

# A Model for Managing Civil Construction Company Systems

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## Abstract

At the beginning of the 20th century, organizations in a globalized and highly competitive environment face two options—either they stagnate by keeping their traditional old fashioned procedures, or they make the decision to look forward and change their current procedure, as they attempt to survive competition and become new competitive organizations that can play a more active role in the future market. Organizational changes are naturally linked to risks, and risks mean opportunities, as well as losses. However, as companies try to modify their procedures and adapt their staff and routine to some novelty, they have a good chance to change risks into opportunities. For most companies, adaptation means the use of modern quality management techniques, such as QCC (Quality Control Circle) or other similar techniques and procedures aimed at improvements such as developing their functions, doing their job, and acting as an organization. Actually, civil engineering companies operating in Brazil have had their success closely related to the way they understand, face, and conduct their adaptation. Although such procedures are useful for a traditional organization to change into a modern one with a competitive edge, there is a previous step that should not be overlooked when considering civil construction companies renewal. This paper presents a management systems model for civil engineering companies that desire to renew and improve their performance. It combines appropriate tools according to their proper uses and creates several subsystems: a functional scope subsystem, a management subsystem, an operational subsystem, an information management subsystem, and an organizational behavior subsystem. The use of this model will provide engineers and managers with efficient and efficacious techniques and procedures for civil construction companies to survive in today's global, competitive world market.

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## Keywords

*Civil construction, management systems, performance.*

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## Introduction

The rapid and steep growth in technological innovations has led the world to remarkable changes during the 1980s and 1990s. Such modifications have strongly affected the organizations and their way of conducting business and operations. Not only do these modern

organizations need to comply with the new technological environment, but they also need to fulfill the needs of a new kind of consumer who becomes increasingly demanding each day.

These changing conditions have strongly impacted the civil construction business. This kind of organization has constantly been forced to adjust to a new environment under extreme competition and high client expectations. Actually, such adjustment means a real challenge for these organizations. They have to choose a more aggressive strategy towards being competitive through updating and improving their management procedures, as well as the application of proper technologies.

They aim primarily at offering products with higher quality at lower costs. They want to fulfill the demands of their clients and provide them with the right products at the right price.

In this new environment, there are only two options for civil building engineering enterprises; either they will fail if they insist on the old and surpassed organizational system, or they will have a chance of success if they completely adapt their management to the new conditions, looking straight ahead towards the future. They should also try not only to survive in the new environment but aim at impacting the environment by being an active part of the changes in the organizational structure through innovation and application of new technologies and management techniques. This means to become a real organization of the future.

As we all know, any change in business environment may present a threat or an opportunity. As companies choose to follow the second option, they will certainly have a better

chance to turn a difficult situation into an opportunity. The authors have observed that building a company's performance is strongly related to two basic phases: properly understanding the new conditions and adequately implementing the necessary adjustments [1].

For most companies, adaptation means the use of modern quality management techniques, such as QCC (Quality Control Circle) [2], or other similar techniques and procedures, aimed at improvements that include developing their functions, doing their job, and acting as an organization. Although such procedures are useful for a traditional organization to change into a modern one with a competitive edge, there is a previous step that should not be overlooked when considering civil construction companies' renewal—reviewing their management system.

The complete improvement and update of the organization's management system is certainly the most effective way to enhance the organization's performance. The new management system should recover the company's competitiveness in the short run, while promoting gradual company improvement in the long run [3]. Actually, for most traditional organizations that have maintained old fashioned procedures for a long time, the decision to act towards changing will be a remarkable step for the transformation process.

Three level administrative procedures have been developed for handling last century industrial development. In the first upper-level, we find those who perform activities related to thinking and planning; they are known as the decision makers. In the second level, we find those

who are responsible for activities related to checking; they are the controllers. Finally, in the third level, we find those who are in charge of executing; they are the makers [4].

The above structure did not bring about an appropriate environment for initiative and development. It provided no basis for a good managerial system. People's objectives and responsibilities were defined and non-interchangeable at each level. Strategy was used only at the decision level; tactics, at the control level; and operation, at the execution level.

Today acute competitiveness and high technological advancements require that a modern organization adjust their management system to a flexible structure where all members can decide, control, and do. Everybody must take part in strategic, tactic, and operational activities. Nonetheless, specific activities will compose the tasks of each organizational level (i.e., while each level will be responsible for specific tasks such as strategic planning, tactics, and operation, people at every level will be required to understand and take an active part in all of these activities.) Actually, a modern management system must put together management tools, as well as performance evaluation tools.

### **Management System**

The authors agree with Arantes [5] that the management system is a set of combined tools aimed at helping the administration conduct the job in an efficient and effective manner. Therefore, the manager's mission lies on "identifying the objectives and translating them into action, through tasks such as planning, directing, and controlling for all efforts directed to all areas and at all levels of the company in order to successfully reach those identified objectives" [6].

On the other hand, the main task of the management system is providing managers with an integrated set of techniques and procedures to allow them to adjust the achieved results with the organization goals and objectives.

The management system proposed in this study puts together management tools (called subsystems) according to their specific functions, so that they can provide managers with conditions to ease their tasks within the organization. These subsystems are: a) functional scope subsystem; b) management subsystem; c) operational subsystem; d) management information subsystem; and, e) human organization subsystem.

#### a) Functional Scope Subsystem

This subsystem defines the reasons for the company to exist. It sets the way it should be organized to perform its duty by defining the macro-objectives, as well as the organizational structure (the organization levels and their interrelationships).

#### b) Management Subsystem

This subsystem provides tools for civil construction enterprises to undertake actions related to planning activities, as well as to evaluate the gap between planned and achieved results. These procedures are developed in three levels: 1) strategic planning, tactical planning, and operational planning; 2) direction; and 3) performance management.

#### 1) Strategic Planning, Tactical Planning, and Operational Planning

Strategic planning is developed through the following phases: strategic prospective; strategic analysis of potential forces; strategic positioning for business; and selecting strategic actions.

Tactical planning is used to turn the strategies developed in strategic planning into policies, organizational plans, and qualifying plans.

Operational planning unfolds the policies into operational plans, programs, and projects for products and services.

## 2) Direction

This is the management subsystem vector that provides managers with tools to improve their development of leadership capabilities, coordination, and decision making.

## 3) Performance Management

This phase aims at the improvement of the organizational system performance. It identifies whether the system is developing according to plan. It includes measurement, feedback, evaluation, variation communications, and implementing corrective actions.

## c) Operational Subsystem

This subsystem provides tools for identifying and applying productive procedures. It allows the organization to better develop products or perform services for supplying their clients with quality and efficiency.

#### d) Management Information Subsystem (MIS)

The management information subsystem is aimed at supplying the company with a set of organized and updated information. This organized information should allow managers to optimize their communication system and decision making process.

This subsystem is structured in the following six phases:

- Establishing an administration committee for MIS
- Developing the plan for MIS
  - Evaluating the present situation of the MIS
  - Identifying information needs
  - Designing the MIS general project
  - Designing the detailed MIS project

#### e) Human Organization Subsystem

This subsystem identifies actions and activities that will promote motivation, as well as create an adequate environment for personnel training whenever such actions are stimulated and/or developed in the organization.

### **Advantages of the Proposed Management System**

Although several enterprises have used management tools, either they are isolated systems or apply to isolated areas of the organization. This system, however, is comprehensive

and provides an integration of the organization actions, allowing the management of conflicts that may arise from actions applied to different levels or areas of the organization.

The ever-increasing complexity of production process interactions due to technological innovations, as well as to marked demands, requires an efficient and effective management system.

We highlight the following advantages for this system:

-Small and medium size civil construction enterprises in Brazil have benefited from this system, especially when we consider that they would not have the financial, material, or human resources for developing such a system alone.

-Many entrepreneurs in the Brazilian civil construction business, mainly those running small or medium size enterprises, use only their empirical knowledge and personal institution because they lack the skills to use an effective and organized methodology for the proper conduction of their business. Therefore, the proposed management system provides such entrepreneurs with the necessary tools to develop their management process in a systemic way. They can then make better use of the knowledge, integration, and rationalization of actions and decisions to be taken. We believe that the use of the proposed system may help avoiding failure of new small organizations due to poor management.

-Due to high levels of competition in some areas of civil construction industry, the price of several products and services has to be minimized. The only way to reduce the price without reducing the profits is through the optimization of management and operational procedures. We can see that the knowledge of the process, as well as the use of the proper management system, becomes paramount for the organizations to face this challenge for a better competitive position.



-This management system has also caused a significant reduction on civil construction costs with a benefit for society. Moreover, the development of organizational management will certainly contribute to the economic system in their area of activity.

## **Conclusion**

This system should not be seen as a finished element. It can suit any kind of civil construction enterprise, provided that tools are duly adapted to fit the management and operational procedures of that specific organization.

It needs to be understood that this model is not a frame for managers to adapt their organizations but just the opposite. The model should be adapted to the organization. Such adjustment is completely possible due to the flexibility of the system.

The present model may be used for those organizations recently established, as well as for those already in operation. For those organizations already in operation, it will demand a shifting process that should be properly planned so that it will be successful.

Therefore, for such process to be successful, three conditions should be met. The first condition refers to the sequence for applying the phases of the management system. The system phases should be applied following the same order presented in this paper. Initially, the functional subsystem will help the organization start by reconsidering its mission, enterprise objectives, and organizational structure. The other subsystems should then be sequentially applied to the organization.

Each of these steps should be seen as a period of reflection and study about the organization itself. Advantages, disadvantages, and opportunities brought about by each element of the model should be carefully analyzed, taking into consideration each specific characteristic of the enterprise and the organization's specific culture.

A second condition to be considered is the time interval needed between implementing changes and obtaining expected results. The third condition is people's resistance before changes. Every change process can generate some resistance level. People fear having to adapt both their habits and existing procedures. In general, this is not an open resistance but a disguised one, since people have difficulties in prioritizing their own interest's vis-à-vis the organizational interest. Protection from this kind of resistance can be the use of negotiation, education, and training. These tactics have been presented in the proposed system.

The proposed management system will increase the efficiency for civil construction enterprises. It is a fundamental tool for the application of the company activities in an integrated way with adequate quality to fulfill the clients' expectations. This tool will allow managers to minimize the use of company resources, such as materials, workforce, and production facilities. It will also allow managers to keep the shortest time for completing the work.

When developing this research, the authors realized that many managers do not understand the management system concept as a formal set of techniques and procedures that help them establish a relation between enterprise objectives and expected results. The authors also perceived a lack of specific literature referring to the applications of management system concepts to civil construction engineering. Literature on these concepts was found; however, the literature applied these concepts to other productive areas. Nonetheless, this literature did contribute to the development of this research.

We hope this paper can stimulate further research on the subject. Furthermore, we are positive that the use of the model for civil construction engineering will bring about opportunities and the need for improvement of the presented management tools, as well as for the development of completely new tools.

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