

Information System for Construction Management of Highways

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Abstract

In this paper we will present the information system intended for the Highways of Montenegro construction firm. As a basis for this information system we shall use the Primavera software's. The information system of this company has to be compatible with the optimal model of organization structure. In this information system we shall present and comprise the original software for marketing of construction companies. We hope this paper will be very useful for future development of The Highways of Montenegro firm as well as for providing of better conditions for realization and for planning and maintenance of highways in the forthcoming period.

Keywords:Information System, Organization structure, Software's, Highways

1. Introduction

The Republic of Montenegro has inadequate structure of infrastructure constructions, especially of highways. The government of the Republic of Montenegro hasn't built any new highway during the last twenty years. The government has only invested in reconstruction of the existing highways. General development of Montenegrin economy is based on infrastructure constructions. The Europe Union made *the Study Development Infrastructure for region Balkan-transportation- (REBIS)*. The study regards development of the traffic infrastructure in the Balkans. A part of this study is development of Infrastructure-transportation objects in Montenegro in next ten years. Realization of this study is one of the pre-requisites for the Republic of Montenegro's admission in the Europe Union. A big obstacle to realization of *the Study Development Infrastructure for the region Balkan-Transportation- (REBIS)* in the Republic of Montenegro is deficiency of the construction companies dealing with planning and construction of highways. There is only one big firm engaged in construction of highways in the Republic of Montenegro. This company's name is The Highways of Montenegro and it employs approximately 950 workers. The Highways of Montenegro firm has mechanizations and equipment but it does not have a suitable organization, information system and practical knowledge. We shall in this paper present the information system intended for the Highways of Montenegro construction firm.

2. The present Model of Structure Organization

The Company “Crnagoraput” covers the whole territory of Montenegro when it comes to the building of new structures, reconstruction and maintenance of the existing road infrastructure. This company deals not only with construction, reconstruction and maintenance, but also with production of building materials. This company has facilities for exploitation and processing of raw materials, quarries, crushing plants, screening plants, concrete factories and asphalt plants all over Montenegro. These plants are distributed so to cover the whole territory of Montenegro with the minimal transportation costs. There are three of these plants and these are plant in Podgorica-Cijevna plant, in Podi and Njegovudje and Stitarica. The plant in Podgorica-Cijevan, Podi are the biggest plants and they are engaged into exploitation of material, crushing plant, separation for sifting and washing of aggregate and asphalt base. The Stitarica base consists of the quarry and crushing plant and exploitation of stone filter for topping and is one of the two in this geographical zone (as the aggregate filter is made of special rock compound abrasion proof).

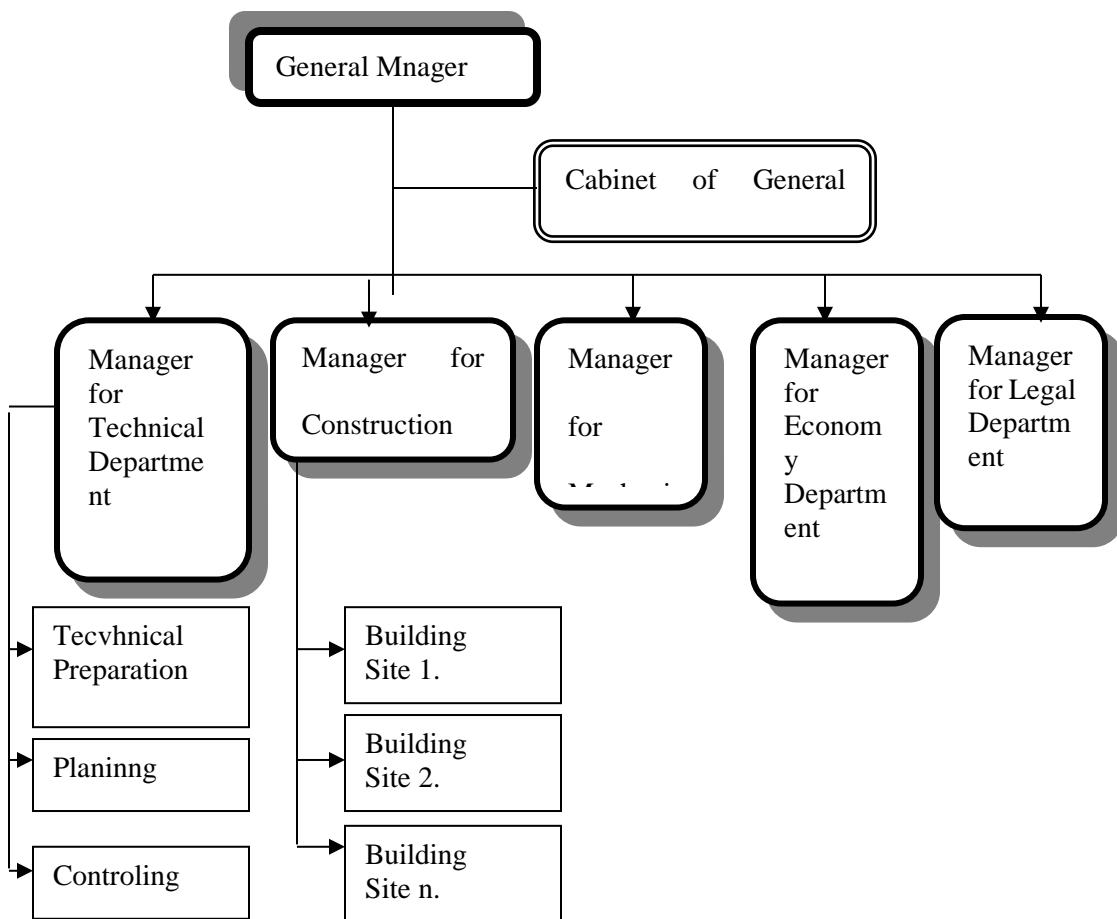


Figure 1. Model of Structure Organization the Crnagoraput Company

The organization model of the Crnagoraput Company is of functional type with vertical hierarchy and generally hasn't changed in last 15 years. The organization model is shown on the picture: The main problem of this organization model is non defined responsibility of the project leaders and of the direct performers as well as of the other employees. Thus, the projects are almost always finished with delay. Great number of hierarchy levels beginning with the direct executors to the managers prevented establishment of the adequate communication and thus responsibility. The level of workers' and managers' knowledge on utilization of modern software tools for process control is very low. So, apart from the organizational problems this company is also faced with the problem of insufficient education of

employees. The existing information system is working only on the Technical service level, whilst among other company levels data processing is organized individually with usage of PCs and MS Office Programs and Project 98. Figure 1. shows the present model of organization structure of “Crnagoraput” company.

3. The proposed Organization Model

The former analysis of the situation in “Crnagoraput” company is presented with the purpose to help defining of the strategy for elaboration of information system, which was our contacted duty. We have concluded that present organizational model of this company is not adequate. It is necessary to change the model in order to enable better functioning and definition of responsibilities as well as the possibility of implementation of the prefabricated software packages. In order to give proposal of information system it was necessary to previously define the organization structure model of “Crnagoraput” company, taking into the consideration all of its specific qualities. In adopting the model, the rationality of the information system elaboration should be taken into account.

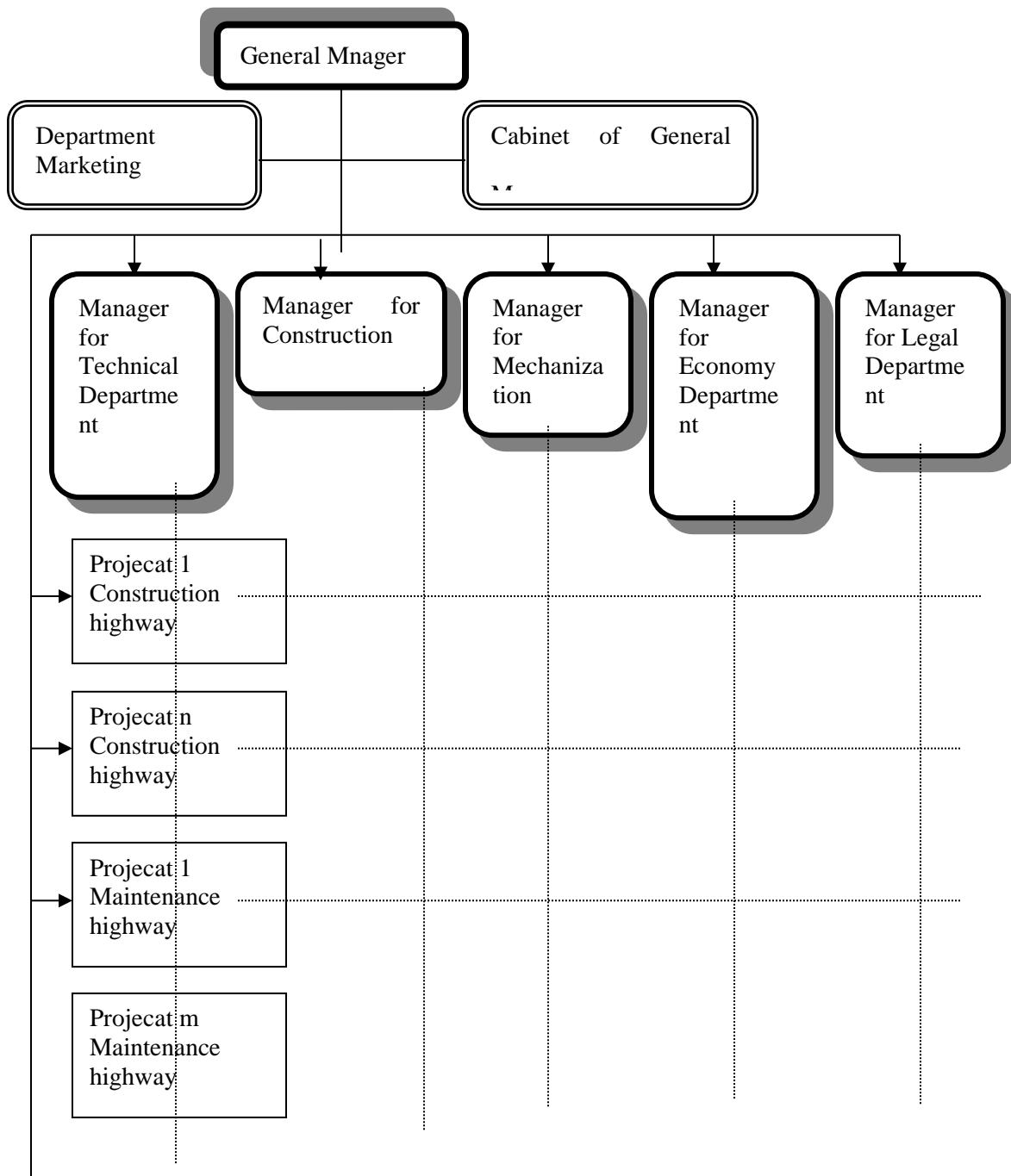




Figure 2. The Proposed Organization Model

The proposed model of the organization structure for “Crnagoraput” company is Matrix Organization, Figure 2. The proposed model enabled moving from functional organization to Matrix Organization with purpose to emphasize responsibility of project leader, to enable better planning and tracking of projects and to reduce great number of hierarchical levels in company managing.

4. The Model of proposed Information System

The proposed structure organization model and software package Primavera are used as a base for Elaboration of the Information System. Due to the great number of projects companies like “Crnagoraput” have to use software packages that provide independent processing of various projects simultaneously as well as adequate reports for different hierarchical levels. Information on project progressing is necessary for making operation decisions in the company management. Picture 3. gives proposal of the information system for the “Crnagoraput” company.

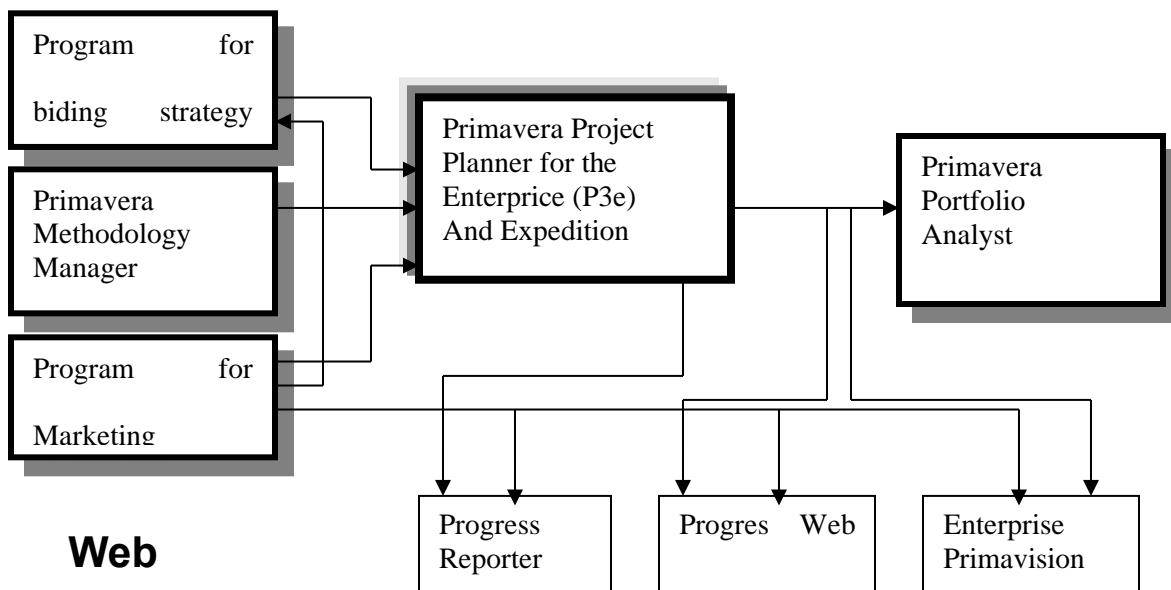


Figure 3. The Model of Proposed Information System

The principal base of the proposed information system is the software of the US software company Primavera. The Primavera Software Company is chosen because many leading international companies use this program as a base for managing and realization of their projects. The Primavera software mainly includes programs related to planning and project realization, but does not include software packages for market investigation and creation of offers and bases for price of materials, labor and mechanization.

The methodology of the information system for “Crnagoraput” company was developed using the following steps:

- New model of the organization structure was defined.
- OBS for the Company established
- ESP is assigned for the Company and the responsible leader (OBS) is determined for each EPS focal point,
- Projects are assigned to ESP focal points and technological organization (WBS) of every project is established,
- Responsible leaders (OBS) are assigned to each project and WBS element,
- General and security profiles are made in P3e.
- Users orders are opened in P3e and leaders in charge (OBS) and project profiles are assigned,
- Necessary resources are determined to complete different projects.

There are different kind of software in the market intended for establishing offers and bases for price of materials, labor and mechanization so we can make a good choice. In this case we suggested the Faraon software package. This program provides creation of data base and price list for labor, material, mechanization, price-lists and norms. This program also provides a rather automated establishment of offers, tenders, situations, bills and price bills of activities and automatically shifts this information to Primavera Project Planner for the Enterprise (P3e) program. This compatibility provides very fast offer creation, and on the basis of it very easy creation of dynamic plans for certain project.

Adequate software package for market investigation that is intended for project management and is also compatible with Primavera package doesn't exist on the market. For those reasons we have had to create by ourselves new software package that would satisfy set demands for market investigation and be compatible with the Primavera and Faraon software program packages. The goals that have been established are investigation of tenders on market for different regions, offer values, accessibility of resources, prices of all resources, experts and legal regulations for different regions, historic data base, investigation of public opinion and advertisement. On account of importance of information system Marketing we have proposed the organization of a new sector.

Program package Primavera Enterprise P3e/c system for planning, tracking and control of all company's projects and is located in the central data base of the company which is situated in the Technical service. By using P3e/c the company can save and manage projects from various locations. Primavera Methodology Manager is an integrated platform for improvement of support to usage of the best procedures, learned lessons and organizational standards in shape of project forms, product forms and measures for procedures assessment. The role of the Primavera Methodology Manager is to create, conquer, organize and improve standard procedures that can be reused for investigation of future project plans.

Primavera Portfolio Analyst offers project abstract and accompanying information for project team members and higher representatives through great number of graphics and reports in monoproject or multiproject environment.

Enterprise Primavision offers interface for leaders of project and members of project team that need «Web» knowledge for managing projects. Users can create projects and manage them by using «Web» browsers. The (P3e) Program can be used for publishing project plans in the form of «Web» page on Internet. The project «Web» page allows project personnel and other concerned parties to view information on project by using «Web» browser.

Information system for corporative managing of projects includes structural access of management of current projects which are in development in various locations simultaneously and are in realization at the same time by the different project teams. To provide security of data and management before the utilization of Primavera software package it is necessary to establish on the level of «Crnagoraput» company organizational system (OBS), project organization on the firm level (EPS) as well as resource hierarchy. And users should be given adequate access rights.

5. Conclusion

The proposed model of information system is projected by using Primavera software package as a base. The process of production of information system for a company such as “Crnagoraput” is very complex, but it is also not so easy to educate the employed to use this suggested information system in an adequate way. On this matter we have adopted the parallel work, development of information system and education of personnel for application of the same as the best solution. The biggest problem is certainly insufficient education of the personnel regarding the technique of managing the projects, work on computers as well as knowledge of the software intended for managing investments. The process of implementation and maintenance of information system is a log one, and it is just like implementation of standards a permanent process.

Considering that this is a pioneer work, greater mobility in this field is only to be expected especially in sector of elaboration of information system for infrastructure investments.

6. References

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