
**AVOCAAD EXERCISES FACILITY MANAGEMENT
TRAINING ON THE WEB
A FACILITY MANAGEMENT SURVEY
RELEVANCE FOR THE ARCHITECTS BUSINESS**

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1. Introduction

Facilities Management (FM) can't be seen as a subject with a specific area of knowledge with exactly defined borders relative to other subjects. Analysing the economic aspects of FM leads to the realisation that building management is experiencing a process of increasing specialisation and professionalism.

It is possible to define FM from a variety of different points of origin. One possible approach views FM as an integral solution for the administration of buildings, their commercial activities, and technical maintenance from an economic perspective, during the whole life of a building. FM covers all strategies in order to efficiently provide, adequately operate and adapt buildings, their contents and systems to changing organisational demands.

The current practice of limited analysis of specific administrative aspects, e.g. maintenance, is replaced by consideration of all factors that affect costs. Since all costs can be directly traced to space, the perfect procedure requires that FM is practised during the whole living-cycle, starting with the definition of the program of construction until the day of conversion or demolition. Through successful FM, the real estate can contribute decisively to the improvement of productivity and the quality of life.

2. Understanding and necessity

Unhappy employees, high costs of maintenance, inflexibility, the waste of space, these are just a few building administration problems that, if not already present, creep in over the years in the absence of proper control procedures.

FM computes the building as a whole, in all its administrative aspects. FM allows a transparent, comprehensive analysis, and provides easy approaches to costing, presentation of a variety of data and visualisation of yields and expenses in meaningful ways.

For decades our market-based economy has driven all areas of the economy toward optimum utilisation of resources. Robots, computers, lean production, home offices, electronic-commerce and many more achievements are tools to lower expenses and enhance products and productivity. However, the economic sector of real estate management seemed, until recently, to have

escaped the pressures of economic efficiency. Only a few years ago, real estate project managers identified real estate management, in all its aspects as an area that must find ways to lower costs.

FM is the tool to transform the frequently inefficiently used buildings, which tie up massive amounts of capital, into resources responsive to the new demands for flexibility, profitability and humanness. The future demands an efficient utilisation of real estate resources and thus exerts pressure to implement FM techniques. A recent study conducted by IFMA (International Facility Management Association) of several U.S. corporations showed that 25 to 50% of business capital balance sheets and 10 to 18% of business profit and loss accounts, can be directly traced to costs of owning and operating both real estate and buildings.

3. Significance and impact on the student

As demand for FM-specialists is on the rise, students have to be prepared to cope with the challenge of the subject FM. Especially a student of architecture who nowadays faces difficulty finding a proper job, FM specialisation would dramatically improve the potential for personal professional success. In addition, in the future it will be more important for architects to consider economic aspects of their projects. The European competition necessitates, already during the early design stage, provision of solid financial statements for the building to the investor, encompassing the entire period of use. As a result architecture students of today need all possible tools at their disposal to be able to predict the future evolution of their realised designs. Only an expert in all these fields will be able to successfully attract big contracts.

4. Significance and consequences for the educational system

Universities need to prepare students by providing all knowledge relevant to their later professional success. FM has to be integrated and taught in combination with the related subjects.

For the AVOCAAD project an integration into the existing teaching areas is useful and attractive at the same time. The AVOCAAD scheme and the involved structures of exercises were publicly discussed for the first time at the 1998-ECAADE Conference in Paris by Verbeke [1]. FM is a recent, fast expanding topic and lends itself particularly well to interactive web instruction. The web is the most recent relevant media evolution which provides the user with an ability to cope with rapidly changing contents and structures at very low costs.

5. Realization of an online exercise

The exercise could be structured into different levels of

- complexity
- overview/detail
- demands (industrial/domestic)
- interactivity (reference/training)
- and alike.

The following figures show an interactive result-page. Interactive exercises and the theoretical background of executing an-screen interactivity are presented in a separate paper on this conference by Sprekelsen/Pittioni [2].

The exercise aims to demonstrating the behaviour of the relations between the costs invested in the building and the maintenance-costs, giving the overall investment after 10 years. We have simplified the very complex relations between building-costs and the expected maintenance-costs to a very high extent. Otherwise it would exceed the nature of a mere demonstration substantially.

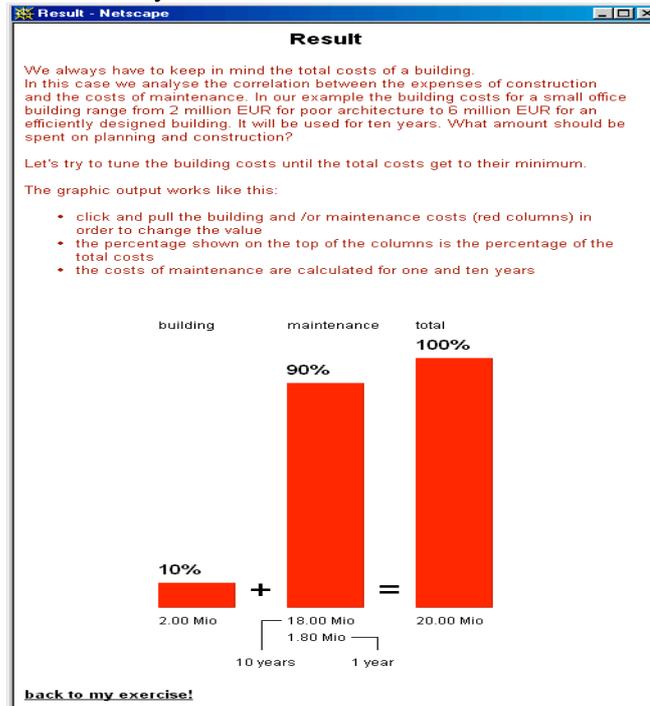


Figure 1:AVOCAAD exercise, FM-training. Building costs at very low level.

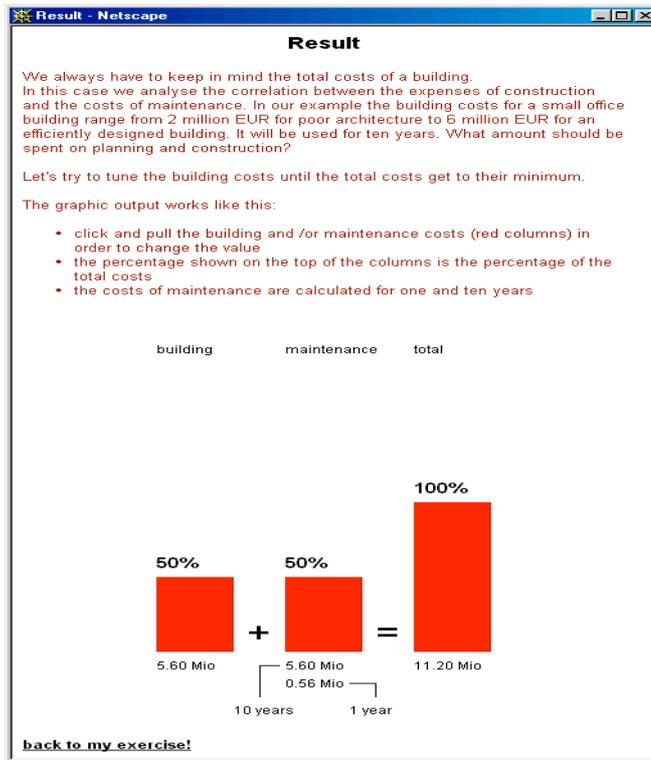


Figure 2: AVOCAAD exercise, FM-training. Building costs at higher level. Maintenance-costs will decrease substantially.

The overall investment will become minimised at a certain relation between the original investment into the building costs and the maintenance costs. These costs depend from the standards chosen and a number of other factors.

This relations can be studied by changing on-screen the first element of the diagram (the building costs), so that the overall costs tend to minimise. See figure 3 – the algorithm operating the relations between the cost-factors show minimum overall costs at 38% building costs and 62% maintenance.

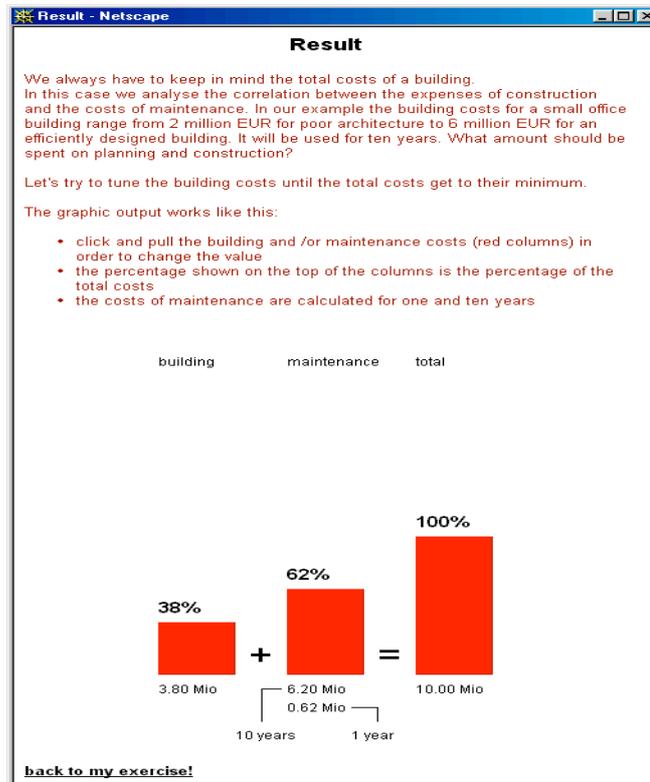


Figure 3: AVOCAAD exercise, FM-training. Building costs at higher level. Maintenance-costs will decrease substantially.

Of course this behaviour will vary with regard to the special kind of buildings, as the dependent parameters will change their values. Anyway, this example should show the general functionality, moreover it is a good demonstration of interactivity within AVOCAAD exercise sheets.

It was positively the intention to avoid complex structures and dependencies to focus merely on the functionality. To obtain this we focused on the following main features:

- simple structure
- easy to understand / intuitive operation
- stress on the content
- real-time interactive exercise simulation, where results can be graphically demonstrated and correlated with user-initiated changes of variables
- tuned on graphical output

It would be a very nice exercise of its own to develop functions which represent the relations dependent on different building usage.

6. References

[1] Oswald, D., Pittioni, G.: AVOCAAD Exercises, Facility Management training on the web, in Proceedings of the 2nd International AVOCAAD Conference (ed. J. Verbeke, T. Provoost et al), Brussels, April 1999.

[2] Verbeke, J., Provoost, T., et al: AVOCAAD, the Scheme, ECAADE Conference, Paris 1998, Proceedings pp. 239-252.