ENVIRONMENTAL ISSUES ON CONSTRUCTION WASTES
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(Received 11 July, 2017; accepted 24 October, 2017)

Key words: Construction Pollution Index (CPI), Quantitative

ABSTRACT

This paper presents a systematic approach to environmental management of pollution hazards caused by construction projects it proposes a qualitative approach to assess and control the problem and the method to calculate the construction pollution Index (CPI) which provides a quantitative measurements of pollution and hazards caused by the construction projects. Through the analysis it is observed that noise and air pollution is high in construction site which affect the workers and society more. Waste reduction is a challenge for the engineers and architects in the construction field. And moreover, waste measurement plays an important role in the management of production system since it is an effective way to assess their performance, allowing area of potential improvement to be pointed out. Material waste has been recognized as a major problem in the construction industry which has important implications both for the efficiency industry and for the environment impact of construction projects.

INTRODUCTION

The Construction process and building use not only consume the most energy of all sectors in the India and create the most CO₂ emissions, they also create the most wastes, use most non-energy related sources, and are responsible for the most pollution. The construction industry has the biggest effect of all sectors because of the quantity of materials used in construction.

Waste accumulates from a number of sources including domestic, industrial, commercial and construction. Evident shows that, approximately 40% of waste generated globally originates from construction and demolition of buildings. And this has taken a major portion of the solid wastes discarded in the landfills around the world. As result of the construction waste, contractors are at a loss due to extra overrate cost, delays and extra work on cleaning, lower productivity etc. This significantly affect the performance and productivity of the organization.

Waste Management

Waste management is the collection, transportation, processing, recycling or disposal of waste materials. It is carried out to reduce the material effect on the environment and to recover resources from them, which can involve solid, liquid, or gaseous substances with different methods and fields of expertise for each (Baby, 2011; Rojas and Amlan, 2005; Gul, et al., 2007).

Management for hazardous residential and institutional wastes in metropolitan areas is usually the responsibility of local Government authorities, and management for non-hazardous commercial and industrial waste is usually the responsibility of the generator.

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LITERATURE STUDY

The literature collected is all based on the issues regarding pollution in construction of the past researches and studies. The literatures are studied for reference and there are journals related to the Construction Pollution Index (CPI). The Research suggests that construction activity is particularly subject to more material waste than other business activities because of its complexity (Gordon and Revey, 2006; He-Zhong, et al., 2007; Pheng and Jhonson, 2005; Ming, et al., 2006).

Methodology

From the literature survey it had been learned and concluded that there are many issues about pollution in construction industry. Due to time constraint for the project, the descriptive survey method is to be adopted, whereas other methods may take long duration. The adopted methodology is described in detail below (Fig. 1).

Data Collection

The survey was conducted to the site in-charge or to the project manager of the construction firm. Here are some of the construction firms listed which are visited for the questionnaire survey and the analysis was done based on that. Around 40 companies were approached for this survey and successfully 35 companies has replies positively to answer the questionnaire (Table 1).

Data Analysis

Construction Pollution Index

CPI value has been calculated and this value helps to find the pollution emission during the process of construction. The pollution emission was taken per day and with constant value.

This value has to be limited to 0.7 which is considered to be the permissible limit.

\[ CPI = h_i \times D \]

Where,

\[ CPI = \text{Construction Pollution Index} \]
\[ h_i = \text{Hazard magnitude} \]
\[ D = \text{Duration in days} \]

Questionnaire Survey

The objective of the questionnaire is to give recommendations over the factors that influence ABC technique. A set of questions. Describing about different characteristics of ABC are prepared. Then it is distributed to both the users and non-users of ABC and the results are analysed by statistical approach using an experimental study.

Questions

1. Do you know what noise pollution is?
   a) Yes
   b) No
   c) Do not know
   d) Missing or insufficient data

2. Are you aware that there are rules and regulations regarding noise?
   a) Yes
   b) No
   c) Missing or Insufficient data

3. Do you think recycling is an important community service?
   a) Yes
   b) No
   c) May be

4. To what extent is the air pollution affecting you?
   a) Very much affected
   b) Affected a little
   c) Not affected at all

Fig. 1 Project methodology for environmental management.
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• The value exceeds 0.7 of the $h_i$, which is beyond the permissible limit and affects the health of human and also pollute the environment.
• Noise pollution is a trouble in both construction phase and also during the demolition phase, were as air pollution is not much evident during its construction phase but during the demolition phase its impact is more.
• Government should interfere in the waste disposal and should apt for a proper planning and schedule and alternative for it.
• As per the data collected from construction firm it is evident that the need for waste management is less as they produce minimum waste.

ACKNOWLEDGMENT

I hereby acknowledge with deep sense of gratitude the valuable guidance, encouragement and suggestions given by my guide Rajprasad J company superintendents, supervisors and faculty of Civil Department of SRM University, who has been a constant source of inspiration throughout this project work.

REFERENCES


RESULTS AND DISCUSSION

As a result of the questionnaire it is found that the environmental awareness among the contractors have been increased over the past. The constructors are improving their waste disposal and also preliminary measures are taken to minimize noise pollution and also air pollution. Among from the results of residential, commercial, industrial, thermal powerplant, taking one as an example (Table 2).

The CPI value for these type of residential building were evaluated during the construction phase and its found to be 0.267.

CONCLUSION

On the basis of the questionnaire survey this thesis is concluded as follows.

- Under the parameters considered demolition, excavation, floor finishes has attained the maximum value irrespective of the type of building.

<table>
<thead>
<tr>
<th>S. No</th>
<th>Type of building</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Residential</td>
</tr>
<tr>
<td>2</td>
<td>Commercial</td>
</tr>
<tr>
<td>3</td>
<td>Industrial</td>
</tr>
<tr>
<td>4</td>
<td>Thermal Powerplant</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Task name</th>
<th>$h_i$ value (per day)</th>
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</thead>
<tbody>
<tr>
<td>Demolition</td>
<td>0.6</td>
</tr>
<tr>
<td>Site preparation</td>
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</tr>
<tr>
<td>Cast-in-place RC Pile</td>
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</tr>
<tr>
<td>Excavation &amp; Support systems</td>
<td>0.5</td>
</tr>
<tr>
<td>Foundation Baseplate</td>
<td>0.3</td>
</tr>
<tr>
<td>RC Frame work</td>
<td>0.5</td>
</tr>
<tr>
<td>Steel frame work</td>
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</tr>
<tr>
<td>Roof work</td>
<td>0.5</td>
</tr>
<tr>
<td>Water supply and Sewage work</td>
<td>0.1</td>
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<tr>
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</tr>
<tr>
<td>Lightning systems</td>
<td>0.1</td>
</tr>
<tr>
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<tr>
<td>Computer and communication network</td>
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<tr>
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<tr>
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<tr>
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<tr>
<td>CPI</td>
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