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Editors of series: *Dragan Veličković, Dušan Ilić, e-mail: facta@ni.ac.yu*  
Address: Univerzitetski trg 2, 18000 Niš, YU  
Tel: +381 18 547-095, Fax: +381 18 547-950

## MANAGEMENT IN CIVIL ENGINEERING AND ITS DEVELOPING TENDS

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**Milorad Zlatanović**

Faculty of Civil Engineering, Beogradska 14, 18000 Niš, Yugoslavia

**Abstract.** *Management is dominant science domain and routine in managing building companies. One of the oldest human activities, civil engineering activates human abilities on building investment objects in order to satisfy necessity for civil engineering objects. It is enough good reason to take place in management development in civil engineering.*

*This paper presents short view of management development, like as significant step and necessity for modern management employing in civil engineering. As there are numerous definitions of management depending on an author, only the most important are presented, namely the most acceptable in civil engineering domain. Special attention is paid to managing functions in civil engineering as well to their correlations.*

*Management in civil engineering is not applied seriously, which is an absurd considering significance and specific character of building industry for community, especially taking account fight for survival and necessity of building company development.*

*If we talk about management in civil engineering total quality management must be mentioned. Total quality management is a business philosophy and existing way of modern companies around the whole world. It is the most modern concept of advancing and developing in all life and work domains.*

**Keywords:** *Management, Civil Engineering, Development*

### 1. INTRODUCTION

Necessity for some planning and organization dates from the first days in history when the simplest jobs were performed for men survival. At the very beginning men have been working intuitively, later work was based on experience and nowadays completely on the

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scientific base. On that way man has founded management roots, based on experience and during development it has reached a scientific discipline level necessary for proper human society development. Managing is a science and also routine, related to human needs for permanent survival.

Machine works in industry (XIX century) produced also high development of management, which is signed by separating capital possession from its function. It has caused that owners become renters and capital was managed by expert teams - managers. They have got a function to manage, because they could do it better than the owners. Managers have the absolute right in managing stuff, processes and people who participate.

In our country, as well in many others, with establishing market economy management have taken a great place in economy and other activities. It could be expected, because economical marketing is inseparable from management even some could say that efficient economy can not exist without modern methods in management. Management have been applied wide in civil engineering from the earliest days, what is normal considering enormous finance investment engaged in projects realization. It could be said that management is a fundamental universal tool of modern civil engineering. Small, middle and large jobs to be performed, no mattering if small, middle or large building companies are engaged, management is necessary to find efficient and appropriate way of activity performing, e.c. to find the optimal way.

Efficient management is necessary for normal functioning of each single system in company, as well for the whole building company. With higher education of specific operation performers in civil engineering more complex activities to perform, bigger amount of activities and men and companies engaged on preparation and perform of the job, management gets on its significance. It tends to become scientific discipline in coming future days in many economy and other domains and in civil engineering for sure as well.

## 2. MANAGEMENT DEFINITION

The most used management definition is the one given by Henry Fayol, the pioneer of modern management. It has been used with less or more modification by numerous theoreticians for a years to present complete management definition, as well in explanation of idea and meaning of management.

Henry Fayol defined management as the most important process in job performing and it undertakes managing in company, which means estimate, organization, commanding, coordinating and control. By Fayol "Managing means leading the company to its goal getting maximal advances from available resources" [2]. American scientists Luter Gulick and Lindal Urwick are the most important escorts of the Fayol's theory "scientific managing". Numerous management schools have been developed later: school "human relations", empirical - managing school of management, school of "social systems", "new school" of American management theory, and many others less successful than mentioned above.

Nowadays management is mostly defined as a process of directing people on performing some jobs and tasks to reach some predefined goals. This complex process is

consisted of a number of single procedures: planning, organization, control etc. Considering this definition as well other definitions of management has triple function:

1. Management is directing process on some jobs and systems, in the aim of reaching predefined goals;
2. Management could be considered as a group of people directing other group on performing some tasks to reach defined common goals. So, some group of people manage specific activities;
3. Management is a complex science area searching on management problems; Management as a complex process with a plenty of subsystems search on managing jobs and systems for efficient tasks and jobs performing.

By the economical consideration management could be notified as an important resource in production, which can significantly increase productivity and profitability of the company. By the organizational consideration management is a system of authority given to the expert group. By the social meaning management could be considered as class and status symbol. Sudden necessity for a lot of qualitative managers made them be intellectual leaders characterized by high education and knowledge.

If we consider already mentioned complexity of managing task it could be said that management is a process of planning, organization, directing and control of all available resources (human, material, financial and information) in the aim of reaching goals (survival, enlargement and development of companies). During this process all available science and expert knowledge are used and previous experiences as well.

### 3. MANAGEMENT FUNCTIONS IN CIVIL ENGINEERING

Management activities can be separated on different functions. The basic task is to define functions and assign activities so that management can realize goals on successful and efficient way.

In civil engineering management can realize the best results through four functions: planning, organization, directing and control. Each of this functions undertakes the rest of three others:

- Function of planning contains functions of organization, directing and control;
- Function of organization contains functions of planning, directing and control;
- Directing function contains functions of planning, organization and control;
- Control function contain functions of planning, organization and directing.

Planning function means making projects for reaching some defined goal. The result of planning is making appropriate decision about the goals of object developing and about the policy and strategy for realization.

Function of organization allude relating people who direct organizational activities on tasks performing, using appropriate methods and procedures, e.c. plans achievement.

Directing function means upkeep and enlargement efficiency of organizational function. This management function performs:

- introduction of goals, policy and plans to engage people;
- employed personnel directing in performing tasks;
- coordination of procedures and activities (by time and resources)

- problems detection and the way of eliminating them
- activities directing
- watching, evidence and activity analysis
- motivation and employment stimulation

Control function means comparing of planned and realized parameters: organization, quality, quantity duration time period and expencies in the aim of reaching of determined goals.

#### 4. BUILDING INDUSTRY SPECIFIC CHARACTERISTICS

Building industry, using modern technique and technology, must be based on management concept, especially because civil engineering is characterized by complexity and mutability of technological processes, which is caused by specific and various character of building industry.

Considering specific character of building industry comparing to the other economical areas, professional management application in civil engineering is of the special significance, even imperative.

Specific character of the building industry comparing to the other economy areas can be shown in the following:

- Every civil engineering object no mattering its size and assignment is a unique;
- Large works amount in city which gives negative influence on working conditions, performed work quality, works quantity, job organization, workers safety etc.;
- Civil engineering object is immobile, while working stuff and mechanization leave for other location after the job has finished;
- Customer is mostly known, although some small objects or object modules can be built for the market (flats, business rooms etc.);
- Investor usually defines directions for object design, because enterprises are taken on auction in the most cases;
- Great number of working personnel and mechanization are engaged, what demands continual control and watching on projects and coordination of the numerous activities;
- Long duration building period causes often problems out of the plan; supplying with material, mechanization, equipment, financial funds and working personnel; economical policy and regulations etc.;
- Building yards are often far away of the company headquarter location, what gives negative effects on building organization;
- Building yards are sometimes in non urban areas, building is performed in inopportune conditions and it could cause undesirable social and psychological problems with employed personnel;
- Object is built in city under climate and meteorological influence, which causes specific job organization.

Searches on building companies development like an integral continual activity is possible through studying its basic areas: production, technology, organization, directing,

control and personnel. Manager's assignment in civil engineering is to prepare company for the next activities and better functioning of system, e.c. company development.

#### 5. BUILDING COMPANY DEVELOPMENT

Building company development has the special meaning for itself and for community as well. It's activities should enable not only existing than continual development. This development should undertake qualitative and quantitative good position of the company for longer period. Development as a long term continual integral directing process means transformation from the current to advanced state with higher level of organization and company efficiency functioning. So development is a dynamic process which is continually planned and realized, assumes continual transformation, advances and enhancement in all company functions. Contribute to this new state is given by relation between management and company development which is going to be emphasized.

Development as a natural necessity presents survival and is projected from nature to economy and as well on building companies. Development presents directed process to reach predefined goals and results.

Company development should not be interpreted as enlargement. Development is a complex process which undertakes by enlargement of value and production amount as well advancing of: production, technique, technology and organization; managing, directing and quality; production programs and occupational safety; total organization and organization of single services and establishing new ones etc. So enlargement means quantitative advancing and development means qualitative advances. Development contains enlargement.

The final step of overall development process is developing programs, investing after all necessary research activities, determining developing goals and policy and making plans for development. Investment documents making is applying (preinvestment and investment studies) complex tasks and efficiency of investment realization depends on them as well total company development. So those jobs are of the primal interest and must be performed on scientific methods and principles.

Any qualitative and consequent developing program can be disturbed during realization period, especially during object building. If the building duration term is over timed than planned, it can rather produce negative than positive developing effects. Software aided managing concepts is recommended to reduce undesirable over timing of building term duration. It can reduce or even eliminate time and financial overflow during building terms.

#### 6. MANAGEMENT IN SCIENCE AND ROUTINE

Management is often considered as a system of government, meaning a group of people have some authority in directing tasks, leading them to common goals. Very important aspects in this condition are: choice of managing people, level and domain of their authority.

Management, basically routine, nowadays is for sure modern complex scientific area engaged on researching managing in various systems. For this area which favor creative

work, but routine is related to experience, nowadays can be said that it is a science and a routine as well. Management development tends to become as much possible science than routine. Involving greater number of scientific areas and basing procedures on scientific principles encourages that motion. Management have engaged numerous scientific areas like as: building technique, organization, technology, economy, cybernetics, informative, psychology, sociology and others. From the other side, all mentioned sciences increase management participation in solving its own problems.

The most of people in civil engineering have a view on management as a routine, considering that good manager could be an able man with a long experience on managing positions. This point of view must be changed, what means establishing serious educational institutions, where the future managers should get basic and enhanced knowledge. Education one time through professional carrier and through short courses should be left and continual education and permanent knowledge evaluation applied. Only this educational system enables managers realize efficient managing building companies in the strong concurrence. This educational system in preparing professional managers should enable maximal engagement of our civil engineering and architecture faculties. They have science and expert potential, this kind of education is of the great interest and this occasion should be used. Positive effects could be numerous:

- Building companies would get qualitative professional managers who would manage their companies on more efficient and qualitative way to the most important goal, building company development;
- Faculties could make an advance in using its potentials, rational using of available resources (at first science and expert potential) and make positive step in its own development;
- Interested people would get a possibility for permanent education through courses and training in management in civil engineering.

#### 7. TOTAL QUALITY MANAGEMENT IN CIVIL ENGINEERING

Successful managing in civil engineering can not be realized without total quality management TQM. Total quality management means three areas of evaluation in companies:

- Quality enhancement is a global company goal;
- High quality of products or services is the goal of all employed by the company;
- The one success evaluation is a satisfied customer;
- The most efficient marketing message is high quality of products and services.

Total quality management is defined on different ways, but truly it presents companies orientation to: customer-buyers, higher products quality and advancing of work and life culture.

Definition of Total quality management given by ISO8402 should be emphasized: Total quality management is management in companies with orientation on products and services quality, based on participation of all members oriented on long-term success with customer satisfaction with overall advancing of all people in company and community.

Basic and fundamental principles of Total quality management are:

- Team working;
- Total support with no alternatives to managers on all levels in Total quality management;
- Permanent production systems advancing;
- Results evaluation;
- All customer requirement satisfaction considering him as the most competent arbiter in the quality evaluation.

Total quality management is the revolution in opinion and evolution and evolution in working systems and managing. It could be considered as a managing philosophy which starts with a customer, and not with a production line, profit, loss etc.

## 8. CONCLUDING REMARKS

Through various management definition, sometimes opposite to each other, the most realistic and acceptable is the definition of P. Dusker: "Management is the 20<sup>th</sup> century story about success" [5]. That story should be continued in 21<sup>st</sup> century, we hope with much more intensity and success on our territories. Management has expansion in civil engineering, because building objects is one of the most creative human activity.

Management and managers are essential to building companies (as well to economy and society), company can not be leaded successfully without them.

Changes in applying management and professional managers in building companies require program, economical, organizational, personnel and financial transformation; modern managers capability is not to satisfy only with their companies development than with their own intensive development as well.

Total quality management concept is very occupied in all life and work areas and the last years it has a full expansion. That is a model of managing which rapidly expands in all countries in the world. There are numerous Total quality management models in use, it could be said that each organization has its own model.

## REFERENCES

1. Ansoff, M.I., *Strategic Management*, The Macmillan Press, London, 1984.
2. Đorđević, B., *Osnove menadžmenta*, List, Niš, 1995.
3. Cole, G.A., *Management - Theory and Practise*, DP Publicaron, London, 1990.
4. Drucker, P., *Management. Tasks, Responsibilities, Practices*, Harper&Row, Publishers, New York, 1974.
5. Drucker, P., *Towards the next Economy and other Essays*, N.R., New York, 1974.
6. Group of authors, Monograph: *Construction Technology – Construction Management '97*, University of Novi Sad, Subotica, 1997.
7. Zlatanović, M., Trajković, D., *Razvoj menadžmenta u građevinarstvu i dalje tendencije*, Zbornik radova GAF, No 18, Niš, 1997.
8. Pendić, Z., Grahovac, J., Jović, Z., *Principi TQM i zahtevi sistema kvaliteta - Neophodna podloga za informacioni sistem*, Kvalitet No 5-6/97, Beograd, 1997.
9. Jovanović, P., *Menadžment - teorija i praksa*, FON, Beograd, 1994.
10. Jovanović, P., *Upravljanje razvojem preduzeća*, FON, Beograd, 1992.
11. Đuranović, P., *Organizacija upravljanju projektima*, Izgradnja No 1/96, Beograd, 1996.
12. Simić, V., *TQM principi i praksa*, Kvalitet, No 1-2/98, Beograd, 1998.

## MENADŽMENT U GRAĐEVINARSTVU I TENDENCIJE RAZVOJA

**Milorad Zlatanović**

*Menadžment predstavlja dominirajuću naučnu disciplinu i vještinu upravljanja građevinskim preduzećem. Jedna od najstarijih delatnosti, građevinarstvo, aktivira kreativne sposobnosti čoveka na izgradnji investicionih objekata, čime se zadovoljavaju potrebe za građevinskim objektima. To je samo po sebi dovoljan razlog da bi se uopšte bavili problemom menadžmenta u građevinarstvu.*

*U ovom radu se navodi kratak pregled razvoja menadžmenta kao i značaj i neophodnost uvođenja savremenog menadžmenta u građevinarstvu. Kako postoji veliki broj definicija menadžmenta, različitih autora, ovde se navode samo najznačajnije, odnosno one koje se mogu prihvatiti sa stanovišta građevinarstva. Pažnja je posvećena i funkcijama menadžmenta u građevinarstvu, kao i njihovim međusobnim odnosima.*

*Menadžmentu u građevinarstvu se ne posvećuje nužna pažnja, što je neodrživo ako se imaju u vidu specifičnosti i značaj građevinske proizvodnje za društvo u celini a posebno ako se ima u vidu borba za opstanak i nužnost razvoja građevinskih preduzeća.*

*Kad se govori o menadžmentu u građevinarstvu neophodno je pomenuti i totalno upravljanje kvalitetom (total quality management). Totalno upravljanje kvalitetom je poslovna filozofija i način života savremenih preduzeća širom sveta. To je najsavremeniji koncept unapređenja i razvoja u svim sferama života i rada.*

*Ključne reči: Menadžment, Građevinska proizvodnja, Razvoj*