

# THE ENGINEER'S EDUCATION IN BUSINESS AND CONSTRUCTION MANAGEMENT

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Educating civil engineers to manage companies and projects successfully is an extremely important task. In 2002, the International MBA in Construction programme was launched at the Faculty of Civil Engineering, specially designed and adapted to the construction industry's specific needs, as "general" MBA is not always suitable for engineers holding managerial jobs in companies and/or in construction projects. Most of the students attending the programme were civil engineers and architects, graduates from Civil Engineering Faculties in Croatia. Problems that have emerged from the introduction of the programme are presented as well as suggestions for the future development of the programme.

Keywords: Civil engineering, Education, MBA

## MBA IN CONSTRUCTION - INTRODUCTION

Managers run companies and projects with the purpose of achieving maximum business results through the direct control of labour performance and the flow of considerable financial resources. Specialisation in business management, known as MBA, is today the most highly respected qualification in the business world. It is a form of additional high education in management, because the programme provides knowledge and skills that enable course participants to master business processes more easily, and to adapt to globalisation processes more quickly and painlessly.

For many years, our civil engineers have been successfully heading contracting companies as well as large-scale projects. They have proved their technical knowledge, skills and expertise working in different economic and political environments in Croatia and around the world. However, they had problems in managing companies and projects as they had no formal knowledge or training in management.

There are some "universal truths" about managers (Katavić, Hamarić 1989), which are also true of managers in construction:

- Managers are only people and have all the human weaknesses: they may look at a problem without seeing it, listen to collaborators without hearing them; they may think about a problem and not do anything, or do things without thinking about the possible consequences first.
- Managers are created not born.

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- The “art of management” must be learned, and what is the most important, it can be learned.

For someone to become a good manager or project manager it is not enough to be “talented” for the job or to want to do it. These are no more than good motivation for a person to embark on the challenging course of acquiring the variety of knowledge and skills without which he or she cannot expect to do demanding and responsible managerial work successfully.

## THE IDEA

The overall purpose of management is to help the organisation achieve its objectives. For the firm this means achieving profitability and liquidity, thus guaranteeing survival. A good manager can save a bad company, whereas an incompetent manager can ruin a good company.

Following the present trends in modern market economies, more and more people enrol in postgraduate courses. Although nowadays most postgraduate courses offer programmes specialised for specific fields, the demand for multidisciplinary and interdisciplinary programmes is progressively increasing. One of the typical programmes of that kind is MBA, intended for young professionals in managerial positions on their way up the hierarchical ladder.

In the last ten years or so many business schools and graduate MBA study courses have been opened in Croatia. The traditional MBA programme approaches business management as an independent discipline that can be applied to all industries. The programmes offering “general managerial training” are not appropriate for construction managers, as they do not take into the account the specific characteristics of the construction industry.

Construction differs fundamentally from all other industries, because in the usual industrial process the product changes its place and the production factors (people and machinery) are static. In construction it is the opposite – the product (the facility under construction) is static and does not change its place. When the “production process” is finished “the product” stays where it was made, while the production factors (people and machinery) move on to the next location – to the “next product”.

H. Fayol (Fayol 1949), speaking generally about the knowledge necessary for managerial work, as early as 1949, established the correlation between technical and other general (economic, sociological, managerial and other) knowledge for various job positions in the management hierarchy.

**Table 1.** Correlation between technical and other knowledge

Work place	Technical knowledge needed	Other knowledge needed
1. Worker	85 %	15%
2. Skilled worker	60 %	40 %
3. Technical manager	30 %	70 %
4. General manager	10 %	90 %

The percentage of “general knowledge” grows as one climbs up the managerial ladder. Every manager well knows that the higher his/her position in the managerial structure is, the less he/she has “to do” with solving technical/professional problems

and the more time and energy he/she spends in solving “all the other” problems in the company.

In April 1989(Katavić, Đukan 1989), in a survey that included engineers who had graduated from the Faculty of Civil Engineering, Zagreb University, between 1955 and 1985, were identified specific managerial features and “the most important” knowledge and skills for a construction manager. The result of the respondents’ evaluation was the ranking list of the ten most important skills and knowledge for the construction manager:

**Table 2.** The ranking list of the 10 most important skill and knowledge

Rank	Skills and knowledge
1	command of technical knowledge and professional skills
2	responsibility towards the employees and the company
3	ability to organize and coordinate work
4	ability to establish good interpersonal relations
5	ability to contract work
6	ability to ensure quality control
7	ability to forecast
8	knowledge of economic business analyses
9	ability of personnel management
10	ability to control costs

The respondents at that time considered it by far the most important for the construction manager to be completely in command of technical knowledge and professional skills. They firmly expressed the view that a person must in the first place be a good engineer to be a good construction manager. They placed the ability to control expenses last of the ten most necessary kinds of knowledge. That’s not surprising if one bears in mind that at that time Croatia, as part of Yugoslavia, was a country with the so-called “socialist self-managed” political and economic system.

Fifteen years have passed since then, the social and economic system has changed, most companies are privately owned, and it was to be expected that stands about the necessary knowledge and skills for managers also changed substantially. The very different conditions and work processes did in fact change the attitude to the knowledge and abilities/skills needed by managers. Many more people now realise that additional training is necessary for managers and it has become usual for experts, people with university degrees, to go to “schools for managers”.

In 2001 a field research about the essential knowledge and skills that the successful manager in the construction industry should possess has been undertaken again (Katavić, Cerić 2002).

The results were interesting. The importance given to a specific kind of knowledge has changed since 1989 (although the results of our surveys are not completely comparable).

The new ranking list of the most important skills and knowledge was the following:

- knowledge in management
- knowledge in project management
- knowledge in economics
- knowledge of foreign languages
- technical knowledge and professional skills.

In 1989 command of professional skills was ranked highest among the most important knowledge and skills, whereas today, with a total of 41 out of 55 answers, it was placed fifth in rank.

Today's respondents rank knowledge in management science (analysis, planning, organisation, motivation, control) topmost. Project management (planning methods, resource management, risk analysis etc.) was considered the next most important knowledge by 91% respondents, and economics came third (accounting, marketing, finances, international economic relations etc.). It is just as interesting that 85% respondents considered knowledge of foreign languages very important for the construction manager. In the earlier survey knowledge of foreign languages was ranked 13<sup>th</sup> on the list.

Based on the results of the aforementioned research and on the increasing demand for postgraduate managerial education in the Croatian construction sector, in February 2001 University of Zagreb (Faculty of Civil Engineering in cooperation with Faculty of Economics) applied for the TEMPUS Curriculum Development Joint European Project grant hoping for financial support for the International "MBA in Construction" programme.

## **THE LAUNCH**

MBA in Construction is a programme that focuses on construction with the purpose of providing present and future construction managers with knowledge in various scientific and professional fields necessary for understanding and mastering complex management processes. Educating civil engineers to manage successfully, as proposed in this "International MBA in Construction" programme at University of Zagreb, is probably a crucial and extremely important task for Croatia's economic development, having in mind the tremendous needs for war damage repairs and for infrastructure and public facilities reconstruction not only in Croatia but also in other former Yugoslav countries.

Civil engineers are trained as managers in only few universities in Europe:

- MBA in Construction and Real Estate by Distance Learning, The University of Reading, UK,
- Executive MBA Construction Project Management, University of Leeds, UK, and
- IT Based Construction Management at the Istanbul Technical University in Turkey.

MBA in Construction programme at University of Zagreb is completely comparable with European trends, which was confirmed when the EU approved CD\_JEP TEMPUS programme enabling commencement of this programme in February 2003.

Twenty three students were enrolled (only one female), graduates from faculties of civil engineering and architecture in Croatia. Only two students broke off their studies because their company's financial difficulties and the company could not continue to pay their expenses.

The average age of the students at enrolment was 32, and the average duration of their previous work experience was 5 years and 4 months. By profession, graduate civil engineers predominated (82.61 %), followed by architects (13.04 %) and graduate mechanical engineers (4-35%).

Most students, 43.48 %, were designers, 39.13 % were consultants, and there were 13.04 % other students. Only 4.35 % students came from contracting companies.

When they enrolled, 13.04 % students were aged 22-25, and 21.74 % were aged 26–28. Most students were between 29 and 32, and 32 was the average age of the first-generation students. The youngest participant was 24 and had no previous work experience, while the oldest was 44 with 20 years of work experience.

## **THE PROGRAMME**

The MBA in Construction programme is a project of Zagreb University (Faculty of Civil Engineering and Faculty of Economics), in cooperation with partner institutions from Great Britain and Germany. Thanks to TEMPUS support, teachers from British universities (Dundee University, Reading University, Salford University) and from the Technische Universität München taught together with their colleagues from Croatia.

In June 2003 the Zagreb University Senate approved this programme making it one of the few graduate business management programmes that has University evaluation and is recognised as an international university postgraduate course. The programme carries a total of 120 ECTS credits in three terms of teaching and a master's thesis, as shown in Appendix 1.

Enrolment requirements includes the GMAT test which course participants passed at the Prometric Testing Centre in Zagreb.

Teaching was organised in 12 modules of five workdays a month for four months during a term, at the Faculty of Civil Engineering in Zagreb and at the Centre for Advanced Academic Studies in Dubrovnik. Teaching was in Croatian and English.

The subjects can be classed in three groups:

- general business management (making business decisions, organisational behaviour and organisation design, business strategy, negotiating and business protocol, business ethics)
- economic subjects (business statistics, marketing strategy, international marketing, accountancy for business management, financial management)
- construction subjects (project planning and control, project management, legal aspects of project management)

The course lasted two years (three terms of lectures and one term for writing the final paper), a total of about 475 hours of teaching, case work and seminars.

Cooperation among professionals of different profiles from Croatia and European countries provided students with the most recent professional and scientific knowledge in the field of business management.

## **LESSONS LEARNED FROM THE FIRST GENERATION EXPERIENCE**

The European Union co-financed the study course through the TEMPUS programme, which means that the deadline for its realisation was determined by TEMPUS conditions. Because of the very short time for preparations students were not on time informed about the obligations and demands of the studies and about overall expenses during studies (this especially refers to staying in Dubrovnik).

Furthermore, because of the lack of time the study course was not sufficiently promoted, so the industry reactions to the programme presented were disappointing and completely opposite to the results of prior market research.

In the opinion of the employers, the greatest “shortcomings” of the course was the **duration of studies** (12 teaching modules require the absence of the employee for as long as that, which employers did not find acceptable); the **dislocation of teaching** (teaching at the Centre for Advanced Academic Studies University of Zagreb in Dubrovnik, in the employers’ opinion, only increases the expenses of the study course – air tickets, student accommodation, expenses for food - without providing any visible advantages over teaching in Zagreb); and of course the **price** (tuition fees for the 1<sup>st</sup> generation were 5,500 Euros, because 50% of the expenses were co-financed from TEMPUS Grant).

It is interesting that the data about student attendance at lectures showed that the lectures held in Dubrovnik were more visited than those held in Zagreb. The reason was that students were free of their work obligations and could completely devote themselves to their studies, which was not possible during the lectures in Zagreb, which was the place of employment for most students.

In this way the idea to dislocate students from their working environment during teaching and to “force” them to entirely devote themselves to their studies and focus on the problems taught showed itself very good, although the employers were probably not enthusiastic. However, after the first week spent in Dubrovnik the students themselves accepted this kind of work with enthusiasm because they became personally convinced of the advantages of intensive everyday and daylong work and association with colleagues and teachers.

The problems observed during the first generation of the postgraduate "MBA in Construction" study course cannot be completely eliminated, but they can be greatly mitigated by taking the objections of the businessmen into account and by closer cooperation. Using the experiences of the first generation of students some changes were made to improve the quality of the course and to facilitate the recruitment of new participants.

The Programme was modified by adding new optional courses and decreasing the number of modules per term. Teaching now includes 6 modules focusing on months that are less active for construction industry (October, November and January, February). According to the new model, teaching in one module lasts 9 days, from Saturday to the following Sunday, with 8 – 9 hours of lectures a day. Thus students “sacrifice” two weekends for their education and employers “sacrifice” 5 working days. All teaching will be held in the Centre for Advanced Academic Studies University of Zagreb in Dubrovnik, which showed itself a very good solution ensuring for students the very necessary peace and enabling them to focus on their studies.

Tuition fees are 12,000 Euros and include accommodation in the refurbished CAAS dormitory, and all the books and materials necessary for the studies (For detailed information about the studies visit [www.grad.hr/mba](http://www.grad.hr/mba)).

## CONCLUSIONS

Many countries in our part of the world require great investments in construction and modernisation of the infrastructure and other facilities to advance the potentials necessary for economic and political stability and development. This can only be

achieved with well-trained managers who are experienced in construction. Therefore, the MBA in Construction Programme at the University of Zagreb is designed to appeal managers within all construction disciplines. Some experiences of the first generation of students enrolled in this Programme are presented.

## REFERENCES:

- Katavić, M and Đukan, P (1989) The Civil Engineer as a Manager. *In: 3<sup>rd</sup> Yugoslav Symposium in Building Organisation*, 19-21 April 1989, Cavtat. University of Zagreb, 767-779.
- Katavić, M and Cerić, A (2002) In Pursuit of the Perfect Project Manager. *In: 2<sup>nd</sup> SENET Conference on Project Management*, 17-19 April 2002, Cavtat. University of Zagreb, 73-83.
- Fayol, H (1949) *General and Industrial Management*. London: Pitman.
- Katavić, M and Hamarić, S (1989) *Business Policy*. Zagreb: University of Zagreb

## APPENDIX 1 - THE MBA IN CONSTRUCTION COURSE PROGRAMME (OCTOBER, 2002)

<b>1<sup>st</sup> Term</b>	<b>Lectures (hours)</b>	<b>Seminars (hours)</b>	<b>ECTS credits</b>
101 Business Statistics	40		7
102 Organisational Design	40		7
103 Organisational Behaviour	40		7
104 Marketing Strategy in Construction	30		6
105 Business Ethics	20		3
192 Optional course - seminar		20	3
<b>Total ECTS credits</b>			<b>30</b>
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<b>2<sup>nd</sup> Term</b>			
201 Managerial Accounting	40		7
202 Construction Project Planning and Control	25		4
203 Financial Management	35		6
204 Human Resource Management	35		6
205 Negotiation and Business protocol	25		4
292 Optional course - seminar		20	3
<b>Total ECTS credits</b>			<b>30</b>
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<b>3<sup>rd</sup> Term</b>			
301 Decision Theory	40		7
302 Business strategy	40		7
303 Construction Contract Law	25		4
304 Construction Project Management	30		5
391 Optional course	25		4
392 Optional course - seminar		20	3
<b>Total ECTS credits</b>			<b>30</b>
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<i>Optional Courses</i>			
521 Information Systems	25		4
522 International Marketing	25		4
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<b>4<sup>th</sup> Term</b>			
401 Master of Science Thesis	240		3
<b>Total ECTS credits</b>			<b>120</b>