

## TEACHING FACILITY MANAGEMENT

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### Abstract

The crisis in Real Estate industry and the expected renewal of the market afterwards provides the extension of traditional civil engineering education. In the Real Estate industry, after the crisis the focal and take-off point should be the building operation, or, in wider term, Facility Management (FM). In engineering education programs FM should be considered and highlighted. The author elaborated critical analysis of major university FM courses. Also, other courses - as FM associations, private programs - were investigated. Present research focuses on the contents and method of training. The comparative analysis shows most recent trends in teaching Facility Management. Interviews with market players show the current demand against graduating engineers.

Based on the researches elaborated, the author suggests a teaching methodology which could be complement with other civil engineering and architecture subjects. The main result of the work is an interdisciplinary course methodology. In the changing world, traditional civil engineering programs should be adjusted in order to meet market needs and opportunities.

### Key words

Engineering education; facility management; facility management education; real estate

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## **1 INTRODUCTION**

The crisis of real estate market started five years ago and it is still transforming the essence of real estate market. The basic truth has been questioned while background processes have come into view. The principal of the continuous raising of real estate value has been broken – as it has been demonstrated, permanent fall of prices happened in certain markets and segments; it has become clear that the need for commercial buildings had been dropped because of the technological development and demographic changes; it has become widely obvious that the value of a real estate had been determined by the existence and demands of the end-users; however, the expectances of sustainability have been basic requirements. It has been clear by today that the real estate market has been described by a completely new paradigm. Within this new paradigm, the concept of „Utility” determines the movements of market instead of the Market Value as value marker. These changes and the new paradigm cause that the maintenance, the management and best utility of real estate portfolio have moved into the focus.

Regarding the whole of the civil engineer education, the management of the real estate, or in general, the facility management had been faded into the background while the main directions of civil engineering education meant and still mean of establishing new technical creations. The education needs to reflect on the changes of market paradigms the soonest, as the market needs experts who understand the operating principles of real estate market and are in the possession of fresh, up-to-date and complex knowledge of operations and utility of the real estate portfolio.

## **2 NEW DIRECTIONS IN ENGINEERING EDUCATION**

Nowadays engineering education is in a continuous renewal of course. Engineering science, as a whole, dramatically developed (see for example [1], [2] and [3]). In the education, according to relating literature, many new methods and approach have been introduced. The frames of present article are not suitable to prepare the complete educational survey of engineering training however, we wish to quote some matters illustrating the directions of changes.

The study [4] provides an academic background to the structural changes of the whole of the civil engineering education. It ascertains that the teaching of the strict analytical sciences is not enough to understand the modern world; it estimates that the education and knowledge open towards the soft human agents. Parallel to the teaching of the technologies of building industry, the pathology of buildings should be taught as well. Antosova [5] in her article calls the attention to the tight links between the two subjects. The architect and civil engineering education has completely separated from their objects, as students are not familiar with building services in its material reality [6] for example.

According to Martin-Gómez and his co-authors, the material experience of learning by touching, according to their suggestion, building service technical cabinets should support the education. The issue of sustainability is slowly integrating into the architect training, however, as Jenson describes in [7], it is not discussed as a complete approach but by explaining technological solutions. The environmental crisis establishes the possibility and necessity of sustainability as a philosophy of engineering and not only another technology. For the year of 2014, the Budapest University of Technology, Faculty of Architecture has determined the new trend of education in supporting creativity – parallel with the world trends – by making able the students to synthesize the human, the art and the technological knowledge.

However, we cannot state that yet in general that the edifications of the biggest market crisis of real estate industry discussed in the introduction should have been integrated by educational programs [8]. The courses for teaching facility management make quite a small rate within the civil engineering education, unfortunately. These courses are to discussed in the next chapter.

It is more unfortunate that the whole of the engineering education forgets about maintenance and utilities and does not, or does slightly discuss these topics.

### **3 EDUCATION OF FACILITY MANAGEMENT**

Different for-profit institutions have specialised for teaching facility management. In the non-profit system of higher education, some departments interested in engineer training of certain universities take part of it. In our analysis, we overlook these university courses, focused on trainings providing BSc/MSc qualifications. The examined teaching programs are narrowed; at one hand, we scanned the courses provided in English (as well), and on the other hand, the accredited courses provided by the IFMA (International Facility Management Association) and the RICS (Royal Institute of Chartered Surveyors). We wish to note that basically no serious training course exists without such accreditation. The process of the accreditation is highly regulated, the educational requirements are determined by the expected competences (vide later) in the document [9].

There are only 26 training programs in the mentioned segment. It is remarkable that only in Europe there are 350 registered courses of architect training [8], while the number of civil engineering training is much more worldwide. These 26 programs were analysed by the published materials of the educating institutions (leaflets, home pages and offers).

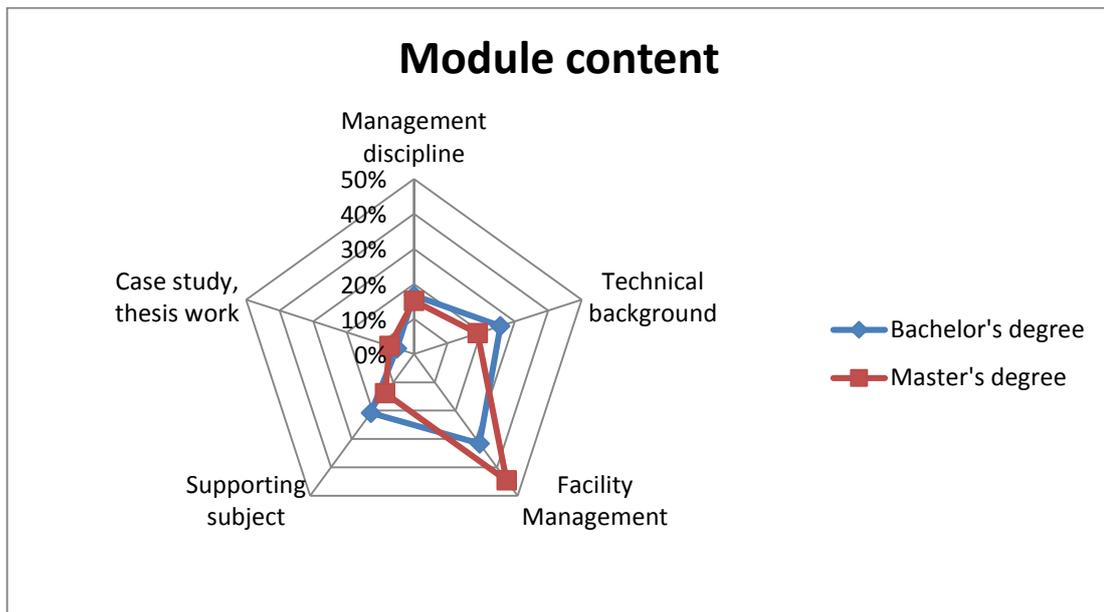
Half of the examined trainings give bachelor degrees, the other half provides master degree for its students. Among the examined programs, there are 14 at North American universities, 8 at European universities (in the UK, in the Netherlands and in Austria), while four can be chosen in Asia. Among the educational institutions in the sample, there are two that provide distance learning programs, but basically all examined educational programs follow the traditional methods of teaching. We found intensive practical courses and site practices in three cases, while half of the programs integrate some kind of work practical training. The program of the Singapore University is to be emphasized as it exploits the local facilities of the state city and at the same time prepares the students for the facility management of these (amusement park and airport).

The quantity, contents and requirements of the examined courses show significant dispersion. The time of bachelor trainings is 2 to 6 years, average 3.2 years while the master trainings last for 1 to 4 years, average 1.8 years. The credit system is usually variant between universities and countries, therefore it is not suitable for comparison however, it is a reference data that the average credit requirements of bachelor trainings make 123 credits, while the average credit requirements of MSc trainings make 92 credits. It is observed that – not surprisingly – the main profile of the mother institute (technical, management, economic) influences the curriculum of the certain trainings. We can picture the composition of the programs by the number and contents of the modules taught. Within the examined sample, the number of taught modules (corrected with the number of minimum expected facultative subjects) is average 20. It is remarkable also that the standard deviation of the number of modules is high (10.9): there are training programs with 7 and also 46 modules. Monitoring the contents of the modules as well, certain institutions break the knowledge into more pieces, however, it can be stated that the necessary package of knowledge to obtain a degree might be significantly different by institutions. In light of the fact that the examined programs are all accredited by international organisations, we can draw the conclusion that there are no standards of knowledge in the field of Facility Management.

We listed the modules of the examined programs into five groups to make the comparison of training structures possible. The listings were made based on the certain module descriptions and on the factual contents. The topics are the following:

- Management disciplines;
- Technical background;
- Real estate industry background;
- Supporting subjects and
- Projects.

The following Fig. 1 introduces the distribution of the above topics in the break down of bachelor and master level trainings.



*Fig. 1: Distribution of Contents*

However, it can be generally stated that the training programs do not emphasize enough, the interdisciplinary nature of facility management. There are less management-oriented subjects, there are less background studies; the education programs are typically dominated by the technical and technological knowledge.

At the end of our examination, we could state that these programs, in their contents and structure, are mostly do not – expect small number of exceptions – react to the changing market environment and requirements.

#### **4 THE NEW ERA OF FM**

The new real estate paradigm, already described in the introduction, has forced the real estate actors and business organisations to act. The traditionally development and appraisal focused technical approach is gradually changed by the vision of the building operation of the real estate stocks. Probably the most respectful international organisation of real estate industry, the RICS initiated for example the preparations of a study [10] and a case study [11]. These two voluminous studies clearly point out that the corporate real estate utilisation is a separate science that finally determines the program and direction of civil engineering work through the real estate development. The profession of facility management by itself – after a long wait – has

started the necessary self-definition and rulings. Between 2006 and 2012 seven different standards were prepared that have become responsible for the structure and unified management of the area of FM. Among these, there can be found the standard of “EN 15221-1 2006 Terms & Definitions” giving a frame to facility management, as well as the highly important order of “EN 15221-7 2012 Benchmarking” providing directions in describing and comparing different services. These stocks are obligatory EU standards and unquestionably, they still have to be waited for affecting the everyday practice. One of the freshest self-ruling development of the field is that the different real estate organisations (among these, the already mentioned RICS and the FM Standards Committee as well) have joined forces to standardise the spatial measure numbers understood and used differently at the different areas of real estate industry (planning, development, facility management) [12]. Even though the European FM standards cover these („EN 15221-6 2009 Space Measurement”), the above initial correctly represents that although the whole of the real estate industry is highly segmented, its actors in the spirit of the new paradigm find it necessary, the reform and the introduction of the integrated approach. The real estate marketers and their organisations have also acknowledged the changed market environment and have launched clearer communication about the new real estate paradigm targeting the wider public. Only one example for the latter is a publication of a book for corporate directors [13] by the Hungarian department of RICS.

Further facts could be quoted to certify that the real estate industry researches, regulates, and at the same time promotes itself and its changed activity. We highly believe that the education cannot be left out of these reforming processes.

## 5 THE FM AND THE MARKET PARTICIPANTS

The IFMA continuously tests the market and draws the profile of the facility management experts. According to this profile, it regularly publishes the list of competences that can be expected at different responsibility levels from the facility managers. However, another two national professional organisations have put up a list of competences, the BIFM (British Institute of Facility Management) and the Facility Management Association of Australia as well. In the article [14] of 2011, Awng *et al* urge the introduction and accountability of these competences into higher education.

The IFMA remarks altogether 28 expected competences at 11 areas [15]. These competence areas are as follows:

1. **Communication**—Communication plans and processes for both internal and external stakeholders
2. **Emergency Preparedness and Business Continuity**—Emergency and risk management plans and procedures
3. **Environmental Stewardship and Sustainability**—Sustainable management of built and natural environments
4. **Finance & Business**—Strategic plans, budgets, financial analyses, procurement
5. **Human Factors**—Healthful and save environment, security, FM employee development
6. **Leadership and Strategy**—Strategic planning, organize, staff and lead organization
7. **Operations and Maintenance**—Building operations and maintenance, occupant services
8. **Project Management**—Oversight and management of all projects and related contracts
9. **Quality**—Best practices, process improvements, audits and measurements
10. **Real Estate and Property Management**—Real estate planning, acquisition and disposition

### 11. **Technology**—Facility management technology, workplace management systems

In the past years, interviews were made by us with national and regional market operators; altogether there were negotiations with approximately 30 facility management companies. Based on this experience, the companies represented on the market expect the above listed knowledge and abilities from newly graduates. We hereby wish to emphasize again that in traditional civil engineering education – against the observed innovations – these topics and abilities are rarely discussed nor deepened.

## 6 SUGGESTIONS

By market expectations summarized in above chapters and the further-thought educational programs of the certain universities, we prepared our own master level training program reacting to the new real estate paradigm. Within this program, there are five blocks where there are 16 modules.

The education starts with everyday problems and case studies, and provides further solutions to these practical questions through the special subjects. Therefore, each module are discussed in overlap thorough the whole of the course. The modules are shown in the following Tab. 1:

<b>Block A: Management</b>	A-1: Management Knowledge
	A-2: Theory of FM
	A-3: Sustainability and Energy Management
<b>Block B: Technical Knowledge</b>	B-1: Engineering Studies I. – Building Constructions
	B-2: Engineering Studies II. – Building Services, Electricity
	B-3: Project Management
<b>Block C: Facility Management</b>	C-1: Real Estate Development
	C-2: Real Estate Facility Management
	C-3: Facility Management in Practice
	C-4: Investments
	C-5: Technologies (CAFM, BIM, intelligent buildings)
	C-6: Facility Management of Public Buildings
<b>Block D: Supporting Education</b>	D-1: Communication
	D-2: Technical English Language
	D-3: IT Practice
<b>Block E: Case Study and Closing Project</b>	E-1: Case Study and Closing Project

*Tab. 1: Teaching Modules*

The program assumes that the students are already familiar with the basics of contractual rights, financial and accounting as well as economic knowledge either within the host educational program or through their preliminary education. The Fig. 2 shows the internal distribution of suggested modules compared with the result of our research.

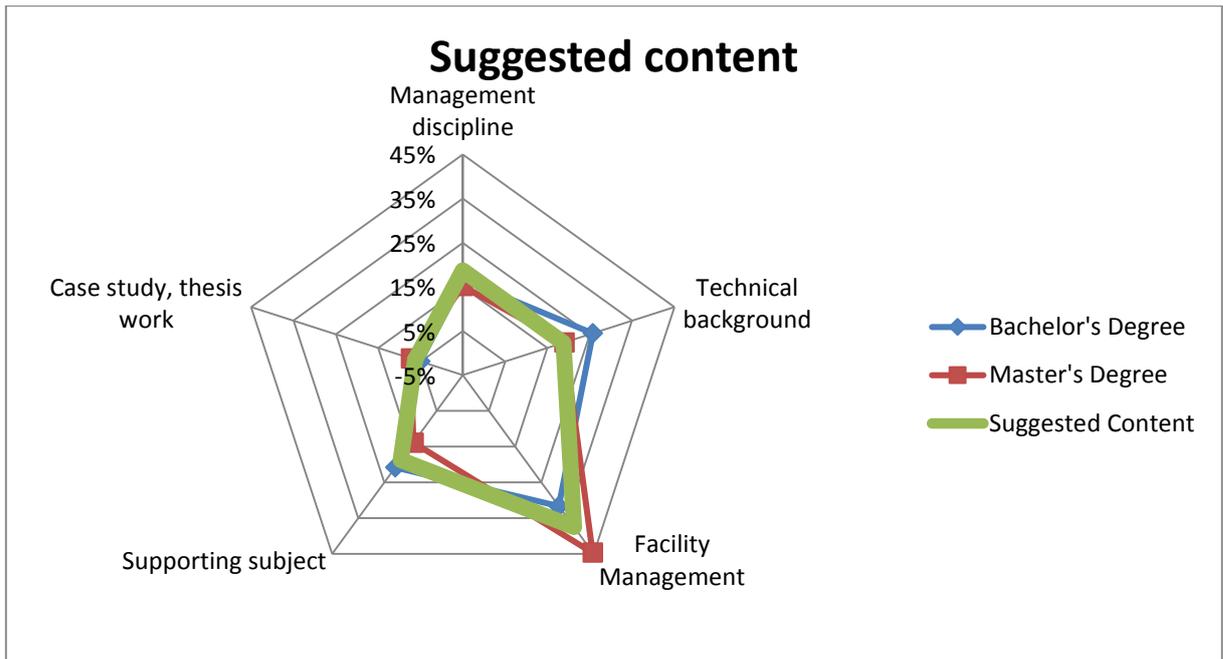


Fig. 2: Distribution of suggested modules compared with the research result

For the successful education of renewed outfit, the didacticism and tools of the 21<sup>st</sup> century are also to be applied, anyway, FM cannot be taught without the knowledge of modern technologies.

## 7 CONCLUSION

Based on the researches elaborated, the author suggests a master's teaching programme which could complement other civil engineering and architecture subjects. The main result of the work is an interdisciplinary course methodology. In the changing world, traditional civil engineering programs should be adjusted in order to meet market needs and opportunities.

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