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The Research of the Ecosystem on Green Construction

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Abstract: Green construction ecosystem was studied. The author analyses the system of construction, and proposed the system of green construction based on ecology theory which was included subsystem of the condition, process and objective on the ecosystem in order to lay the foundation for system evaluation. The text analyses elements of green construction system, which would help to improve the competitiveness of green construction for construction enterprises, and meet the requirements of environmentally friendly, resource-saving society. The competitiveness of green construction was considered with objective which was evaluated to maximize the competitiveness, and it overcomes the current competitiveness evaluation from the owners and the interests of construction enterprises ignoring the ecological environment. It is a new method which could provide a strong support as a business strategy based on ecological environmental protection, development and green construction program formulation. Analyses indicators of competitiveness and the relationship of the construction phase, it could identify the main reason for the green effect, and find the need to improve measures in order to lay the foundation for further enhancing the competitiveness of construction enterprises.

Keywords: competitiveness, ecosystem, the system flow, the system of construction, the system of green construction

1. CONSTRUCTION SYSTEM

1.1 Building System

Building systems engineering is a branch of the entire system engineering disciplines, theories and methods of systems engineering in the construction industry [6]. Building systems can be divided according to the process, stakeholders, structure, process can be divided into planning, design, construction, property and other subsystems, subsystem consist of a number of elements of the subsystem elements according to the relationship between the formation of a complex system of multi-level structure. The construction system is an important part of building systems.

1.2 The construction system

The construction is a system with the ideas and methods of systems engineering, starting from the concept of overall, global, and properly handle the relationship between various aspects of the optimization of the entire system. Construction of buildings structures by the drawing which professional design program implemented process of the real structure. This process often involves many aspects of society and hundreds of thousands of engineering and technical personnel, during which contain complex physical and mental, at the same time requires a higher construction technology and the level of organization and management, which is a huge project [1].

From a system perspective, the “construction” function is achieved through the construction of the system; “system” means the construction process by much interrelated and influence each other, interaction, and interdependence of the composition of parts.

The construction input materials, energy, capital, output for the building and construction waste, and so on. The construction system is a black box, its internal organization, personnel, equipment, management models,

technology and other factors. These elements were interrelated and influenced each other, interaction, interdependence [7].

Analysis of the construction project constructed activities, from system engineering principles involved in its internal and external elements constitute the formation of a complex system of construction production. This composite system is mainly composed of subsystems of the construction process, construction conditions, subsystems and construction of the target subsystem.

Construction projects or construction conditions mainly related to construction techniques and management guarantee. The target system including the target level and target elements; construction process, including procurement of materials, project planning, project implementation, project acceptance evaluation, etc. Construction process depends on the conditions of the construction system; realization of the target elements depends on the sub-goals of security and process stages of construction conditions. To conduct an overall study of the construction system, we must study the impact of the construction conditions of the various elements of the system construction process and goals. Commence on the system of construction conditions around the technology systems and management systems.

1.3 The difference between construction and ecological systems

Human society based on human behavior-oriented, relying on the natural environment, material flow is the lifeblood of the social system for the artificial ecosystem of the meridian, that is, “social - economic - natural complex ecosystem”[8]. The Earth's ecological health of the negative effects, in large part of the reason is because people ignore the interdependence of natural and economic systems over the years [9]. Construction exists in the natural ecosystem has its own characteristics, as shown in Tab.1[10]

Table 1. Comparison with the characteristics of construction system and natural ecosystem

Natural ecosystem	Construction system
Acquisition, conversion and storage of solar energy	Consumption of fossil fuels and other energy
CO2 absorption synthetic O2	Consumption of O2 to produce CO2
Certain filtering and the ability to lift the artificial pollutant toxicity	Generate off-site processing of waste
Produce fertile soil	Occupied , destroyed soil
Storage and purification of water	Often caused by the reduction of water pollution and water resources
Self-sustaining and updated; if excessive interference can maintain a balance	Not self- maintaining and updating

It can be seen from the Tab.1: The construction system is a huge consumer and give the ecological environment in a negative impact on traditional building activities in the production and living rooms at the same time providing people with excessive consumption of resources and energy, it generates construction waste, sewage, noise, etc. causing serious environmental pollution, resulting in the destruction of the worldwide decline in the quality of human life and natural ecosystems. Relevant international organizations, research shows that: 45% of global energy consumption used to meet the heating cooling and lighting of the building, 5% for the construction of the building process [10]. Therefore, if construction mode (such as green construction) to reduce energy consumption, has a not inconsiderable role in the stability of the entire ecosystem.

2. GREEN CONSTRUCTION SYSTEMS

The practice of green construction is a highly complex system engineering, not only in construction project management, planning and construction process on the concept of eco-environmental protection and awareness, owners, contractors, project managers, material suppliers also need to have strong environmental awareness.

2.1 The meaning of green construction system

Green construction system is a typical benign operation of open systems, interaction with the global environment, the development of coordinated interaction and traditional construction methods do not take into account the ecological environment, and ignore the interaction with the environment, did not pay attention to the feedback signal of the environment, so that the functioning of social systems once a crisis. Green construction system, we must first clear structure of the system, rationalize the relationship between the various elements of the structure, which is the basis for further qualitative and quantitative research.

Green construction and construction compared to the stressed system, the coordination of all elements of the natural ecology and symbiotic, not just the elements of the construction process, construction technology and management methods of integration.

Construction content refers to material procurement, project management, planning, project implementation, acceptance evaluation, etc. Constitute the green construction process. In the realization of the way, the meaning of the technical means: start from a technical and economically viable method for the implementation of green construction; the meaning of the regulatory pathways as follows: under the premise of using green construction techniques, strengthening construction management and coordination with external for green construction, good protection, which constitutes the condition of the green construction system. The goal is simply more green construction, the whole process of optimal control, the rational allocation of resources to maximize the effectiveness of the system construction, and ultimately achieve the goals and system objectives and requirements, which constitute the target system of green construction. In the output form, it emphasizes on the basis of construction garbage in order to minimizing products and services. Construction systems have stayed in the ecological environment and green construction system emphasizes coordination with the ecological environment.

2.2 The characteristic of green construction system

2.2.1 Open

Green Construction regard as a special open systems^[11]. Green construction open system not only requires coordinated system of internal elements, and the system can self-adapt to the regulation of the external environment, changes in construction conditions, request of the owners. In the natural, economic, and social environment, and can be monitored and adjusted with the feedback of the external information in a timely manner. Green construction is a complex system engineering, green construction is not only a simple reliance on green construction technology, and needs to take full account of the construction site of the venue and the environment, resource use, waste disposal and on-site construction organization, management, and other factors^[12].

2.2.2 Within the system nonlinear interaction

In the overall system, each subsystem is not isolated and unrelated. The interaction has an effect on subsystems, the specific performance of mutual restraint and mutual coordination. The development of a subsystem, the change is not only constrained by other subsystems, and also the impact of changes in their development. Under certain conditions, the interaction allows the parties to produce synchronous non-linear coordination role, so that the overall system to produce the new nature and function^[13].

Correct decision-making capacity depends on the construction process, how to focus on environmental changes and cognitive reasons. The causes and consequences correlate non-linear relationship. The

organizational structure of the ecosystem is a network model, in which there are feedback loops, energy, materials and information flow through the system. The biotic and a biotic components of ecosystem relationship was nonlinear^[9]. Building behavior of the causes and results of non-linear environment impact, we do not feel less than our actions lead to what kind of environmental change. Building behavior of the causes and results of non-linear environment impact, we do not feel less than our actions lead to what kind of environmental change. Even felt a kind of environmental change, using linear thinking may never find the real cause of the cause consequences. The system thinking, a correct judgment of the causes and consequences of environmental changed.

3. CONCLUSION

Green construction system emphasizes the coordination of all elements within the system and the natural ecology and symbiotic, not just the elements of the construction process, construction technology and management methods integration. Including conditions subsystem implementation pathway, the process subsystem of the system content, objectives of the subsystem also includes coordination with the ecological environment. Green construction only as a system, in order to maintain a sustainable competitive advantage in the construction of low-carbon, green tide, in line with the requirements of sustainable development.

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