Construction Maeconomics Conference 2020

Facility Management

Ing. Matej Pastierik\*1

1Fakulta stavební, Thákurova 7/2077, Praha 6, 166 29, Česká republika, matej.pastierik@fsv.cvut.cz, (+421 944 169 753)

Abstract

The paper focuses on a basic and brief explanation of the facility management profession, competencies and its structure. At the same time, it focuses on pointing out rising energy prices, energy consumption and looking for opportunities to save energy consumption. The implementation of energy management into the company´s process can have a positive effect on the life cycle of the building and the environmental impact. Facility management is an essential component of the company´s structure, it has information of the condition of the building and seeks effective measure to improve operations. It provides information about the condition of the building t other departments and is a necessary basis for, for example, a significant renovation of the building.

Keywords

Facility Management; Energy Management; Structure; Certification.

Introduction

The topic of my dissertation is *Evaluation of the need to restore typical hall buildings.* In my work I defined that it is and object of a retail chain. Based on this determination, we will be able to understand the process of facility management (hereinafter FM) and we will have an overview of the individual contexts. For a correct evaluation of the renovation of the building, FM is an essential part of the entire life cycle of the building and with the information that FM has about the building, the evaluation is faster and more qualitative.

Facility Management

There are many definitions that mean something different by the abstract term of the FM. *“The latest definition of FM tells us that it is a profession that includes several disciplines to ensure the functionality of the embedded environment by integrating people, processes and technologies”* (Roper, Payant, 2014, p. 4).

For the purpose of my work, I can consider the following definition: *“Facility Management is a strategic concept of economy, management and organization of all material resources within the company”* (Technical Management of Buildings – Facility Management, 2018, p. 7).

Because the building and embedded environment is a complex system, and in terms of caring for their function, FM must include knowledge of architecture, construction, accounting and management (Sari, 2018).

*“European legislation makes a significant contribution to creating a single market and increasing the free movement of services within the European Union. Its basic principle is the harmonization of basic service requirements and subsequent standardization – the creation of uniform European standards. This also applies to the area of facility management, which is one of the most important services with a significant contribution to the performance of companies in the European market”* (Somorová, 2008).

In the standard, FM is defined as *“the integration of processes within the organization of the provision and development of agreed services that support and increase the effectiveness of the basic activities of the organization”* (Somorová, 2008).

In the Slovak Republic before 2009, there was a Facility Management Company IFMA SK, which disbanded after two years. In 2009, the organization SAFM was established, where the goal is to bring FM as such to the attention of the professional public. The SAFM Association holds natural and legal persons and is based on the principles of equality, voluntariness and equal partnership of members (SAFM, 2020).

When implementing FM in a company´s process, it is appropriate for the company to set goals that it will expect from FM. In my case, I agree most with the goals of the German retail chain. Below we have listed the basic goals of the department store.

**Maximum satisfaction**

In terms of FM, the user is the operation. FM provides support and strengthens the operations team.

**Attractive market**

The value and appearance of the property are permanently through maintenance and improvement measures.

**Increasing yield**

All goals are achieved at minimal cost. If one goal is partially at odds with others, balanced compromise solutions must be found.

**Sustainability**

The measures are examined, evaluated and optimized with regard to their social and environmental sustainability.

**Ensuring the responsibility of the operator**

The safety of customers and employees is continuously ensured (Technical Management of Buildings – Facility Management, 2018).

FM is basically based on three pillars: integrity, life cycle and transparency (figure 1). All information on the material resource (transparency) should be available for processing to all required departments (integrity) throughout its life cycle. By material source we mean an abstract concept that can have many meanings (e.g. refrigeration rack, ventilation equipment, but it cannot be any personnel) (Technical Management of Buildings – Facility Management, 2018).



Figure 1 – 3 pillars of FM (Technical Management of Buildings – Facility Management, 2018)

By integrity we can understand that the FM department does not exist in isolation but consists of the work of many departments that have different perspectives and interests in a material resource. In addition, FM includes technical and business aspects. All departments involved could ideally use a system in which information is displayed and maintained from the perspective of the department concerned.

Life cycle, FM monitors the material resource from planning through its use to its utilization.

Transparency is one of the most important parts of FM, without a comprehensive FM concept, information about material resources will be lost over time. After several reconstructions, if you like restorations, the data on buildings should be partially re-uploaded to the system. This information is passed on to several departments, which then process it (Technical Management of Buildings – Facility Management, 2018).

FM competencies

FM competence is defined as the ability to have the knowledge, skills and attitudes to meet work expectations. Based on the International Facility Management Association (IFMA), there are 11 core competencies (Ngoh, [b.r.]):

* *communication* – communication plans and processes for internal and external stakeholders;
* *emergency preparedness and business continuity* – management plans and procedures and emergency management;
* *environmental management and sustainability* – sustainable management of the built and natural environment;
* *finance and business* – strategic plans, budgets, financial analyzes, procurement;
* *human factors* – healthy and safe environment, safety, employee development;
* *leadership and strategy* – strategic planning, organization of employees and organization of managers;
* *operations and maintenance* – operation and maintenance of buildings, services for users;
* *project management* – management forecast of all projects and related contracts;
* *quality* – best practice, process improvements, audits and measurements;
* *real estate management –* real estate planning, acquisition and disposition of real estate;
* *technology –* building management technology, workplace management systems (Ramesh Satyam, 2013).

FM structure

Furthermore, we can show the organization of FM on a model example, which can be implemented in my issues of the retail chain.

The FM team is divided into a *central* and *decentralized team*. The decentralized team includes technical management and maintenance staff for buildings and, for example, energy and refrigeration managers. The central FM team consists of employees of the technical office.

*The technical facility manager* falls under a decentralized team, taking care of the attractiveness, optimal functionality and security of the objects assigned to him. The measures must be planned foresight and the cost plans accurately and very well knows the allocated objects. Other tasks of the TF manager include: responsibility for repair, maintenance and inspection of existing properties and technical equipment in accordance with operational requirements and regulations, monitors and maintains the correction of errors and deficiencies, implements projects related to reconstruction or more precisely restoration, plans and participates in inspections of buildings and load-bearing structures carried out by experts.

*Technical service* is the interface between the operation and external service providers. Its records shortcomings from expert reports and expert opinions and derives the necessary measures to remedy shortcomings. Other tasks include organizing, inspecting and managing operational and statutory maintenance cycles, inspecting the warranty in the event of maintenance/inspection deficiencies and, for example, maintaining the up-to-dateness of technical master data for equipment and machines.

*The technical office* is responsible for making minor repairs quickly. Employees of the technical office check, organize and manage repairs, coordinate together with commercial FM repair processing and mediate workers and process orders (Technical Management of Buildings – Facility Management, 2018).

Energy Management

The management and maintenance of the building includes several activities and services, which often exceed the basic competencies of the company. These include, for example, services from procurement and property management to internal postal services, cleaning services, product and logistics services. FM helps to organize and optimize these activities and focuses on increasing the operational efficiency of equipment, so FM includes energy management (EM). The growing cost of energy has inevitably become aware of the energy consumption of the building. Energy knowledge helps to identify and evaluate the potential for energy savings (Austrian Energy Agency, [b.r.]).

EM is the key to saving energy in any organization. The great importance of energy savings stems from the global need to save energy, this global need affects energy prices, emission targets but also the legislation that leads to the introduction of EM into society. EM is a means of controlling energy, operating energy and reducing energy consumption (Energy Lens, [b.r.]).

Before listening the main steps of energy consumption management, we will clarify the main reasons for the introduction of EM in the organization or more precisely to companies, but also to my model of retail chains, because this is where energy can best be controlled and “saved” and as an example we can cite the use of waste heat that is generated from refrigerated furniture.

Main reasons:

* *cost reduction* – an increasingly important factor, as a result of rising energy costs;
* *reducing the carbon footprint* – the carbon footprint by which we damage the environment and the associated “carbon” taxes mean that by saving austerity measures, we save costs and society can be promoted as environmentally friendly and sustainable;
* *reducing risk* – the more energy a company consumes, the greater the risk that an increase in energy prices or a lack of energy supply could seriously affect a company´s profitability.

Main steps to the EM process:

* *measuring energy consumption and collecting data* – a simple rule applies here, the more data is collected, the more complex the outputs will be. There are many ways to collect energy data, one of which can be automatic measurements that record consumption at short intervals (e.g. 15-minute intervals);
* *searching for and quantifying energy saving options –* data collected on the basis of measuring energy consumption are the basis for quantifying and searching for energy saving (Energy Lens, [b.r.]).

Figure 2 shows a model situation as this data collection and retrieval may look like in practice.



Figure 2 – example of a model situation of energy consumption collection and search for measures (Energy Lens, [b.r.])

* *focus on energy saving options –* finding a problem where energy is wasted is only the first step. We need to find opportunities to save energy and focus on savings, look for effective solutions (insulation, equipment upgrades) that will help us with energy consumption;
* *monitoring the progress of energy saving –* after the implementation of energy saving measures, it is important to find out how effective the individual steps were, e.g. control a measurement of energy consumption on equipment (Energy Lens, [b.r.]).

After the mentioned information, we have an overview of how significantly EM can help us in the operation of buildings and energy savings. By implementing EM into FM, we can return to the chapter FM structure and add a significant component of the structure, namely the energy manager.

The basic tasks of the *energy manager* include regular monitoring of operations through energy management, derives specific measures from the evaluation of branches, deals with implemented measures and evaluates them regarding their achievement (Technical Management of Buildings – Facility Management, 2018).

ISO 50001: 2018 Energy management system

The new revised international energy management standard ISO 50001: 2018 can help companies implement EM in their process. Efficient use of energy helps organizations save money, help save resources and address climate change. ISO 50001 encourages organizations in all sectors to use energy more efficiently through the development of an energy management system. The system is based on the continuous improvement management system model, which is also used for other standards such as ISO 90001 or ISO 14001. This makes it easier for the organization to integrate energy management into its efforts to improve quality and environmental management.

Like other management system standards, ISO 50001 certification is possible but not mandatory. Some organization choose to integrate the standard exclusively for the benefits it provides, others choose to certify to show external parties that they implemented an energy management system (ISO 50001 Energy Management, [b.r.]).

Environmental assessment of buildings and certification

“Sustainability assessment of buildings is a systematic assessment of buildings in terms of environmental, social and economic aspects and indicators in order to eliminate negative impacts and impacts on the environment and ensure a quality environment for buildings is a tool for controlling and creating sustainable buildings” (Bielek, 2014, p. 464).

FM play an important role in sustainability , they need to answer question about the environmental performance of existing buildings, new buildings, but also buildings that are planned to be restored, and at the same time introduce measures to help reduce the building´s environmental impact.

FM is a current activity aimed at optimizing the use of available resources and increasing the performance of buildings and their systems, thus contributing to the development of a productive environment. FM is a proactive management that enables planning of operation and maintenance of buildings and which strategically supports the basic business of organization (Degani, Cardoso, [b.r.]).

FM knows best the entrusted operation (retail store), the object, i.e. the integrated assessment of the building belongs to the competence of FM. Determining the physical condition of buildings, finding potential and coming up with measures to achieve the sustainability of buildings is largely the task of FM or the role of energy manager.

Buildings are evaluated based on several aspects and criteria that are in line with the principles and goals of sustainable construction. Buildings are assessment, for example, in the areas of site selection and project planning, building materials and structures, the building environment, energy efficiency, water and waste management. Based on the developed assessment methods, manuals, calculation models and software tools are created, which differ in the scope, depth and degree of evaluation of selected indicators (Bielek, 2014).

“The most important systems for comprehensive building assessment include the following: BREEAM (UK), Green Globes (Canada), LEED (USA), CASBEE (Japan), SB Tool (international – 28 countries), SB Tool CZ (Czech Republic), HK-BEAM (Hong Kong), NABERS (Australia), HQE (France), BEAM (Hong Kong), SABA (Japan), Total Quality (Germany), IBEAM (Ireland), Ecoprofile (Norway), EcoEffect (Sweden), PromisE (Finland), E-audit (Poland), ITACA Protocol (Italy), Minergie (Switzerland), DGNB (Germany), LiderA (Portugal) and Lotus (Vietnam) and other” (Bielek, 2014, p. 465).

We will mention some of the most important systems and state how the individual systems classify objects and which building specifications they focus on:

* *LEED (LEED rating system, LEED – Leadership in Energy and Environmental Design)* – the system evaluates new buildings, existing buildings, commercial buildings, residential and other types of buildings. It covers 6 basic areas: sustainable location, water efficiency, energy and atmosphere, quality of the indoor environment, design innovation and regional priority;
* *BREEAM (Building Research Establishment Environmental Assessment Method)* is a method of environmental assessment of new and existing buildings. It evaluates residential, administrative and industrial buildings as well as buildings for shops and education. The evaluation areas are management, energy, health, well-being and comfort, pollution, transport, landscape and ecology, materials, waste and water;
* *SB Tool (Sustainable Building Tool) –* an international system developed in cooperation with more than 28 countries around the world. The assessment methodology uses 8 key areas, namely location, available services and site characteristics, urban design and infrastructure, energy and resource consumption, environmental burden, indoor environment quality, service quality, social, cultural and perception aspects, costs and economic aspects (Bielek, 2014);
* *SB Tool CZ (National Sustainability Assessment Tool)* – a national Czech certification tool for expressing the quality of buildings in accordance with the principles of sustainable construction. It is used for certification of apartment buildings, family houses and office buildings. A team of experts from the Faculty of Civil Engineering of Czech Technical University in Prague took part in the development. SB Tool CZ contains a set of criteria in the field of sustainable construction. Based on the number of points received, the final level of quality is determined. Evaluate buildings in terms of technical design (SBTOOLCZ, 2020);
* *CASBEE (Comprehensive Assessment System for building Environmental Efficiency)* – the method is used for new buildings, existing buildings but also for the renovation of buildings. This method evaluates the indoor environment, energy, natural resources and materials. We distinguish here two main factors, which are marked as Q (quality), which characterize environmental quality, and L (loadings), which tell us about the environmental burden. The overall assessment is expressed in BEE (Building Environmental Efficiency), which shows us the environmental quality of the building;
* *BEAM (The Honk Kong Building Environmental Assessment Method)* – we can say that it is a comprehensive system for environmental assessment of all type of residential and non-residential buildings. The method is used to evaluate new and existing buildings. The following aspects are assessed: aspects of the quality of the architectural environment (hygiene, health? Comfort and well-being), site aspects (land use, site impact and transport), material aspects (materials used, recycling, waste management), water aspects (water quality, supplies and recycling) and energy aspects (energy used, efficiency of systems and equipment and energy management) (Bielek, 2014).

As mentioned above, the individual systems evaluate new buildings, planned buildings, existing buildings, but also buildings that are waiting of have undergone significant renovation. For each evaluation criteria, the object obtains a certain number of points, of course, each method has a different evaluation methodology and thus a specified number, which can be obtained on a given area After a comprehensive assessment of the building, the building is classified and certified on the basis of the achieved number of points (Bielek, 2014).

Conclusion

In this work, we have shown the important role that FM plays in the life cycle of a building. Whether we just want to implement FM in a company system or work with FM in a company, we have shown its strengths. It is an excellent helper for finding out the condition of the building, for prolonging the life of the building and searching for energy measures. FM also deals with the sustainability of buildings in order to improve the performance of buildings but also to minimize the environmental impact of buildings on the environment.

The FM structure with the whole structure helps us to identify potential problems related to operating costs, before these problems would cause us a financial burden to repair any unresolved problems. The only goal is not only to optimize operating costs, but all of the above, a whole combination of measures, monitoring, building management, quality compliance and proving the condition of buildings on the basis of documents and measurements.

References

AUSTRIAN ENERGY AGENCY. *Integrating Energy Management in comprehensive Facility Management.* [accessed 19.09.2020]. Available online at: . https://ec.europa.eu/energy/intelligent/projects/sites/iee-projects/files/projects/documents/eurocontract\_epc\_facility\_management\_model\_contract\_en.pdf

ASTRI ANINDYA SARI. *Understanding Facilities Management Practices to Improve Building Performance: The opportunity and challenge of the facilities management industry over the world.* MATEC Web of Conferences 204. 2018. [accessed 19.09.2020]. Available online at: <https://www.researchgate.net/publication/327795726_Understanding_Facilities_Management_Practices_to_Improve_Building_Performance_The_opportunity_and_challenge_of_the_facilities_management_industry_over_the_world>

BIELEK B., BIELEK M., VRANAY F., LUKÁŠIK D., VRANAYOVÁ Z., VILČEKOVÁ S., EHRENWALD P., HÍREŠ J., MAJSNIAR V., MIKUŠOVÁ M., *Nízkoenergetická, zelená, udržateľná budova, klíma, energia.* 2014. ISBN 978-80-227-4185-9.

CLARICE MENEZES DEGANI, FRANCISCO FERREIRACARDOSO. *Facilities management and buildings environmental performance.* [accessed 19.09.2020]. Available online at: https://www.irbnet.de/daten/iconda/CIB21549.pdf

ENERGY LENS. *The What, Why, and How of Energy Management.* [accessed 19.09.2020]. Available online at: https://www.energylens.com/articles/energy-management

FRANK NGOH. *Facility Management Core Competencies – Relevance In Today´s Context.* [accessed 19.09.2020]. Available online at: <http://www.constructionplusasia.com/sg/facility-management-core-competencies-relevance-todays-context/>

ING. VIERA SOMOROVÁ, PhD. *STN EN 15221 Facility Management.* 15. Júl 2008. [accessed 29.09.2020]. Available online at: https://www.asb.sk/biznis/facility-management/stn-en-15221-facility-management

ISO 50001 ENERGY MANAGEMENT. [accessed 19.09.2020]. Available online at: https://www.iso.org/iso-50001-energy-management.html

KATHY ROPER, RICHARD PAYANT. *The Facility Management Handbook. Fourth Edition.* AMERICAN MANAGEMENT ASSOCIATION. 2014. [accessed 19.09.2020]. Available online at: <https://books.google.sk/books?hl=en&lr=&id=C-2lAwAAQBAJ&oi=fnd&pg=PP1&dq=facility+management&ots=R4rZ5KTPQK&sig=DykiTKdo_iakoV_Xg0AfbX3cXKc&redir_esc=y#v=onepage&q=facility%20management&f=false>

RAMESH SATYAM. *Facility management.* 2013. [accessed 19.09.2020]. Available online at: <https://www.slideshare.net/race2style/facility-management-25807152>

SAFM. *Slovenská asociácia facility management.* [accessed 29.09.2020]. Available online at: <https://safm.sk/portal/>

SBTOOLCZ. *Národní nástroj pro certifikaci kvality budov.* 2020. [accessed 29.09.2020]. Available online at: https://www.sbtool.cz

TECHNICKÁ SPRÁVA BUDOV – FACILITY MANAGEMENT. *Kaufland Handbook.* 2018.