies have been installed, tested, operated and maintained in accordance with the requirements of the relevant contract. Commissioning also includes the Works are built as designed, are certified by a suitably qualified engineer and are fit for the intended purpose. Commissioning takes place during the construction of the Works, before Completion (as defined in the relevant construction contract) of the Works.

As indicated in the flowchart, Commissioning planning commences in design development. As part of the Commissioning process where it is responsible for specifying detailed commissioning requirements and acceptance criteria for achieving design intent, and for transferring the information to the Construction Contractor for the development of the Commissioning and Handover plan.

The Construction Contractor is responsible for developing a Commissioning and Handover Plan, also to ensure that all Commissioning and Handover requirements are addressed and relevant stakeholders consulted as part of the process. For all participants consultation with the relevant stakeholders is essential to ensure that all Commissioning and Handover requirements are addressed.

Commissioning is an example of Commissioning is the testing and operation of ICT systems to ensure that such ICT systems meet the requirements of the technical documentation forming part of the construction contract. Another example of Commissioning is the installation of new aircraft into a newly-constructed hangar. Commissioning is not Handover or Takeover (both of which happen later). These are separate but related stages of an infrastructure project.

3.5   REFURBISHMENT, FIT-OUT AND PROJECT MANAGEMENT

Renovate and refurbish are basically synonymous.,refurbish has connotations of simply painting walls a different colour and rearranging furniture etc where as renovate has connotations of totally changing your house/appartment. E.g painting, putting in a new kitchen, bathroom etc and maybe even knocking down a wall to make a room bigger. In the construction perspective, the works involved the construction of a new mezzanine floor for office accomodation and the refurbishment of the existing office and reception area, together with an upgrade of existing staff canteen.

As in the fit-out project, It is the works that include strip out of existing bathrooms and kitchens; install new fire and sound rated partitioning; new fire rated doors and suspened ceiling; new ventilation and air conditioning; vinyl and carpet tile flooring; new kitchens and bathrooms.

Figure 3.3: Pictures showing the Refurbishment and Fit-out

In Figure 3.3, Installing and reorganising an office are important and often frequent changes for a company. In the current economic climate, businesses need to be able to adapt quickly and to anticipate future equipment requirements and changes in staffing levels, as well as developments associated with working practices. Hence, alteration, renovation, and workplace installation involved:

- ➢ Alteration management
- ➢ Renovation management
- ➢ Furniture installation
- ➢ Datacom installation
- ➢ Voice installation
- ➢ Provision of furnishings
- ➢ Equipping
- ➢ Relocation moving
- ➢ Procurement (to alter, renovate, and install)
- ➢ Preparation of "as-built"
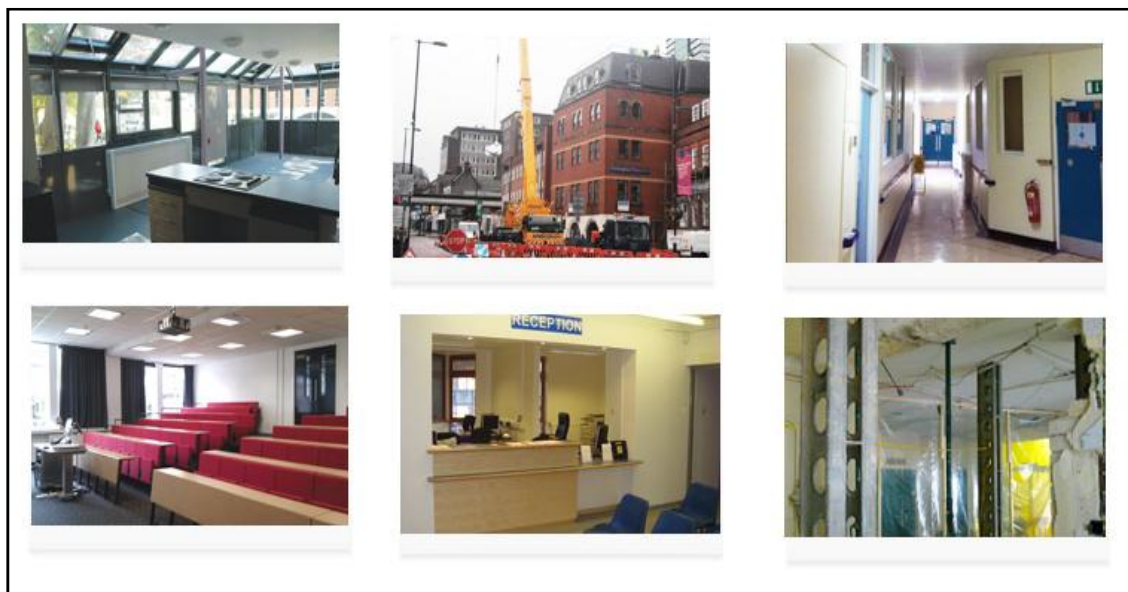- ➢ Project management

Figure 3.4: Alteration, Renovation, and Workplace Installation

In Figure 3.4, it shows the project to renew space that has been used at some time, either to be renewed for a similar purpose or to prepare it for a change of use. It is the activities in refurbishment and fit-out for several construction projects.

Project management is the discipline of organizing and managing resources (e.g. people) in a way that the project is completed within defined scope, quality, time and cost constraints. The first challenge of project management is to make sure that a project is delivered within defined constraints. The second, more ambitious challenge is the optimized allocation and integration of inputs needed to meet pre-defined objectives. Facilities managers are regularly tasked with the delivery of significant projects for their organisations. These may range from the commissioning of new works, relocating staff to new accommodation, implementing new working methods or introducing environmental / sustainability programmes. To be successful the FM team needs to apply a structured approach appropriate to the scale of the task.

3.6 CONCLUSION

The process or processes put in place by a person or organization to assist in the management, coordination, control, delivery, or support of one or more Facility Items, throughout their Lifecycles. Moreover, it represents the general ability or functional capacity for a Resource or Organization to deal with or handle one or more Facility Items, throughout their Lifecycles

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LEARNING ACTIVITIES

(1)   What is the importance of facilities management at construction phase?

(2)   Compare the refurbishment with renovation?

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CHAPTER 4

IN-HOUSE AND OUTSOURCING

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Discuss the in-house services and outsourcing
(2)   Distinguish between in-house and outsource

4.1   INTRODUCTION

Not so long ago, the term "outsourcing" struck fear into the hearts of facility professionals. Today it is a way of doing business and part of corporate life.
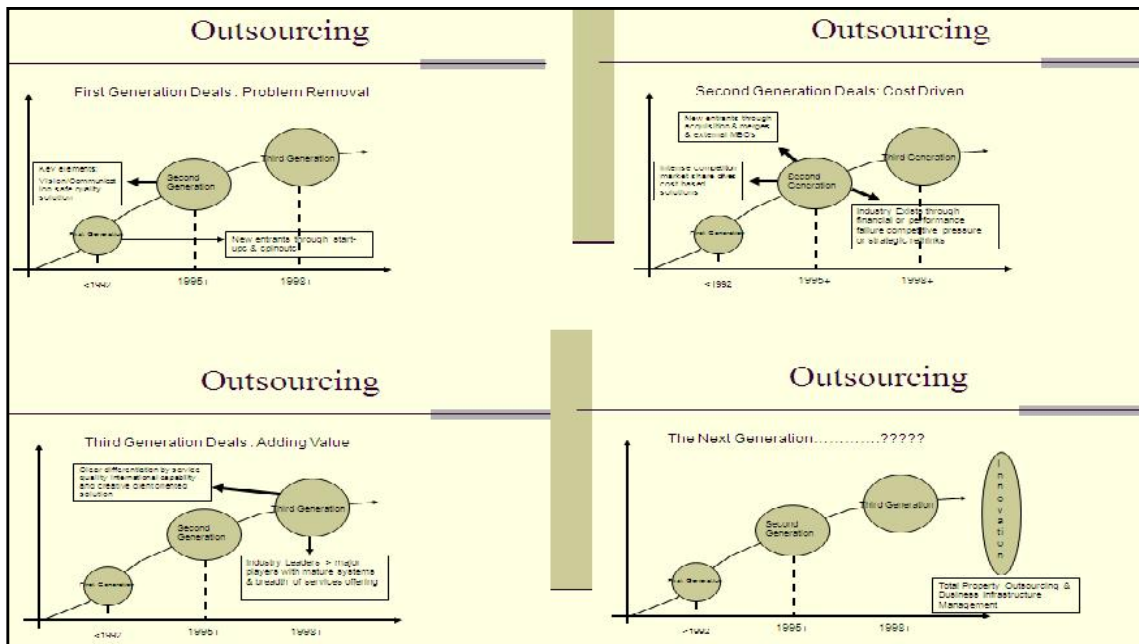

Figure 4.1: The Evolution of Outsourcing

In Figure 4.1, it shows that outsourcing has come a long way. Errors and successes paved the way for this concept to mature as a form of asset and facilities management (FM). Investment in the physical infrastructure and the provision of facilities management (FM) services should be geared toward achieving the strategic objectives of an organization, which largely aim at value creation. Sole focus on the financials while choosing between outsourcing and in-house FM options excludes other non-financial measures such as the extent to which the FM route contributes to improving internal business processes and the overall strategic health of the organization. This paper presents the results of investigations into a holistic perspective on the key variables to consider in choosing between outsourcing and in-house FM in order to provide value added service and improve organizational performance. This chapter presents a holistic perspective on the key variables to consider in choosing between outsourcing and in-house FM in order to provide value added service and improve orgranizational performance.

4.2   IN-HOUSE SERVICE

Investment in the physical infrastructure and the provision of facilities management (FM) services should be geared toward achieving the strategic objectives of an organization, which largely aim at value creation. Sole focus on the financials while choosing between outsourcing and in-house FM options excludes other non-financial measures such as the extent to which the FM route contributes to improving internal business processes and the overall strategic health of the organization.

The many things a company must do to handle a service in-house (and keep it running continuously), it becomes more evident why many companies choose outsourcing versus operating a service in-house. If a service is provided in-house, a company must:

- ➢ Locate a qualified employee
- ➢ Train the employee
- ➢ Pay employee wages and benefits
- ➢ Provide the employee a physical workspace
- ➢ Provide the required technology items (computer, phone, Internet access, copier, fax machine, etc.)
- ➢ Pay telecommunications costs (phone line, inbound toll-free calls)

Some services, for example Inbound Response Management, require continuous coverage and dedicated resource. This is required because responses are generated on a random basis by outside forces, rather than on an internal, controlled schedule. Services of this type would also require coverage during absences of the primary resource, such as:

- ➢ Scheduled vacations
- ➢ Unscheduled sick days
- ➢ Unscheduled Family leave
- ➢ Maternity leave

With outsourcing, the company must only:

- ➢ Locate a reliable and high-quality vendor
- ➢ Pay the vendor for the services provided

Thinking a bit more broadly, there may well be things you're doing that could be done by others with specialty skills and technology and a client base large enough to generate both scale economies and valuable cross-industry perspectives and advice.

4.3   OUTSOURCING

According to Atkin and Brooks, an important concept in the facility management field is that of outsourcing, where the owner enters into an arrangement with external organizations to provide one or more services in preference to their being provided through internal arrangements. The reasons for this action can vary, including lack of in-house resources, lack of expertise and pressure to reduce costs. Unfortunately, confusion can exist because of the close association that facility management has with outsourcing. The two concepts are not synonymous; rather, outsourcing is one means for providing facility-related services to the owner organization.

Market changes and budgetary pressures are forcing companies to re-examine their support operations. Facilities Management (FM) outsourcing may lead to a leaner, more efficient organisation that can concentrate on core business and reduce operating costs. FM are also getting increasingly sophisticated. They are seeking out the best solutions to meet their demanding business needs in the changing world. Consequently, they are building strong, long-term relationships with the service providers they value most.

Organisations explore outsourcing options for a variety of reasons:
  - ➢ Cost reduction
  - ➢ The potential to convert fixed costs to variable costs
  - ➢ Insufficient management time available for the in-house operation or its improvement
  - ➢ Difficulty in retaining sufficiently qualified staff

The switch to outsourcing brings advantages including:
  - ➢ Cost savings of 10% - 20%
  - ➢ Improved service delivery by specialist FM service providers
  - ➢ Better attraction and retention of staff by the service providers

- ➢ Improved management of existing resources
- ➢ Transformational initiatives
- ➢ The added value of consultancy expertise
- ➢ The potential for better procurement opportunities on an asset refresh

In order for FM outsourcing work:
- ➢ Successful FM outsourcing hinges on strong leadership
- ➢ Decision-makers empowered to manage resources, balance the programme's priorities and focus on the business benefits realization
- ➢ Good stakeholder management and communication are vital
- ➢ Clear service levels and governance are needed

Benefits management should also be considered, as FM outsourcing is typically highly visible - end users notice changes to food services, environmental conditions and housekeeping immediately. Monitor how the initial foreseen benefits will remain intact and of value to the organisation. Thorough interrogation of the service provision market is needed, to ensure delivery capability. Global estate holders will be affected by the significant differences in labour laws in each country, impacting on service provision.

Non engineering operations such as cleaning and security are out-sourced (as contracted-out used to be called before jargon invaded facilities management). With task such as the maintenance of heating, air-conditioning and electrical services and the repair and maintenance of the fabric retained as an in-house opeartion.

There four main versions of the out-sourcing:-
1. Out-tasking some of the services on separate contracts
2. Out-tasking all services on separate contracts
3. Contracting-out on a commercial contract
4. A management type of contact

The next wave of outsourcers continues to grow in size and capabilities through mergers and acquisitions. In this case, size does matter. It represents the span of a client base which, in turn, translates into a distinct pool of knowledge and best practices. This knowledge bank is very valuable to customers, because it means they can benefit from the experiences of others. The six phases towards outsourcing (established by The Outsourcing Institute several years ago) are still valid today. The success of an outsourcing exercise depends on whether the entire process is being followed.

Outsourcing fails when there is lacking in clarity. This happens when customers do not have a good understanding of what they have, what they don't have, and what they want in the first place. Good outsourcers will patch along the way as they stumble through the mess. Bad providers will fail and take the fm down with them. Jeffrey Budimulia, facility manager for the International School of Beijing, suggests, "For preparing a location for FM outsourcing, we need to ask who can do the job professionally and more effectively. It takes months of planning, including studying both internally (what can be outsourced) and externally (who is available)."

4.4   OUTSOURCING VS. IN-HOUSE?

Where else are/might we be seeing migration to outsourcing, beyond the well-established areas like data-processing, IT/network support, non-deposit investment products? Some examples:
- ➤ Compliance management – to cost-effectively keep up with continual change
- ➤ BPO (business process outsourcing), such as for mortgage loans
- ➤ Most of the HR/payroll function, with that function in-house trimmed to oversight of payroll data and personnel information, plus performance review
- ➤ New product development and marketing – e.g., private-labeling

➤ Writing, updating of policies and procedures

➤ Investment portfolio management, accounting and reporting

➤ Management of the appraisal, OREO, loss-reserving and problem asset functions

As options for outsourcing (or perhaps co-sourcing, to retain a measure of control) proliferate, potential cost savings can be tempting. Look at internal bottlenecks – e.g., over-burdened staff and their specific responsibilities that may be off-loaded externally. The cost savings from not having to hire additional staff, versus the outsourced vendor cost, should be a straightforward calculation. But if that makes outsourcing look like a slam-dunk, there are offsetting, and less easily quantified, costs to consider.

Start with the reputation risk from the loss of direct control, particularly if the service is visible to customers and/or "mission-critical." There's strategic risk – e.g., should a vendor be purchased, or fail to invest sufficiently, or suddenly become a direct competitor. There are operational risks from vendor reliability (quality, timing, support), from systems incompatibilities, from technology failure. And compliance risk, in particular from customer data security issues.

All of these considerations are addressed in the due-diligence and ongoing monitoring (including risk assessment) requirements and the recommended contract provisions outlined and other regulatory pronouncements. While these risks represent a very real offset to the tangible benefit of meaningful cost savings, a structured approach to understanding, mitigating and monitoring these risks can give you and your regulators some comfort as to their control. And at a time when the industry is turning attention to reviving revenue growth (in addition to containing costs), recognize that outsourcing can open new avenues (markets, products, etc.) otherwise much more difficult for a smaller institution to navigate.

4.5   CONCLUSION

It is paramount for the entire facilities staff to understand the importance of the migration to the new service provider. To develop a comprehensive transition plan takes a dedicated team that knows the staff and the customers. The fm must commit time and resources to define and stabilize the new partnership. This is not the place for a part-time job, since it will be very important for the fm to take good care of the existing staff.

There must also be secure buy-in from all employees. That means the FM must communicate from the beginning to the end of the transition (and everywhere in between). The service provider must be sensitive to differences and respect both workplace diversity and the corporate culture.To outsource or not to outsource, that was the question. While it still is an unpopular action for corporations to take, most large companies – and increasingly small-to-midsize firms – outsource work at some point or another.

LEARNING ACTIVITIES
(1)   How does the client select the outsources without jeopardizing the core business?
(2)   Discuss the differences between in-house services and outsourcing.

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CHAPTER 5

CHANGE MANAGEMENT

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Discuss the process involved in change management
(2)   Determine the importance of changes
(3)   Justified the choices involved in dealing with changes

5.1   INTRODUCTION

Inefficient manufacturing processes, nonproductive work environment, and higher worker expectations required senior management to seek alternatives, to plan for the long term, to "work smarter", to be more productive and become more competitive. The business practice and profession is continuing to evolve to provide management services that meet strategic long-range and short-term corporate requirements. The business practices combine proven and innovative methods and techniques with the most current technical knowledge to achieve humane, productive, and cost-effective work environment.

5.2   MANAGING CHANGE IN PRACTICE

Change management is an approach to shifting/transitioning individuals, teams, and organizations from a current state to a desired future state. It is an organizational process aimed at helping change stakeholders to accept and embrace changes in their business environment or individuals in their personal lives. In some project management contexts, change management refers to a project management process wherein changes to a project are formally

introduced and approved. Change management uses basic structures and tools to control any organizational change effort.

In Figure 5.1 the goal is to maximize benefits and minimize the change impacts on workers and avoid distractions Organizations today are feeling the impact of change saturation and fatigue.
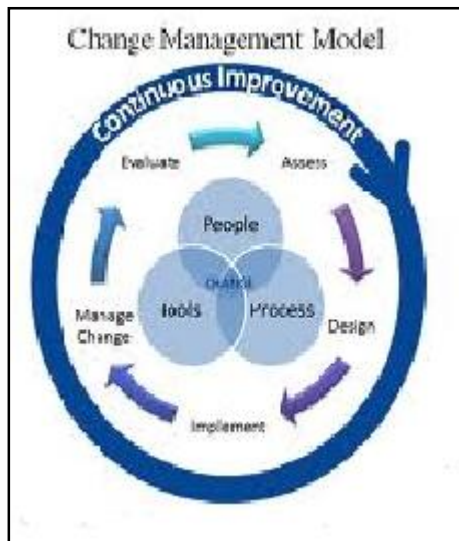
Figure 5.1: Change Management Model

5.3   CHANGE AS A PROCESS

Change is too often falsely perceived by individuals and organizations as a fairly simplistic phenomenon. This is a comfortable, sometimes useful, yet extremely deceiving notion (Everad and Morris, 1990). Organizational change can have many faces. But regardless of the type, the critical aspect is a company's ability to win the buy-in of their organization's employees on the change. Steps to assess need for change:

  ➢ Recognize a problem exists and find its source.
  ➢ Look inside and outside the firm for sources.
  ➢ Decide on the change to make: determine the ideal future state.
  ➢ Decide exactly what the future company will look like.

- ➢ What obstacles need to be changed to get there.
- ➢ Implement the change:

  A top-down change is quickest, bottom-up is more gradual.

  Bottom-up is more effective at eliminating obstacles.
- ➢ Evaluate Change: was it successful? Benchmark (compare) your change to others.

To effectively implement organizational change consists of a four-step process.
- ➢ First, recognizing the changes in the broader business environment.
- ➢ Second, developing the necessary adjustments for their company's needs.
- ➢ Third, training their employees on the appropriate changes.
- ➢ Fourth, winning the support of the employees with the persuasiveness of the appropriate adjustments.

This four-step process is change management in its essence, and organizational change in practice.

5.3.1 Management Responsibility

A manager, who is generally the head of a department or functional area within an organization, has specific responsibilities depending on the needs of his or her organization. The job description of a manager varies from organization to organization. Here is more about what a manager does, the manager's job description.

The manager's role and job description is at a pay grade or job classification level of the organization that integrates functions and departments for implementation success. The manager who is responsible for a department normally has directly reporting employees for whom he or she is reponsible to provide leadership.

Because the role of the manager bears significant responsibility, accountability, and authority within an organization, the manager has these responsibilities. Traditionally, the manager's job description and responsibilities include:

➢ Plan: planning the operation and function of the area over which the manager is assigned responsibility in a way that accomplishes the goals for which he or she is responsible.

➢ Organize and Implement: organizing the production of the work, and the workforce, training, and resources necessary, in a way that accomplishes the desired and required outcomes to meet the goals.

➢ Direct: providing the employees and their resources with enough guidance, direction, leadership, and support necessary to ensure that they are able to acomplish their goals.

➢ Monitor: following up to ensure that the plan to achieve the goals is being carried out in such a way that its accomplishment is assured.

➢ Evaluate: reviewing and assessing the success of the goal, the plan, and the allocation of the employees and their resources.

➢ Performing other responsibilities as assigned by the president, vice president, or director to whom the manager reports.

These are the traditional roles of a manager. As changes occur, the management responsibility also need to be looked into and understand that responsibility for the process belongs to management. Therefore:

➢ The process has an inherent capability which will not change unless the process is changed by management.

➢ Improve the process

- ➢ Stop blaming others
- ➢ Identify the aspect of the process that contributes to the common cause.
- ➢ Determine which aspect of the process to change or improve in order to reduce variation.
- ➢ Change the organizational view
- ➢ Plan for the culture change as well as the process change.
- ➢ Never blame the workers for common cause variation.
- ➢ Not try to interpret individual variation of the process or explain

5.3.2 The Workers Responsibilities

Employers and employees have responsibilities to each other, they should also expect their rights to be upheld. Employees are expected to receive the terms and conditions of their work setting out when their work commences, what their main duties are, who they are accountable to, rates of pay, and other entitlements. Employers and employees are expected to meet minimum legal requirements for such areas as Health and Safety at Work, and minimum standards and conditions related to hours, and the treatment of people in the workplace.

Along with rights for employees there are corresponding responsibilities such as the expectation to work in a safe way and to have regard for the safety of work colleagues In controlling the variation, the worker need to:
- ➢ Communicate to management the specific problem (s).
- ➢ Learn the process so that the worker can identify any difference
- ➢ Be open to teamwork

Furthermore, the responsibilities of worker and management in controlling variation:
- ➢ Immediately try to understand when a special cause has occurred
- ➢ Determine what was difference when the special cause occurred

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- ➢ Identify ways to prevent the special cause from recurring , once it is understood
- ➢ Not make fundamental changes in the process
- ➢ Not tweak the process.

Change occurs as a process, not as an event. Organizational change does not happen instantaneously because there was an announcement, a kick-off meeting or even a go-live date. Individuals do not change simply because they received an email or attended a training program. When we experience change, we move from what we had known and done, through a period of transition to arrive at a desired new way of behaving and doing our job.

5.4   COMMUNICATION CHANGES

In Figure 5.1, these skills are aimed at involving people and encouraging commitment to the change process It may not be possible to overcome some change issues through communication – at times the differences between intended outcomes and internal and external views can be too deeply embedded
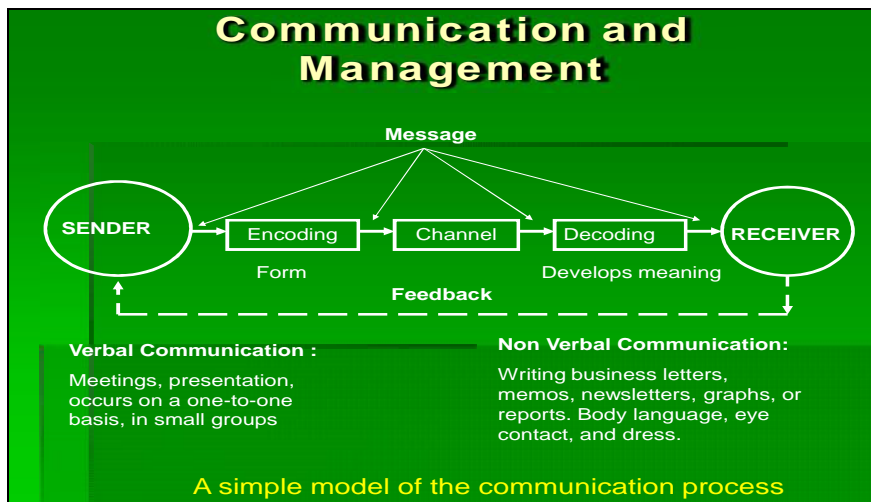

Figure 5.2: Communication and Management

Four key skills for communicating include:
- ➤ Listening: There are four types of listening skills – suspending judgement, identifying assumptions, listening for learning, and reflecting.
- ➤ Telling stories: This is an effective way of helping employees learn from past changes & painting pictures of the future.
- ➤ Selling change upward: Issue selling is a way of gaining senior management attention to changes initiated from below.
- ➤ Toxic handling: Some people in organizations take on a role of handling the ill-effects of change processes and absorbing these as a way of shielding others from their negative impact.

Different change conversations should be used at different stages of a change process. There are four types of conversations:
- ➤ Initiative conversations: these draw attention to the need for change.
- ➤ Conversation for understanding: this communicates the type of changes needed and allows for a greater appreciation of why this type of change.
- ➤ Conversations for performance: this focuses on the actual change that is intended and how progress will be monitored.
- ➤ Conversation for closure: this signals the end of the change

Coherent language is important to avoid message ambiguity in the change message. The desired change and the language used must be in sync with and reflective of each other. Based on literature reviews, there are four dominant language forms used in change conversations:
- ➤ Ideals: expressing preferences
- ➤ Appeals: seeking support
- ➤ Rules: seeking to direct the behavior of individuals
- ➤ Deals: serving as a form of bargaining and exchange

The use of metaphors influences the images of change. These change images include:

- ➢ Machine: this is based on the "fix and maintain" view: repair, adjust, correct.
- ➢ Developmental: this is based on the "build and develop" view: growing, getting better, nurturing.
- ➢ Transitional: this is based on the "move and relocate" view: leaving the past behind, moving from
- ➢ Transformational: this is based on the "liberate and re-create" view: reinventing, recreating

The use of words and sentences that are misinterpreted or have evolved from their original meaning can be detrimental to the change process. It is important that a common change language is established.

5.5   RESOLVING CONFLICT

Within this fast growing professional discipline, facilities managers have extensive responsibilities for providing, maintaining and developing myriad services. These range from property strategy, space management and communications infrastructure to building maintenance, administration and contract management. Figure 5.3 below shows how to resolve the conflict and it should be able to guide staff in any organization. There are 10 ways on how to resolve conflict where understanding and being considerate are important aspect.

Figure 5.3: Conflict Resolution

The FM sector is now large and complex, comprising a mix of in-house departments, specialist contractors, large multi-service companies, and consortia delivering the full range of design, build, finance and management. Hence, there will be conflict in ideas or perseptives, and in many cases, conflict in the workplace just seems to be a fact of life. We've all seen situations where different people with different goals and needs have come into conflict. And we've all seen the often-intense personal animosity that can result.

Conflict exists in situations where goals, interests or values of people are incompatible and they block other's efforts to achieve their goals. Some level of conflict is inevitable given the wide range of goals in a firm. The fact that conflict exists, however, is not necessarily a bad thing as long as it is resolved effectively, it can lead to personal and professional growth. In many cases, effective conflict resolution can make the difference between positive and negative outcomes. The good news is that by resolving conflict successfully, we can solve many of the

problems that it has brought to the surface, as well as getting benefits that we might not at first expect. Therefore, it is wise to:

➢ Increased understanding: The discussion needed to resolve conflict expands people's awareness of the situation, giving them an insight into how they can achieve their own goals without undermining those of other people.

➢ Increased group cohesion: When conflict is resolved effectively, team members can develop stronger mutual respect, and a renewed faith in their ability to work together.

➢ Improved self-knowledge: Conflict pushes individuals to examine their goals in close detail , helping them understand the things that are most important to them, sharpening their focus, and enhancing their effectiveness.

However, if conflict is not handled effectively, the results can be damaging. Conflicting goals can quickly turn into personal dislike. Teamwork breaks down. Talent is wasted as people disengage from their work. And it's easy to end up in a vicious downward spiral of negativity and recrimination. If we were to keep our team or organization working effectively, we need to stop this downward spiral as soon as we can. To do this, it helps to understand two of the theories that lie behind effective conflict resolution:

In the 1970s Kenneth Thomas and Ralph Kilmann identified five main styles of dealing with conflict that vary in their degrees of cooperativeness and assertiveness. They argued that people typically have a preferred conflict resolution style. However they also noted that different styles were most useful in different situations. They developed the Thomas-Kilmann Conflict Mode Instrument (TKI) which helps you to identify which style you tend towards when conflict arises.

Thomas and Kilmann's styles are:

➢ Competitive: People who tend towards a competitive style take a firm stand, and know what they want. They usually operate from a position of power, drawn from things like position, rank, expertise, or persuasive ability. This style can be useful when there is an emergency and a decision needs to be make fast; when the decision is unpopular; or when defending against someone who is trying to exploit the situation selfishly. However it can leave people feeling bruised, unsatisfied and resentful when used in less urgent situations.

➢ Collaborative: People tending towards a collaborative style try to meet the needs of all people involved. These people can be highly assertive but unlike the competitor, they cooperate effectively and acknowledge that everyone is important. This style is useful when a you need to bring together a variety of viewpoints to get the best solution; when there have been previous conflicts in the group; or when the situation is too important for a simple trade-off.

➢ Compromising: People who prefer a compromising style try to find a solution that will at least partially satisfy everyone. Everyone is expected to give up something, and the compromiser him- or herself also expects to relinquish something. Compromise is useful when the cost of conflict is higher than the cost of losing ground, when equal strength opponents are at a standstill and when there is a deadline looming.

➢ Accommodating: This style indicates a willingness to meet the needs of others at the expense of the person's own needs. The accommodator often knows when to give in to others, but can be persuaded to surrender a position even when it is not warranted. This person is not assertive but is highly cooperative. Accommodation is appropriate when the issues matter more to the other party, when peace is more valuable than winning, or

when you want to be in a position to collect on this "favor" you gave. However people may not return favors, and overall this approach is unlikely to give the best outcomes.

- ➢ Avoiding: People tending towards this style seek to evade the conflict entirely. This style is typified by delegating controversial decisions, accepting default decisions, and not wanting to hurt anyone's feelings. It can be appropriate when victory is impossible, when the controversy is trivial, or when someone else is in a better position to solve the problem. However in many situations this is a weak and ineffective approach to take.

Once we understand the different styles, we can use them to think about the most appropriate approach (or mixture of approaches) for the situation you're in. We can also think about our own instinctive approach, and learn how we need to change this if necessary. Ideally we can adopt an approach that meets the situation, resolves the problem, respects people's legitimate interests, and mends damaged working relationships.

5.6 CONCLUSION

The facilities management profession has come of age. Its practitioners require skill and knowledge. The sector definition continues to expand to include the management of an increasingly broad range of tangible assets, support services and people skills in order to manage change. With regards to conflict, people's conflict management styles tend to mesh, and a "right" way to solve conflict emerges. It's good to recognize when this style can be used effectively, however make sure that people understand that different styles may suit different situations. Look at the circumstances, and think about the style that may be appropriate.

LEARNING ACTIVITIES

Based on changes in management, discuss the relationship between facilities management and human interaction.

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CHAPTER 6

HUMAN RESOURCE MANAGEMENT IMPLICATION

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Discuss the views in human resource management and FM.
(2)   Elaborate the implication in FM with regards to human resource management.

6.1   INTRODUCTION

Facilities management encompasses multi-disciplinary activities within the built environment and the management of their impact upon people and the workplace. Effective facilities management, combining resources and activities, is vital to the success of any organisation. At a corporate level, it contributes to the delivery of strategic and operational objectives. On a daily basis, effective facilities management provides a safe and efficient working environment, which is essential to the performance of any business – whatever its size and scope. In addition, this chapter will explore the implication of management with respect to the facilities management.

6.2   DEALING WITH SHIFTING DEMANDS FOR RESOURCES

Although facility management is a well-known concept within organisations, it is poorly understood and implemented. Most organisations struggle to generate the promised added value that facility management can create. Facility management is usually defined in terms of the measures taken to control the delivery of facility services. However, this definition omits the customer. Therefore demand-oriented facility management is meant to incorporate the customers' point of view. The

word 'demand' can indicate two different perspectives within facility management. On the one hand the customer is considered to be central to the supply of facility services, yet on the other this may indicate a strict control of the services process.What competences or skills are needed for facilities managers? From the context of change management, facility managers have been required not only technical skills and knowledge of physical facilities, but also business and managerial skills. Hence, dealing with shifting demands for resources, it will consist of:

- People
- Place
- Technology
- Proces

Society is becoming increasingly focused on the individual's needs and demands. Therefore organisations need to organise their services flexibly in order to respond quickly to changes in existing markets and changing markets. New organization structures are developing to meet these changes and to incorporate the knowledge and expertise of specialised companies. The main principles are:

- Outsourcing of generic services and insourcing of specific services based on the current need.
- Differentiating between generic and specific services. Generic services are easier to supply. Specific services can be purchased;
- Implementing multifunctional workplaces and, when possible, building modulation;
- Centralising services, like one kitchen for different care centres or collective facility service centres.

There is an increasing need for the management of facility processes. Therefore more coordination, cooperation and expertise are required. This will result in a more intelligent use of the facility resources and in turn create the preconditions for improving the primary process and reducing the total costs of the organisation.

6.3   MANAGEMENT OF ORGANISATION

Managers are people who steer an organisation towards meeting its' objectives. Management has been described as: 'the process of planning, organising, leading and controlling the efforts of organisation members and of using all organisational resource to achieve stated organisational goals.
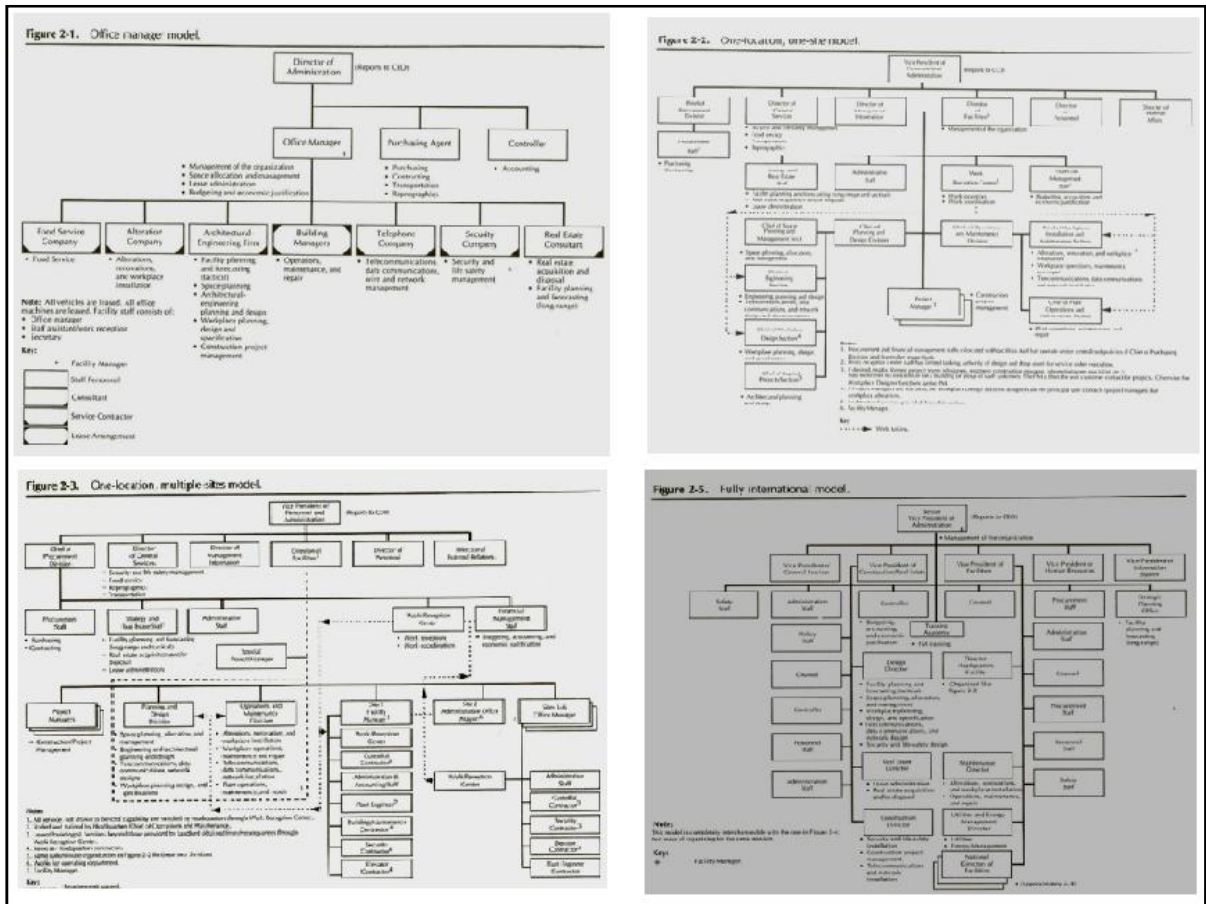

Figure 6.1: Model of Management Structure for FM

A manager's job is to maintain control over the way an organisation does things, and at the same time to lead, inspire and direct the people under them. In Figure 6.1, it shows model of management structure dealing with FM. As for FM, it will involve:

> ➢ To ensure that everything is available and operating properly for building occupants to do their work.

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- ➢ Most influence upon the quality of life within a facility
- ➢ Range from the small scalable (e.g. single small building custodial services) to the large scale (such as Johnson Controls' operation of Chrysler manufacturing) or even on an international scale (e.g. global service provision to a multinational corporation)

Fundamentally, FM is the practice or coordinating the physical workplace with the people and work of the organization; integrates the principles of business administration, architecture, and the behavioral and engineering sciences. Each manager in an organisation is given an area of responsibility. Typically they will have targets and objectives to meet which fit into the organisations overall targets and objectives. Managers are typically responsible for:

- ➢ Establishing, prioritising, and making sure that objectives are met
- ➢ Establishing a framework for communications, and patterns of work within their area of responsibility e.g. department
- ➢ Communicating targets, goals and results to people that work for them
- ➢ Motivating employees
- ➢ Setting out the administrative arrangements for their area of responsibility
- ➢ Creating, monitoring, and making sure that budgets are achieved.

A key managerial responsibility is for the management of resources. The sorts of resources that a manager will be responsible for will include:

- ➢ People - directing the activities and looking after people
- ➢ Financial - using financial resources in the best possible way for the organisation in line with profit and sales targets.
- ➢ Materials - making sure that materials are used in the most productive way with the minimum waste
- ➢ Machinery and equipment - using the most appropriate machinery and equipment, and making sure that it is maintained, replaced and updated where necessary
- ➢ Time - ensuring efficient use of time

- ➢ Buildings - making sure that premises are safe and are being used in the best possible way
- ➢ Information - making sure that the organisation uses the most effective information processing technologies.

In a globalized world, operating companies and organisations has become an increasingly complex task. Managers must be able to coordinate a variety of contradicting goals. These goals include such themes as controllability vs. flexibility, strategic competition vs. cooperation, and personnel inspiring vs. personnel diversity.

6.4   EMPLOYMENT DISPUTES

Conflicts at work take many forms. It might be an individual with a grievance, a problem between an employee and a manager or conflict between two co-workers. Any conflict can get in the way of work and make business less productive. There a broad range of workplace dispute resolution tools that assure solutions to workplace conflict consistent with any human resource policies and related law.

Figure 6.2: Areas of Dispute in Employment

The resolution tools are there for employee's right. The areas of disputes are shown in Figure 6.2. In order to resolve disputes, there are tools which include:

- ➢ Mediation

    Voluntary process where mediators assist people in conflict to explore their differences and develop their own solutions to these concerns.

- ➢ Training

    Online and classroom trainings on such topics as workplace conflict, the grievance procedure, and disciplinary process.

- ➢ AdviceLine

    Confidential consultation on employment rights and responsibilities as well as available options in resolving workplace conflict.

- ➢ Grievance Procedure

    A process where workplace concerns can be raised by an employee with agency management and may qualify for a hearing before an independent, neutral hearing officer.

FM contracts create complex arrangements requiring consideration not only of the performance specifications but a range of other commercial issues such as employment law, pensions, and other regulatory matters. Very often FM Contracts form part of a much wider commercial arrangement and in such circumstances it is important to have a thorough understanding of such procurement processes, no matter how far down the supply chain the Service Provider may be. This to avoid conflict and employment disputes.

Although terms and conditions vary, most of policies give access to a range of legal services and advice regarding employment disputes. These would usually

include unfair dismissal, redundancy and discrimination on the grounds of sex, race or disability. Legal expenses can help with the legal costs of pursuing legal proceedings arising from a dispute with our employer as an employee under our contract of employment.

6.5 FUNCTIONS, JOB DESCRIPTIONS AND SKILLS

Facilities management offers a chance to develop our career in a diverse, exciting and rapidly expanding area of the economy. The sector is now thought to be worth up to £95 billion a year in UK. In fact, it's one of the fastest growing professions in the UK, and covers an increasingly broad range of responsibilities.

These range from property strategy, space management and communications infrastructure to building maintenance, administration and contract management. The strength and success of any organisation depends to an extent on its facilities management. The overall function of a facilities operations manager is to ensure that processes needed to produce and distribute the products of an enterprise run smoothly and without unnecessary interruption.

This job involves measuring and monitoring a variety of processes and, when necessary, intervening appropriately to prevent or resolve problems, overseeing each step along the way. As well as the building itself, facilities management is also concerned with support services including catering, security, the postroom, cleaning and often health and safety and environmental regulations. IT and telephony systems may also fall within their remit. All these services have a direct impact on the daily working lives of a client's employees. Hence, below are important factors:

Scope

The facilities operations manager is responsible for the effective management of buildings, power and equipment such as control and monitoring systems and heating, ventilation and air conditioning (HVAC) systems.

Tasks

The tasks of the facilities operations manager include reviewing data related to facility performance to achieve consistent service and efficiency, planning and directing staff activities, establishing and implementing department goals, locating and procuring appropriate resources and managing budgets.

In views with skills needed for FM, below are factors that important:

➢ Knowledge

Required knowledge includes technical expertise in the operations of the enterprise, and knowledge of management, human resources processes, quality control and budgeting.

➢ Skills

Some of the key skills needed by the facilities operations manager include good judgment and decision-making skills, the ability to think critically and solve problems, and monitoring and coordination skills.

➢ Tools

Tools commonly employed by the facilities operations manager include computers, a wide variety of software programs, PDAs and organizers and communication tools such as phones, pagers and two-way radios.

A job description identifies, defines and describes the most important features of a job as it is being performed. A job description should describe and focus on the job itself and not on any specific individual who might fill or who is currently in the position. Facilities managers negotiate with people at all levels, from cleaner to

company director, and so must have excellent people skills. You'll need to behave professionally and fairly at all times, and be able to express yourself well, both when speaking and in writing. The ability to work within a team is another essential pre-requisite, as is the ability to take control of a situation and resolve it with minimal disruption to the business operations.

Facilities managers also have to be numerate, literate and possess a sound knowledge of health, safety and environmental legislation within the built environment. You will have to demonstrate excellent leadership qualities and be able to juggle multiple and often conflicting priorities.

6.6   PERFORMANCE APPRAISAL

Performance appraisal is the systematic evaluation of the performance of employees and to understand the abilities of a person for further growth and development. The achievement of an organisation's goals rests with it's people. The more talented the people and the better they are managed and coordinated toward those goals the greater the chance of success.
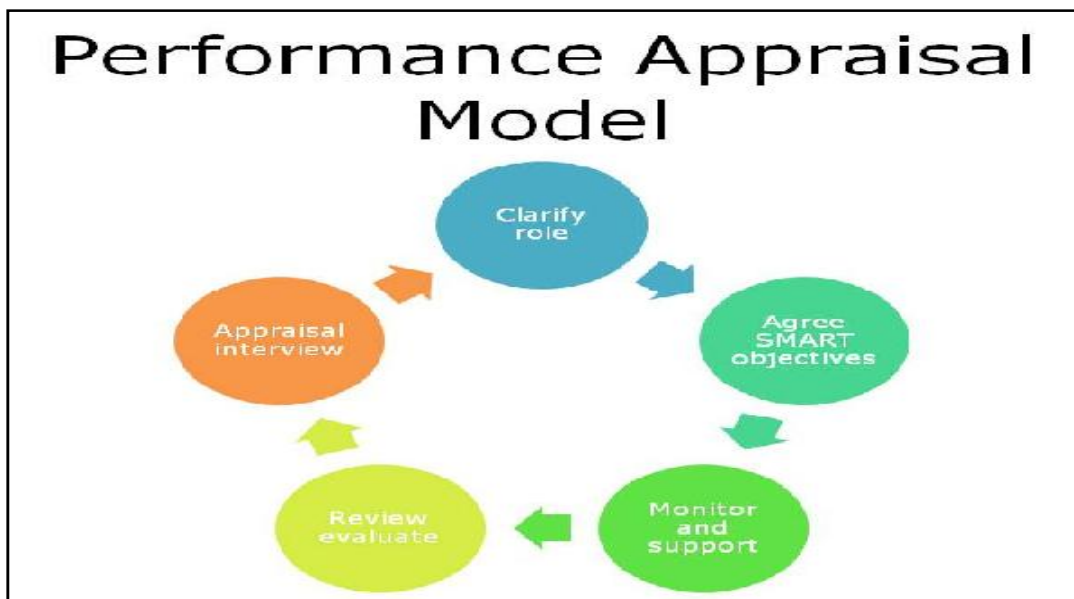

Figure 6.3: Performance Appraisal Model

Performance appraisal is all about providing a way to do this. Performance appraisal is generally done in systematic ways as shown in Figure 6.3, which are as follows:

> ➢ The supervisors measure the pay of employees and compare it with targets and plans.
> ➢ The supervisor analyses the factors behind work performances of employees.
> ➢ The employers are in position to guide the employees for a better performance.

Remember that the performance appraisal summarizes the employee's contributions over the entire appraisal period (usually one year). It is not a step in the disciplinary process. It may occur as often as we believe is necessary to acknowledge the employee for accomplishments and to plan together for improved performance.

The goal of the performance appraisal process is to help the employee feel:
> ➢ Positive about the job
> ➢ Motivated to do well and to develop
> ➢ Benefited by specific, constructive feedback
> ➢ Appreciated for specific contributions
> ➢ Informed about current and future performance objectives
> ➢ Involved as a participant in the process
> ➢ Preparing for the Appraisal

Both we and the employee play an important role in creating a productive performance appraisal process. Here are some suggestions to get the employee involved:

- ➢ Schedule a mutually convenient time and place for the performance appraisal discussion. Allow enough time and ensure privacy.
- ➢ Explain that you would like the discussion to be a dialog, with input from both of you included in the final written document.
- ➢ Give the employee some options about how to prepare for the discussion. For example:
- ➢ Ask the employee to prepare a self-evaluation using the same form you will use for your draft. The employee can address accomplishments and things that could be done better.
- ➢ Explain that you will be doing the same and that you may exchange these documents a few hours before your meeting
- ➢ Give the employee a list of questions to consider to evaluate his own performance. Sample questions might be:
  - ➢ What have been your major accomplishments?
  - ➢ What could you have done better?
  - ➢ What could I do as your supervisor to help you do your job better?
  - ➢ Would you like to see your responsibilities change? If so, how?
  - ➢ Prepare a draft appraisal, making sure we have as much information as possible, including:
    - ➢ Job description
    - ➢ Performance standards
    - ➢ Previous appraisals
    - ➢ Letters of commendation and/or criticism
    - ➢ Samples of work
    - ➢ Records of disciplinary action

Misunderstanding and poor communication of expectations result in appraiser and appraisee having differing views of performance requirements, which inevitably leads to appraisals charged with disagreement, conflict and

exasperation. Start the appraisal process at the beginning of the year, take time to clearly communicate required outcomes and levels of performance and check that appraisees understand and agree. This forms a clear reference point for performance review – job descriptions, goals, objectives, key performance indicators, competencies can all be used to establish clear performance expectations.

Periodic reviews help supervisors gain a better understanding of each employee's abilities. The goal of the review process is to recognize achievement, to evaluate job progress, and then to design training for the further development of skills and strengths. A careful review will stimulate employee's interest and improve job performance.   The review provides the employee, the supervisor, the Vice President, and Human Resources a critical, formal feedback mechanism on an annual basis, however these discussions should not be restricted solely to a formal annual review.

Preparation is essential if appraisals are to go well. A successful appraisal is the culmination of a years worth of observation, reflection, evaluation and review.

- ➢ Keep notes throughout the year. No-one can hope to rely on their memory for everything, keep information that will be useful at appraisal noting examples and relevant feedback on the appraisee's performance. Being accurately informed helps to avoid conflict during appraisal meetings and builds credibility. Encourage individuals to keep similar notes to help them review their performance.
- ➢ Set a mutually convenient time for the meeting. Allow enough time for the meeting and don't cancel it
- ➢ Book a suitable room for the meeting. Think about privacy, removing distractions and the room layout. Remove barriers such as desks and aim for a calm, conversational environment

- ➢ Issue relevant documentation and allow enough time for completion. Use the issue of documentation to reiterate the purpose of the appraisal meeting
- ➢ Gather additional feedback, particularly if you have little direct contact with the individual
- ➢ Review all the evidence and feedback that you have – look for trends, do not just focus on one-offs
- ➢ Prepare a draft appraisal document and ask the appraisee to prepare a draft. This will encourage them to review their own performance
- ➢ Think ahead about potential development solutions and ways of stretching the individuals talent
- ➢ Prepare for their response. Anticipate how they may view our comments and think about how you will handle their reaction.

6.7   CONCLUSION

A performance appraisal is a review and discussion of an employee's performance of assigned duties and responsibilities. The appraisal is based on results obtained by the employee in his/her job, not on the employee's personality characteristics. The appraisal measures skills and accomplishments with reasonable accuracy and uniformity. It provides a way to help identify areas for performance enhancement and to help promote professional growth. It should not, however, be considered the supervisor's only communication tool. Open lines of communication throughout the year help to make effective working relationships. Each employee is entitled to a thoughtful and careful appraisal. The success of the process depends on the supervisor's willingness to complete a constructive and objective appraisal and on the employee's willingness to respond to constructive suggestions and to work with the supervisor to reach future goals.

LEARNING ACTIVITIES

(1)   What is your understanding of changes in terms of FM?

(2)   Discuss the role of FM in performance appraisal.

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CHAPTER 7
DESIGN CYCLE

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Discuss the design cycle in FM
(2)   Explain the concept of project management in FM.
(3)   Intergrate the relationship between facilities planning with FM.

7.1   INTRODUCTION

This chapter deals with project management and the facilities planning needed for any organizations. Therefore, the needs and feasibility assessment with regards to design as well as market research including:

- ➢ Economic impact study
- ➢ Financial planning—government appropriation; bond referendum; donor(s); fund raising; naming rights; fees; operational expenses
- ➢ Program planning— clientele; competitive; recreational; scheduled; unscheduled; multi-purpose or single sport
- ➢ Design and construction

7.2   PROJECT MANAGEMENT

Facilities managers are regularly tasked with the delivery of significant projects for their organisations. These may range from the commissioning of new works, relocating staff to new accommodation, implementing new working methods or introducing environmental / sustainability programmes. To be successful the FM

team needs to apply a structured approach appropriate to the scale of the task. This seminar sets out to demystify the project management process and equip the team with the basic tools to control and deliver projects in line with expectations.A manager can control 4 things:

- ➢ Resources (can get more dollars, facilities, personnel)
- ➢ Time (can increase schedule, delay milestones, etc.)
- ➢ Product (can reduce functionality - e.g. scrub requirements)
- ➢ Risk (can decide which risks are acceptable)

Apart from that, the approach (applies to any management)

- ➢ Understand the goals and objectives, quantify them where possible
- ➢ Understand the constraints, if there is uncertainty, use probability estimates
- ➢ Plan to meet the objectives within the constraints
- ➢ Monitor and adjust the plan
- ➢ Preserve a calm, productive, positive work environment

Although some may view Project management is difficult, however with carefully planning for example:

- ➢ First Plan the project

      Requires Work Breakdown Structure

      Requires cost and effort data

- ➢ Then identify risks

      Identify risk mitigation strategies

      Try for risk prevention

- ➢ Keep Measuring Progress

      Choose metrics that help track progress towards goals

      Choose metrics that give early warning about risks

All these can help the project manager in handling difficult task with regards to FM and other related project concerning construction industry. Moreover, Facilities Management provides project management services for construction and design projects. The FM Project Manager works with a project's Building Committee, which makes design decisions based on user requirements.

In this role, Project Manager provides the following services:
- ➢ Developing of the project budget and schedule
- ➢ Coordinating of the work, monitoring costs and reviewing construction work performed by the Contractor.
- ➢ Keeping the Building Committee informed of the project progress
- ➢ Hiring professional movers for occupancy
- ➢ Providing an overview presentation on the project and a tour of the facility.
- ➢ Assisting with warranty and post-occupancy construction issues.

7.3   FACILITIES PLANNING

Facilities planning determines how an activity's tangible fixed assets best support achieving the activity's objective. As shown in Figure 7.0, this includes activities such as facilities location, facilities design, facilities layout, or plant layout.
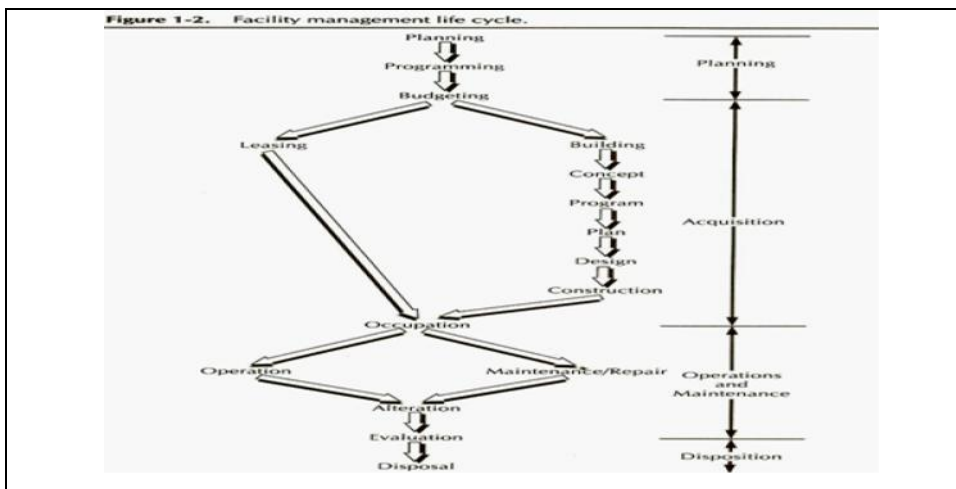

Figure 7.1: Facilities Planning

What is facilities location?

The location of the facility refers to its placement with respect to customer, suppliers, and other facilities with which it interfaces. Also, the location includes its placement and orientation on a specific plot of land.

What is facilities design?

The design components of a facility consist of the facility systems, the layout, and the handling system.

What are facility systems?

The facility systems consist of the structural systems, the atmospheric systems, the enclosure systems, the lighting/electrical/communication systems, the life safety systems, and the sanitation systems; the layout consists of all equipment, machinery, and furnishings within the building envelope; and the handling system consists of the mechanisms needed to satisfy the required facility interactions.

The facility systems for a manufacturing facility may include the envelope (structure and enclosure elements), power, light, gas, heat, ventilation, air conditioning, water, and sewage needs.

What is facility layout?

The layout consists of the production areas, production-related or support areas, and personnel areas within the building.

The handling system consists of the materials, personnel, information, and equipment handling systems required to support production.

7.3.1 The Importance of facilities planning

Facilities planning must be a continuing activity in any organization that plans to keep abreast of developments in its field. Economic considerations force a

constant reevaluation and recognition of existing systems, personnel, and equipment. New machines and processes render older models and methods obsolete.

> With the rapid changes in production techniques and equipment that have taken place in the recent past and those that are expected in the future, very few companies will be able to retain their old facilities or layouts without severely damaging their competitive position in the marketplace. Productivity improvements must be realized as quickly as they become available for implementation.

> Facilities planning can increase plant productivity and reduce costs by reducing or eliminating all activities that are unnecessary or wasteful. A facilities design should accomplish this goal in terms of material handling, personnel and equipment utilization, reduced inventories, and increased quality.

If an organization continually updates its production operations to be as efficient and effective as possible, then there must be continuous relayout and rearrangement activity in progress.

Only in very rare situations can a new process or piece of equipment be introduced into a system without disrupting ongoing activities.

A single change may have a significant impact on integrated technological, management, and personnel systems, resulting in suboptimization problems that can only be avoided or resolved through the redesign of the facility, therefore:

> By incorporating vital health and safety measures into the initial design phase, the employer may avoid fines for unsafe conditions and losses in both money and man- power resulting from industrial accidents.

- Energy conservation is another major motivation for the redesign of a facility. Energy has become an important and expensive raw material. Equipment, procedures, and materials for conserving energy are introduced to the industrial market- place as fast as they can be developed.

- Other factors that motivate investment in new facilities or the alteration of existing facilities are continually considerations, fire protection, security, and the American Disabilities Act (ADA) of 1989. Community rules and regulations regarding noise, air pollution, and liquid and solid waste disposal are frequently cited as reasons for the installation of new equipment that requires modification of facilities and systems operating policies.

- Pilferage is yet another major and growing problem in many industries today. Several billion dollars' worth of merchandise is stolen annually from manufacturing companies in the United States. The amount of control devoted to material handling, flow of materials, and design of the physical facility can help reduce losses to a firm.

7.4   Facilities Planning Process

Although a facility is planned only once, it is frequently replanned to synchronize the facility and its constantly changing objectives.
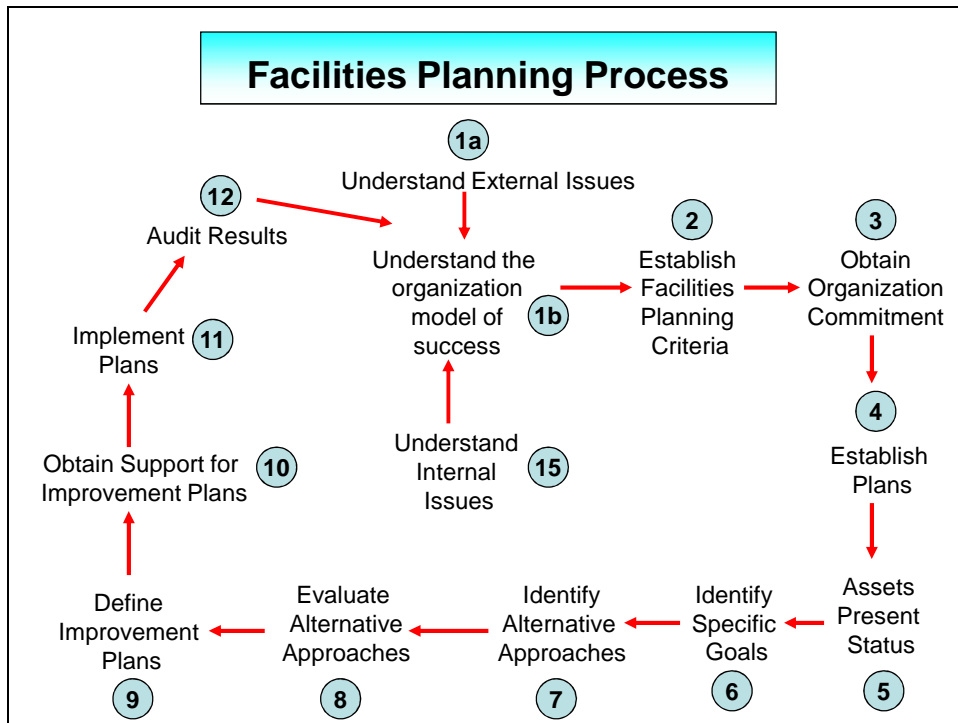
Figure 7.2: Facilities Planning Process

Below is the explanation based on Figure 7.2:

1. Define (or redefine) the objective of the facility. Whether planning a new facility or planning the improvement of an existing facility, it is essential that the product(s) to be produced and/or service(s) to be provided be specified quantitatively. Volumes or levels of activity are to be identified when possible. Discussion Question: Why is it important to define the objectives of the facility? What are some typical facility objectives?

2. Specify the primary and support activities to be performed in accomplishing the objective. The primary and support activities to be performed and requirements to be met should be specified in terms of the operations, equipment, personnel, and material flows involved. Support activities allow primary activities to function with minimal interruption and delay. As an example, the maintenance function is a support activity for manufacturing.

3. Determine the interrelationships among all activities. Establish if and how activities interact or support one another within the boundaries of the facility and how this is to be undertaken. Both quantitative and qualitative relationships should be defined. Discussion Question: What interrelationships are we talking about? Why are they important?

4. Determine the space requirements for all activities. All equipment, material, and personnel requirements must be considered when calculating space requirements for each activity.

5. Generate alternative facilities plans. The alternative facilities plans will include both alternative facilities locations and alternative designs for the facility. The facilities design alternatives will include alternative layout designs, structural designs, and material handling system designs. Depending on the particular situation, the facility location decision and the facility design decision can be decoupled. Discussion Question: Why is it important to develop several alternatives?

6. Evaluate alternative facilities plans. On the basis of accepted criteria, rank the plans specified. For each, determine the subjective factors involved and evaluate if and how these factors will affect the facility or its operation.

7. Select a facilities plan. The problem is to determine which plan, if any, will be the most acceptable in satisfying the goals and objectives of the organization. Most often cost is not the only major consideration when evaluating a facilities plan. The information generated in step 6 should be utilized to arrive at final selection of a plan.

8. Implement the facilities plan. Once the plan has been selected, a considerable amount of planning must precede the actual construction of a facility or the layout of an area. Supervising installation of a layout, getting ready to start up, actually

starting up, running, and debugging are all part of the implementation phase of facilities planning.

9. Maintain and adapt the facilities plan. As new requirements are placed on the facility, the overall facilities plan must be modified accordingly. it should reflect any energy-saving measures or improved material handling equipment that become available. Changes in product design or mix may require changes in handling equipment or flow patterns that, in turn, require an updated facilities plan.

10. Redefine the objective of the facility. As indicated previously in Step 1, it is necessary to identify the products to be produced or services to be provided in specific quantifiable terms. In the case of potential modifications, expansions, and so on for existing facilities, all recognized changes must be considered and integrated into the layout plan.

7.4   CONCLUSION

From planning medical to research facilities where life can depend upon the quality of the environment, it must be correct and in the right place. The right service in the wrong place or vise versa diminishes the entire facility. The understanding of architecture and engineering should be combined with experience in planning medical research facilities, computer areas, broadcast facilities and specialized test facilities. From this, the developed in-depth knowledge and an attention to detail is important. Therefore, all services must be of the correct type, quantity and in the correct location.

LEARNING ACTIVITIES

(1)   Objectives of Facilities Planning?

(2)   What are some typical facilities design objectives?

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CHAPTER 8
OPERATION AND MAINTENANCE (O&M)

LEARNING OUTCOME

At the end of this chapter, students will be able to:-

(1)   Discuss the operation and maintenance works with regards to FM.
(2)   Explain the maintenance works.
(3)   Elaborate the maintenance and operation and its importance for a building.

8.1   INTRODUCTION

This chapter covers the topic of Operation and Maintenance (O&M) in views of FM. Facilities Management provides a wide range of services, from project and construction management assistance to operating and maintaining campus facilities. Facilities operations and maintenance encompasses all that broad spectrum of services required to assure the built environment will perform the functions for which a facility was designed and constructed. Operations and maintenance typically includes the day-to-day activities necessary for the building and its systems and equipment to perform their intended function. Operations and maintenance are combined into the common term O&M because a facility cannot operate at peak efficiency without being maintained; therefore the two are discussed as one.
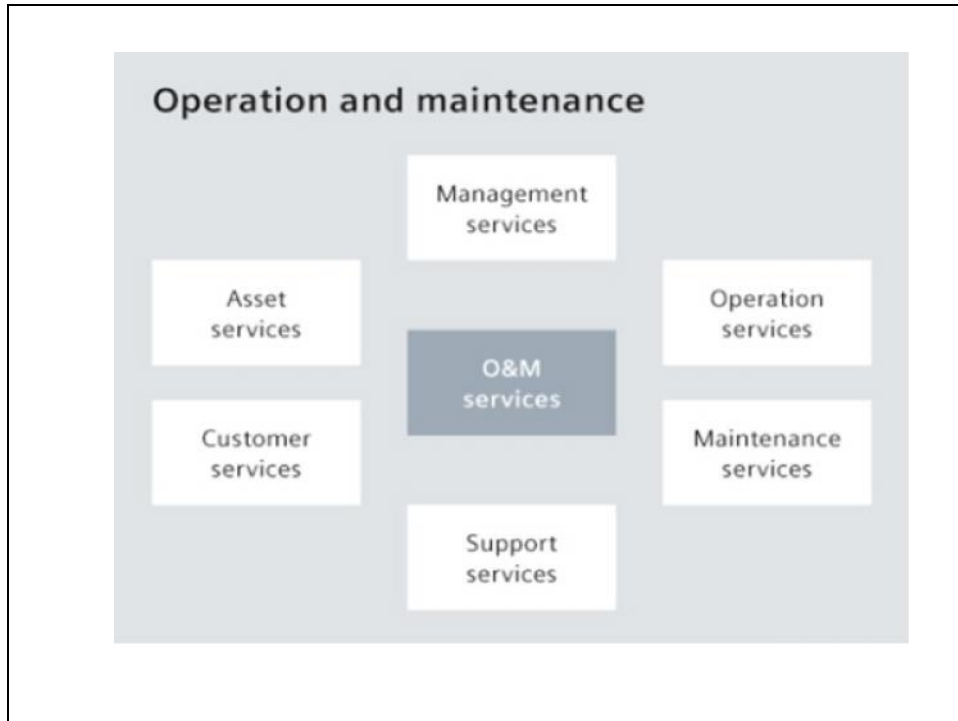
8.2   WORK COORDINATION

Figure 8.1: Operation & Maintenance (O&M) sections

In Figure 8.1, it shows the section or division in O&M and therefore the work coordination offers guidance in the following areas:

> Real Property Inventory (RPI)—Provides an overview on the type of system needed to maintain an inventory of an organization's assets and manage those assets.

> Computerized Maintenance Management Systems (CMMS)—Contains descriptions of procedures and practices used to track the maintenance of an organization's assets and associated costs.

> Computer Aided Facilities Management—is an approach in Facilities Management that includes creation and utilization of Information Technology (IT)-based systems in FM practice.

➢ O&M Manuals—it is now widely recognized that O&M represents the greatest expense in owning and operating a facility over its life cycle. The accuracy, relevancy, and timeliness of well-developed, user-friendly O&M manuals cannot be overstated. Hence, it is becoming more common for detailed, facility-specific O&M manuals to be required as a part of the total commissioning process.

➢ Janitorial/Cleaning—As the building is opened the keys are turned over to the janitorial, custodial or housekeeping staff for interior "cleaning" and maintenance. Using environmentally friendly cleaning products and incorporating safer methods to clean buildings provides for better property asset management and a healthier workplace. Grounds maintenance and proper cleaning of exterior surfaces are also important to an effective overall facility maintenance and cleaning program.

➢ Historic Buildings Operations and Maintenance—this is a unique and complex issue: balancing keeping old equipment running while contemplating the impact of installing new more efficient equipment. Further, cleaning of delicate surfaces and artwork require the use of products that are less likely to damage these surfaces, while providing a healthy environment for the building's occupants. Maintaining strict temperature and humidity control to protect artwork and antiquities is an additional challenge for the O&M staff. Extensive research has been done by the Smithsonian Institution regarding the effect of temperature and humidity on artifacts and can be found in the following links:
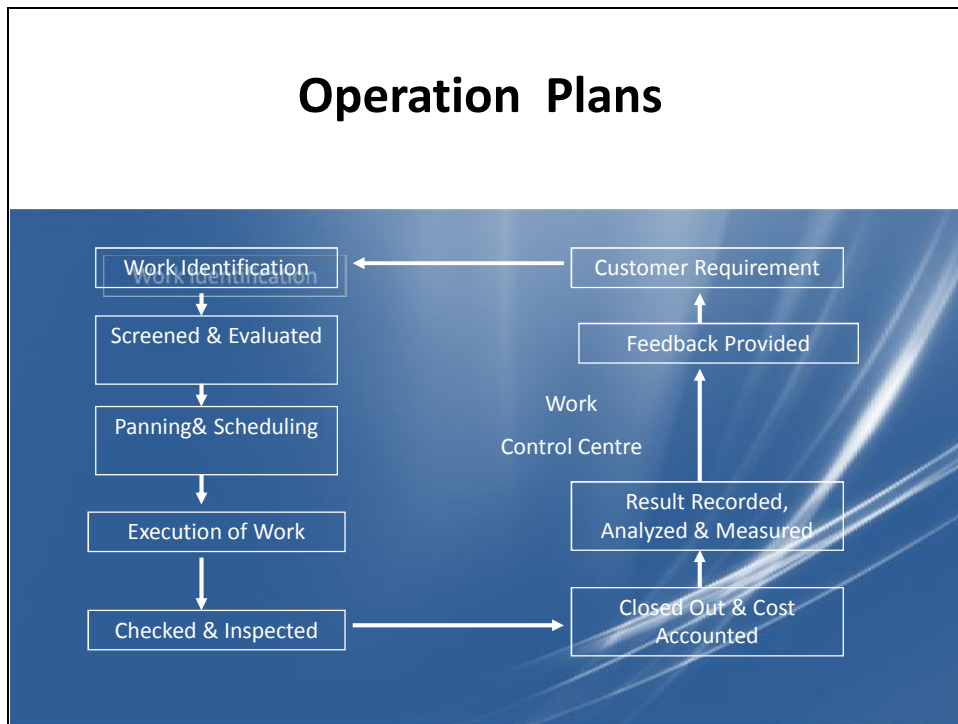
8.3   FACILITIES OPERATION

Figure 8.2: Operation Plans

In Figure 8.2, operations is defined as services necessary to keep equipment and systems operating as designed or at a level that meets the operational goals of the facility management team. Facilities play a major role in many different industries, such as Sports, Entertainment, Manufacturing, and Healthcare. Each industry has a different mission, and with different missions come different problems. For example, a manufacturing facility will not have the same problems as a sporting facility, so they will manage with departments like Maintenance, Engineering, Process Innovation, Production, etc.

The following topics should be addressed in a Facilities Operations Plan:

1. Tenant occupancy and operations schedule

2. Building and System level equipment performance

3. Computer managed maintenance system (CMMS)

4. Life Safety / Fire Control

Moreover, the facilities operation should be classified as below; these classifications should be in accordance with the organization business agenda or its type of services:

- ➢ Manufacturers produce products, from raw materials or component parts, which they then sell at a profit. Companies that make physical goods, such as cars or pipes, are considered manufacturers.

- ➢ Service businesses offer intangible goods or services and typically generate a profit by charging for labor or other services provided to government, other businesses or consumers. Organizations ranging from house decorators to consulting firms to restaurants and even to entertainers are types of service businesses.

- ➢ Retailers and Distributors act as middle-men in getting goods produced by manufacturers to the intended consumer, generating a profit as a result of providing sales or distribution services. Most consumer-oriented stores and catalogue companies are distributors or retailers.

- ➢ Agriculture and mining businesses are concerned with the production of raw material, such as plants or minerals.

- ➢ Financial businesses include banks and other companies that generate profit through investment and management of capital.

- ➢ Information businesses generate profits primarily from the resale of intellectual property and include movie studios, publishers and packaged software companies.

- ➢ Utilities produce public services, such as heat, electricity, or sewage treatment, and are usually government chartered.

- ➢ Real estate businesses generate profit from the selling, renting, and development of properties, homes, and buildings.

- ➢ Transportation businesses deliver goods and individuals from location to location, generating a profit on the transportation costs

The operational phase of a commercial building is significantly longer than the design and construction phase of a project. The lifecycle cost of the operational

life of a building is about 60 to 85 percent of the total lifecycle cost, where as the design and construction is about five to ten percent. Therefore, the classification for facilities operation must be appropriate and suitable for any organization. This is to ensure the suitability of facilities operation with the facilities provided. For example, for agricultural section, the facilities might include the building equipped with certain type of machinery or the building is design to facilitate the needs of farmers, as for transportation businesses, the facilities might include the building equipped with modern technology in storing or facilitate the needs of customer for easy interaction.

8.4   MAINTENANCE AND REPAIR

The maintenance and repair play important role in building life. In Figure 8.3, it shows how the workflow from complaint to maintenance and repair works.
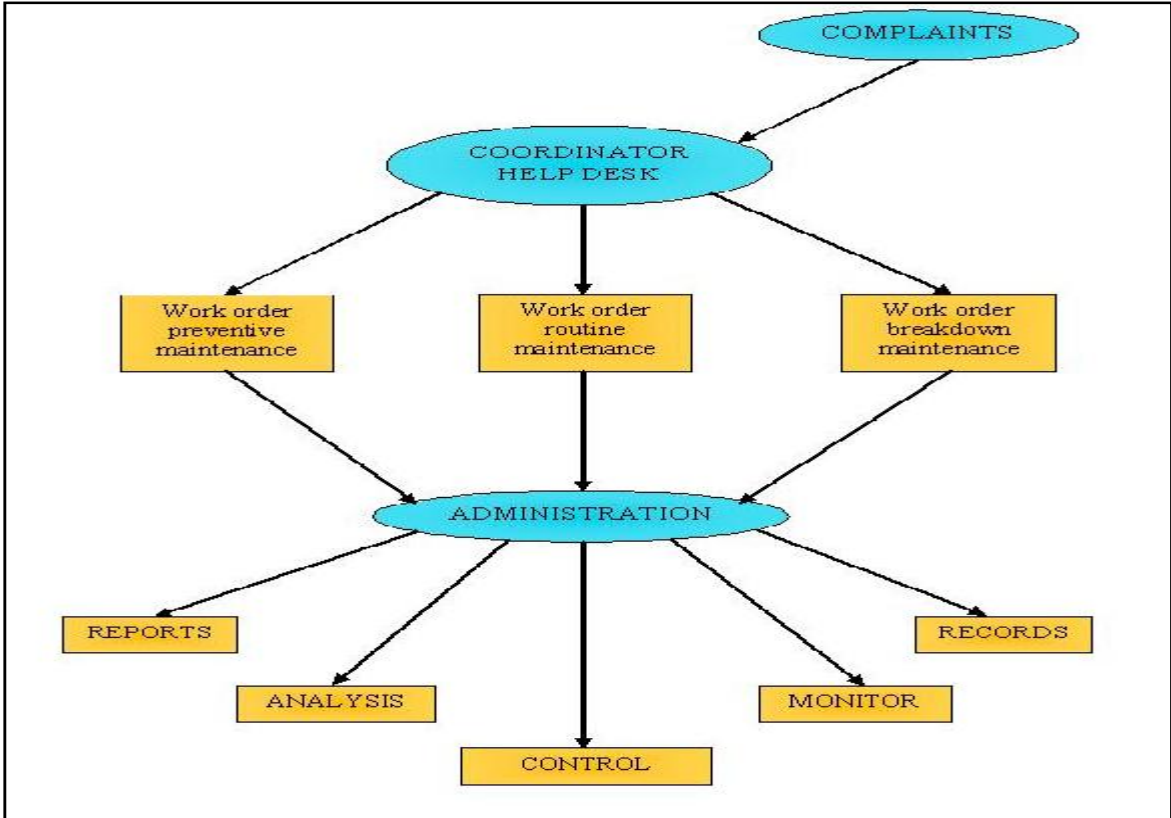

Figure 8.3: Maintenance progress

Building operational & maintenance

OTHER SERVICES
Building Maintenance also provides custodial services, emergency response, and assists with City sponsored special

Figure 8.4: Building Operational & Maintenance

Figure 8.5: Building Operational & Maintenance

Maintenance services are defined as services that help restore equipment or systems to design conditions or to conditions that have been determined to be sufficient for the given project scope. As in Figure 8.4 and 8.5, the building systems and equipment focused on within this chapter are heating, ventilating

and air-conditioning (HVAC) systems, building automation systems (BAS), lighting, renewable energy technologies and software that support these systems, such as computerized maintenance management systems (CMMS), computer aided facility management systems (CAFM) and energy analytics software. To operate a high performance building requires proactive management processes for energy and maintenance. The scope of O&M includes the activities required to keep the entire built environment as contained in the organization's Real Property Inventory of facilities and their supporting infrastructure, including utility systems, parking lots, roads, drainage structures and grounds in a condition to be used to meet their intended function during their life cycle.

Figure 8.6: Maintenance Routine

In Figure 8.6, the activities include preventive and predictive (planned) maintenance and corrective (repair) maintenance. Preventive Maintenance (PM) consists of a series of time-based maintenance requirements that provide a basis for planning, scheduling, and executing scheduled (planned versus corrective) maintenance. PM includes adjusting, lubricating, cleaning, and replacing

components. Time intensive PM, such as bearing/seal replacement, would typically be scheduled for regular (plant or "line") shutdown periods. Corrective maintenance is a repair necessary to return the equipment to properly functioning condition or service and may be both planned or un-planned. Some equipment, at the end of its service life, may warrant overhaul. The definition of overhaul is the restoration of an item to a completely serviceable condition as prescribed by maintenance serviceability standards. In conclusion, maintenance includes:

➢ Preventive and predictive maintenance
➢ Routine maintenance and minor repairs
➢ Major repairs
➢ Emergency repairs
➢ Alterations and improvements
➢ Housekeeping

Requirements will vary from a single facility, to a campus, to groups of campuses. As the number variety and complexity of facilities increase, the organization performing the O&M should adapt in size and complexity to ensure that mission performance is sustained. In all cases O&M requires a knowledgeable, skilled, and well trained management and technical staff and a well planned maintenance program. The philosophy behind the development of a maintenance program is often predicated on the O&M organization's capabilities.

The goals of a comprehensive maintenance program include the following:

➢ Maintain a proper level of material and spare parts to support timely repairs.
➢ Accurately track the costs of all maintenance work.
➢ Schedule all planned work in advance, and allocate and anticipate staff requirements to meet planed and unplanned events.
➢ Monitor the progress of all maintenance work
➢ Maintain complete historical data concerning the facility in general and equipment and components in particular

Sustainability is an important aspect of the O&M process. A well run O&M program should conserve energy and water and be resource efficient, while meeting the comfort, health, and safety requirements of the building occupants. A critical component of an overall facilities O&M program is its proper management.

Organizations that require a higher level of O&M information beyond the typical vendor equipment documents should ensure sufficient funds are set aside and appropriate scope/content requirements are written and specified during the planning stage. It is mportant to analyze and evaluate a facility from the system level, then develop procedures to attain the most efficient systems integration. System-level manuals include as-built information, based on the maintenance program philosophy. O&M procedures at the system level do not replace manufacturers' documentation for specific pieces of equipment, but rather supplement those publications and guide in their use. For example, system-level troubleshooting will fault-analyze to the component level, such as a pump, valve or motor, then reference specific manufacturer requirements to remove, repair, or replace the component. Documentation should typically meet or exceed client or commercial standards.

8.5   O&M ACTIVITIES

O&M activities start with the planning and design of a facility and continue through its life cycle. During the planning and design phases, O&M personnel should be involved and should identify maintenance requirements for inclusion in the design, such as equipment access, built-in condition monitoring, sensor connections, and other O&M requirements that will aid them when the built facility is turned over to the owner/user organization. The O&M team should be represented on the project development team so they know ahead of time the types of controls, equipment and systems they will have to maintain once the facility is turned over to them. For larger complexes, O&M staff should consider

system-wide integration and compatibility of proposed products with existing systems, including tools, equipment and cleaning supplies.

Near the end of the construction phase and prior to turnover of the facility, vendor/manufacturer O&M manuals are organized and provided to the owner/operator. Typically, personnel are trained in specified areas to support operations. Assurance that the manuals and training are provided is a part of the Building Commissioning process. In addition, typically part of the construction contract, warranties/activation dates and spare parts information should be organized and tracked.
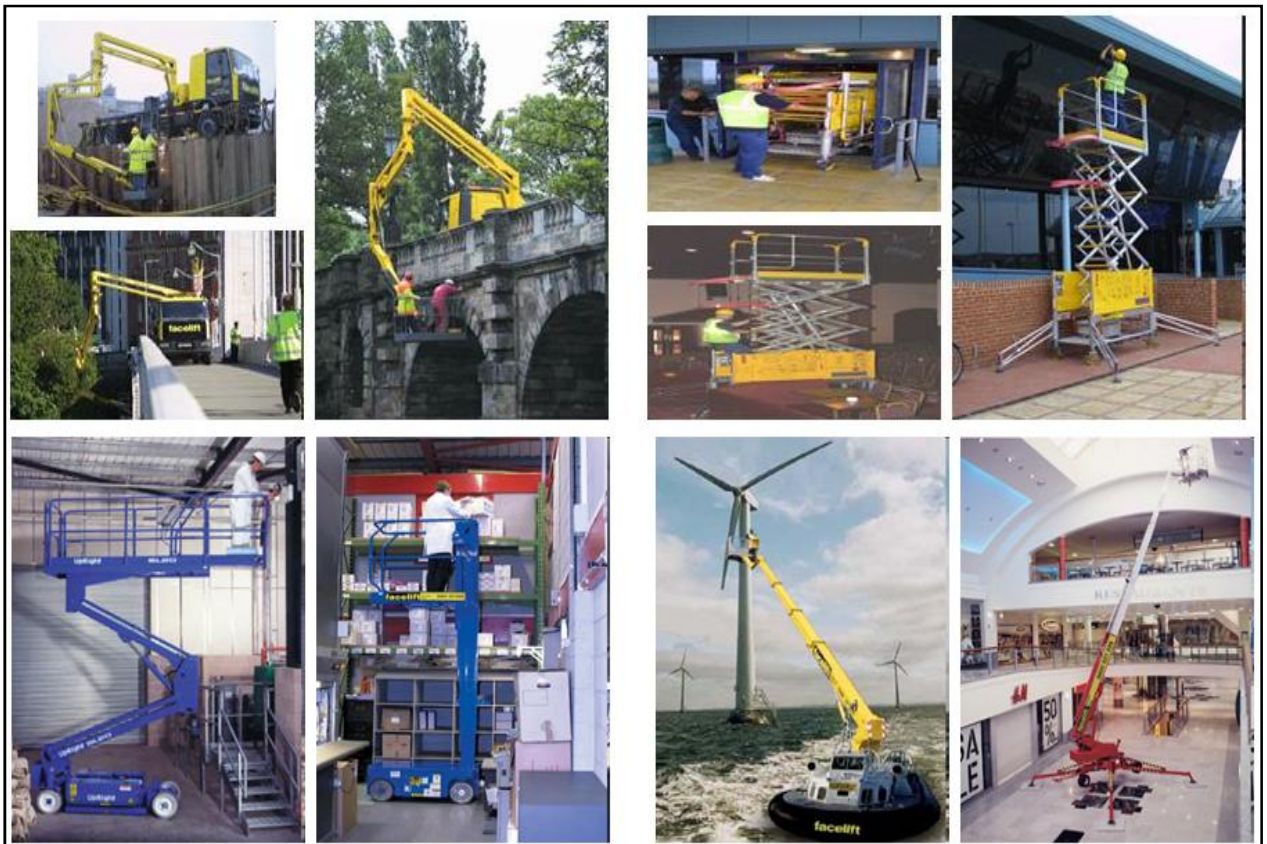

Figure 8.7: Various types of Maintenance and Repair

The O&M organization is typically responsible for operating and for maintaining the built environment as shown in Figure 8.7. To accomplish this, the O&M organization must operate the systems and equipment responsibly and maintain

them properly. The utility systems may be simple supply lines/systems or may be complete production and supply systems. The maintenance work may include preventive/predictive/ (planned) and maintenance, corrective (repair) maintenance, trouble calls, (e.g., a room is too cold), replacement of obsolete items, predictive testing & inspection, overhaul, and grounds care.

According to the International Facilities Management Association (IFMA), the operating life cycle costs of a facility typically are comprised of 2% for design and construction, 6% for O&M and 92% for occupants' salaries. O&M of the elements included in buildings, structures and supporting facilities is complex and requires a knowledgeable, well-organized management team and a skilled, well-trained work force whether the functions are performed in-house or contracted. The objective of the O&M organization should be to operate, maintain, and improve the facilities to provide reliable, safe, healthful, energy efficient, and effective performance of the facilities to meet their designated purpose throughout their life cycle. To accomplish these objectives, O&M management must manage, direct, and evaluate day-to-day O&M activities and budget funds to support the organization's requirements.

O&M organizations may utilize Computerized Maintenance Management Systems (CMMS) to manage their day-to-day operations and to track the status of maintenance work and monitor the associated costs of that work. These systems are vital tools to not only manage the day-to-day activities, but also to provide valuable information for preparing facilities key performance indicators (KPIs)/metrics to use in evaluating the effectiveness of the current operations and to support organizational and personnel decisions. These systems are starting to be integrated more and more with Geographic Information Systems (GIS), Building Information Modeling (BIM) technologies and COBie to increase/improve a facility's operational functionality.

Operation and Maintenance (O&M) organizations must address the skill level of their staff in light of the O&M systems and components within their facilities. This extends beyond the in-house staff to any contracted services as well. If the skills required to support installed systems and equipment are scarce, either training must be provided or less sophisticated equipment systems utilized to provide an economical working arrangement.

With the natural industry progression of incorporating technology advances into renovations, major capital repairs and new building construction, high-tech building systems are being placed into service that current O&M staff are not familiar enough with to properly correct problems when they arise, or to keep operating efficiently. An example of this is building automation systems (BAS). Often untrained personnel will override programmed settings with manual settings that address specific hot/cold call issues, but over time these cumulative over-rides result in un-balanced system-wide operations.

Regardless of their equipment sophistication levels, every organization should develop training programs and track staff qualifications to ensure they are adequate for existing and planned building systems. This will allow organizations to make improvements to training as needed on an ongoing basis. A recurring training program should consider both the type of skills required and the available labor pool skills in the geographic area. Topic areas to consider are:
- ➢ Safety/OSHA regulations and guidelines
- ➢ Equipment operational start-up and shutdown procedures
- ➢ Normal operating parameters
- ➢ Emergency procedures
- ➢ Equipment preventative maintenance (PM) plans

The use of proper tools and materials, to include personal protective equipment (PPE)

Training programs should be reviewed at least annually and whenever changes are planned for equipment or new facilities. In addition to regular assessments of the O&M staff's technical abilities concerning existing equipment, the staff should always be included throughout new project development efforts by design teams. The O&M staff can provide valuable inputs to match the workforce's abilities and training plans with any new equipment. The O&M staff is usually one of the best sources for input on how an existing facility is performing, and they can provide insight into how new equipment will be incorporated into facility maintenance programs. The staff may not always understand the underlying cause of a building problem symptom, but they can identify areas that receive repeated attention in efforts to correct a long-standing condition. O&M staff inputs can guide designers to address these areas in renovation and equipment upgrade projects. A simpler equipment solution should be pursued if the needs of specific equipment cannot be addressed long-term with available labor resources due to technological levels.

Qualified personnel are needed to operate and maintain facilities at peak efficiencies, and to protect significant investments in equipment and systems. Besides posing a potential physical hazard to themselves and others, untrained employees can unknowingly damage equipment and cause unnecessary downtime. Inefficient and improper O&M can also void warranties and reduce expected useful life (EUL) of equipment.

Certifications and proper training of O&M service providers protects the organization, employees and visitors. Training sources include manufacturers, professional organizations, trade associations, universities and technical schools, commercial education/training courses, and in-house training and on the job training (OJT) options. Training programs should provide a mix of these sources to the workforce to ensure materials addressed are up to date and applicable to the organization's facilities.

Most O&M organizations typically also perform work that is beyond the definition of O&M, but is so often required and performed by them, that the work often becomes a part of their baseline. This work is facilities-related work that is new in nature, and as such, should not be funded with O&M funds but funded by the requesting organization. E.g., from installing an outlet to support a new copier machine, providing a compressed air outlet to a new test bench, day porter services for special event set-ups and moves, or other minor facilities work of like nature to a complete room rehab and/or new, small construction projects.

8.6   EMERGING ISSUES

It is the role of the facility management function (whether it is a separate department or small team) to coordinate and oversee the safe, secure, and environmentally-sound operations and maintenance of these assets in a cost effective manner aimed at long-term preservation of the asset value, and also other janitorial duties such as making sure the environment is properly cleaned and sanitised for its tenants. In those cases where the operation of the facility directly involves the occupants and/or customers of the owner organization, the satisfactory delivery of facility-related services to these people will be an important consideration too; hence, the term "end-user satisfaction" is often used both as a goal and a measure of performance.

> ➢ Historic Buildings Operations and Maintenance. This is a unique and complex issue: balancing keeping old equipment running while contemplating the impact of installing new more efficient equipment. Further, cleaning of delicate surfaces and artwork require the use of products that are less likely to damage these surfaces, while providing a healthy environment for the building's occupants. Maintaining strict temperature and humidity control to protect artwork and antiquities is an additional challenge for the O&M staff.

➤ Deferred Maintenance. The method of determining the value of an organization's deferred maintenance has been in discussion over the past decade. In 1995 the Federal Accounting Standards Advisory Board (FASAB) established Accounting Standard Number 6 which defined and established the requirements for reporting of deferred maintenance. All these efforts will have an impact as to how a federal agency will account for and track maintenance and repair costs and the backlog of deferred maintenance.

➤ Sustainability. Recent directives have established goals for reduction of energy and water usage and to improve the sustainability of both new buildings as well as existing buildings This will impact how facilities are operating and how they are maintained. The Federal High Performance and Sustainable Buildings section provide key information needed by Federal personnel to meet high performance and sustainable building requirements.

➤ Teardowns. Demolishing older or historic buildings and replacing them with new structures that may not be as durable, sustainable or secure is a problem found in many communities in both the government and private sector. Currently there is no single tool available to solve the Teardown problem but rather a combination of strategies works best. Recognizing that most architects, engineers, and facility maintenance personnel don't know where to start or go for best practices.

8.7 CONCLUSION

Facilities management is the process by which and organization delivers and sustains services in a quality environment to meet strategic needs. Facility management involves evaluating the quality of the building is measured continuously (Alexander, 1993). Evidently, facilities management is a very broad field and covers a variety of things. It requires an effective management system in order to become more organized and work systematically. One of the aspects of facility management that should be considered is maintenance. In the construction, maintenance is not being focus entirely, while it is important to maintain a level of quality that can fulfill its functions.

Building maintenance required once the completed building (Seeley, 1976). This is because any potential damage or facilities are not functioning properly can occur. Thus, a form of maintenance management system should be implemented efficiently in order to maintain and preserve buildings that have been built.

LEARNING ACTIVITIES

(1)   What is facilities operation and it relevance to FM?

(2)   Make comparison between hospital and school in terms of maintenance and repair activities.

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