Analysis on Environmental Impediment Factors in the Construction Process

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ABSTRACT

Recently, during strengthen the concern and restriction about Environment, sustainable construction is gradually considered in the construction industry. However, most researches concerned about sustainable construction were focused on general environmental management of specific items such as sustainable planning, structure and indoor environment, there has been few study on management technique which reflects characteristics of the construction process in order to help perform an environmentally sustainable construction and solve public complaints owing to environmental pollutions.

Therefore, this paper aims to derive an environmental impediment factors by work types during construction process, to propose the managing scheme using EPE(Environmental Performance Evaluating). The research results will be used for developed sustainable construction management techniques for reducing environmental pollutions in the construction site.

KEYWORDS: Environmental impediment factors, construction progress, sustainable construction, Environmental performance evaluation

1. INTRODUCTION

Environmental protection is an important issue all over the world (Tse, 2001). In the construction industry, also during strengthen the internal and external concern and restriction about Environment, sustainable construction is gradually considered. Especially, because most of high-rise buildings are being built in density developed urban environments, the necessity of sustainable project management in construction site is increased gradually.

Nevertheless, most researches concerned about sustainable construction were focused on a standard of natural environment, sustainable building materials, and maintenance process such as indoor air quality, there has been few study on management technique which reflects the characteristics of construction process in order to help perform an environmentally sustainable construction and solve public complaints owing to environmental pollutions.

Therefore, this paper aims to derive an environmental impediment factors during construction process, to propose the managing scheme using EPE (Environmental Performance Evaluating).

This paper provides a systematic approach to dealing with environmental impediment factors caused in construction process and the results will be used for development of sustainable construction management techniques for reducing environmental pollutions and public complaints in the construction sites.
2. CLASSIFICATION OF ENVIRONMENTAL INFLUENCE FACTORS

According to increasing concern and social demand about the sustainable construction, a number of statutes about sustainable construction have been in operation, researches related environmental institutions are continuous.

In this research, based on these statutes and institutions, groups for analyzing environmental impediment facts in construction process can be divided into the following three categories.

(Figure. 1)

2.1 Air

The influence factors to air pollution were classified into two categories, one is "dust", and the other is "gas". Furthermore, management factors of these two categories were analyzed in detail by work types.

2.2 Noise / Vibration

The influence factors to noise/Vibration were one classification criteria to itself, management factors of this category was analyzed in detail by work types. Noises/Vibrations were occurred in priority in the foundation work, early stage of construction, because of the characteristic of construction work.

2.3 wastes

Wastes have a considerable impact on environmental influence factors in construction site, and have a characteristic that were occurred in a whole construction process. The amount of generation also could be quantify and manage more easily than air pollutions and noise/vibration.

The influence factors to waste were classified into two categories: One is "construction wastes", and the other is "toxic waste". These two categories were analyzed in detail by work types

3. ENVIRONMENTALLY IMPEDIMENTAL FACTORS BY WORK TYPE

In figure 2, environmental impediment factors which occurred in construction process were classified into aspect of air, noise/vibration, and wastes, and were expressed by work type.

<Figure. 1> A classification procedure of environmentally impedimental factors
In order to evaluate and manage the environmental impediment factors which were drew at the previous chapter, this paper proposes a EPE system. EPE was introduced for accessing the performance of projects’ (or companies’) the past and present. Fig. 3 show the overview of EPE.

<table>
<thead>
<tr>
<th>Category</th>
<th>Item</th>
<th>Work Type</th>
<th>Influence factor</th>
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<Figure 2> environmentally implemental factors

4. MANAGING SCHEME USING EPE

In order to evaluate and manage the environmental impediment factors which were drew at the previous chapter, this paper proposes a EPE system. EPE was introduced for accessing the environmental performance related to management and operational system.(C. M. Tam et al., 2002)

The LCA(Life Cycle Assessment), usually using the Analysis of Buildings’ environmental influence, is a tool to collect and evaluate the inputs, outputs and the potential environmental impacts of a product system throughout its life cycle. In construction process, however, there is limit to collect and evaluate the environmental influence factors. On the contrary, EPE has been designed for reviewing, evaluate the environmental influence factors. On the contrary, EPE can be utilized to management process or tool that compare and evaluate the environmental influence related to management and operational system.(C. M. Tam et al., 2002)

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As defined earlier, in categories of environmental implement factors, air and noise/vibration are evaluated at the right lower part and wastes are evaluated at the left lower part in figure 3. This system can not only used in evaluation tool of the environmental level of finished project, but also measure improvement environmental level thorough management. Further, it can be used to manuals and standards of sustainable construction process in a company level.

![Diagram](Diagram.png)

**Figure 3** Overview of EPE (Kuhre, 1998)

5. CONCLUSIONS

This research derived the environmental implement factors in construction process by classifying into Gas, Noise/Vibration, and wastes. The continuously management and improvement of these factors reduce the pollutions in construction site and solve public complaints owing to environmental pollutions. Also, EPE system, proposed to manage the factors more effectively, control and evaluate the environmental implement factors and can be used to maintain valuable historical data for permanent reuse. The research results will be used for developed sustainable construction management techniques for reducing environmental pollutions and basis data for sustainable construction in the construction process.

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REFERENCES