A Study on Waste Minimization and Management in Construction Industry

Keerthi[1] & Samuel Thanaraj[2]

[1]Post Graduate Student, ME Construction Engineering and Management, Nehru Institute of Technology, Kaliyapuram, Coimbatore, Tamil Nadu, India
[2]Assistant Professor, Civil Engineering Department, Nehru Institute of Technology, Kaliyapuram, Coimbatore, Tamil Nadu, India

Abstract: *Construction industry has been developing rapidly around the world. The development has led to a serious problem in generation of construction wastes in many developing countries. The construction wastes grouped into physical and non-physical waste and it has greater impact to environment, economy and social of every country. Before it can be managed well, it is quite important to understand the root cause of waste generation. This paper identifies and detects the factors that contributes to the generation of construction waste. The questionnaire survey will be carried out in many companies. After the completion of the questionnaire survey, the results will be analyzed using SPSS software. By the result analysis the waste minimization, reuse and recycling will be found and the mitigation measures will be provided. The significant factors of each category of waste were determined. The findings will help the construction players to avoid, reduce and recycle the physical and nonphysical wastes. Furthermore, the paper has put forward some recommendations for better improvements in construction with reference to SMART- Waste Planning Tool (Waste Management policy assessment tool).*

Key Words: *Waste Management, SPSS, SMART-Waste Planning Tool*

1. Introduction

Construction and demolition waste management has become one of the major environmental problems in many municipalities. It has been a pressing issue in India since the late nineties due to the running out of disposal sites to manage the huge amount of waste generated. The building industry is consuming a considerable amount of resources, from the most common material sand to the valuable natural assets like timber. If the life cycle of the materials used on site, from its transportation and delivery stage to the end fate is closely examined, it is generally known that there is a comparitively large portion of the materials being wasted because of poor material control on building sites.

There are two main kinds of building construction waste, structure waste and finishing waste. Concrete fragment, reinforcement bars, unused timber plate and pieces are generated as structural waste during the course of construction. Finishing waste which includes a wide range of waste materials is generated during the finishing stage of a building. For instance, surplus cement mortar arising from screeding scatters over the floors inside the building. Broken raw materials like mosaic, ceramics, tiles, paints and plastering materials are wasted because of careless use. The packaging of public and household facilities such as gas cookers, washtubs and window frames are also parts of the finishing wastes.

2. Objectives of Study

The objective of this study is to analyze the waste management within construction context and evaluate its features through Literature Review, Questionnaire surveys and work-site visits. It aims to identify the causes of material waste on site, find the material wastage level for various trades of building projects and explore ways to avoid or reduce material wastage and zero waste for future building projects. In this project, the major causes of wastage are identified and are ranked based on their criticality.

3. Methodology

This project have adopted some reliable and innovative methods which include, selection of study area, systematic collection of data's in the form of literature papers and journals analysis and understanding of data, identification of the topic, project planning which involves adopting innovative ideas for the progress of project success, conducting a detailed study on the needful tools. In this project, for example the data analysis by SPSS (Statistical package for social sciences) software was well studied and the critical factors that are identified by

ranking in SPSS software would be studied and then, to tackle it, a mitigation tool or SMART-Waste Planning Tool is to be used. Survey through questionnaires is found effective because relative case of obtaining standard data is appropriate for achieving the objectives of this study. The ranking was determined by using the mean and standard deviation values computed from the respondents data. The questionnaire survey was done to determine the importance of critical success factors for waste management which was perceived by contractors, supervisors, site engineers working within construction industry.
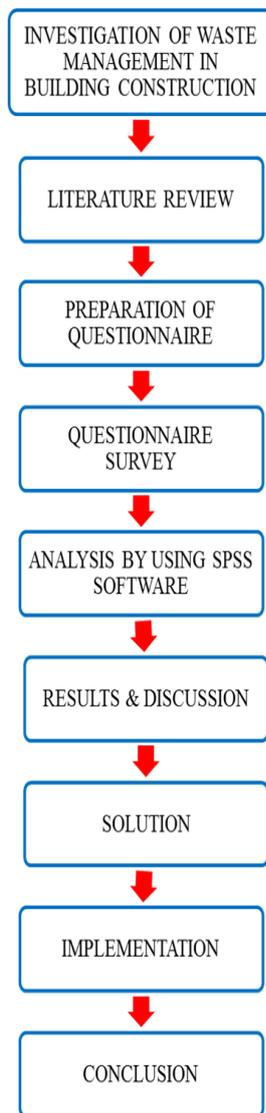

Figure 1. Methodology

4. Analysis by SPSS Software

SPSS (The Statistical Package for the Social Sciences) software has been developed by IBM and it is widely used to analyze data and make predictions based on 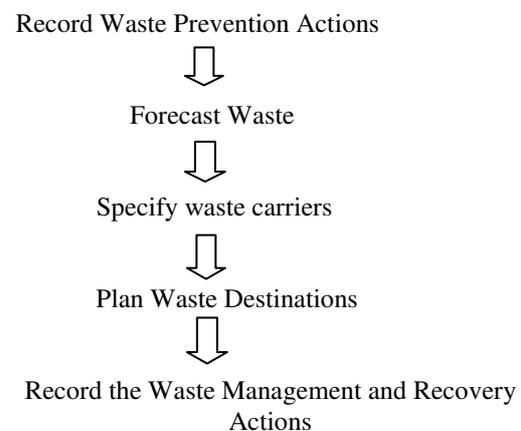specific collections of data. The implications of the results are fairly evident and are statistically valid. The datas obtained after questionnaire survey is then analyzed using SPSS. The mean, mode and standard deviation values are obtained and from these values, we rank the factors contributing to waste according to their criticality. The results may be in the form of bar charts or pie charts. Main Text

5. Result and Discussion

In this section, the results obtained are analyzed, interpreting what the results mean and explaining any results which are unexpected. The discrepancies are identified and also identify any sources of error in the measurements and if possible, suggest how prevention of problem could be performed more accurately. Here, the SMART – Waste Planning Tool is to be used for solving the problem.

6. SMART- Waste Planning Tool

SMART Waste Plan tool is a free tool that has been developed by BRE (Building Research Establishment) to help the industry prepare, implement and review the Site Waste Management Plans (SWMPs) in full compliance with the legal requirements. It can also be used for meeting the Code for Sustainable Homes and BREEAM mandatory requirements for waste. SMART Waste Plan takes you through a step by step approach for the SWMP, making it easy and user friendly. It also include an optional integrated waste measurement tool to help us measure waste on our projects. The Policy Tool evaluates each region's present waste management situation and its potential to improve the waste management. The Policy Tool contains various number of possible measures related to the waste hierarchy.

Record Waste Prevention Actions

⇩

Forecast Waste

⇩

Specify waste carriers

⇩

Plan Waste Destinations

⇩

Record the Waste Management and Recovery Actions

The Policy Tool has been developed on the basis of the Directive 2008/98/EC on waste, the Waste Framework Directive. The Directive

2008/98/EC on the waste determines the use of the Waste hierarchy. The waste hierarchy sets the priority order in the waste prevention and management legislation and policy:

- Prevention
- Preparing for re-use
- Recycling
- Other recovery, e.g. energy recovery
- Disposal

SMART Waste Plan Tool is designed to help users to prepare, implement the waste management policies, to measure the quantity of wastes produced and also to provide suitable measure by which the waste can be reduced in the construction industry. This tool also deals with the new SMARTER tool for measuring energy and water use on site and procurement of certified timber, pre- demolition audits including case studies, bench marking information to help us to compare their performance and a link to the BRE MAP to locate nearby waste management and recycling facilities. It also includes defining a chain of responsibilities, monitor the SWMP requirements of individual contracts, ensure appropriate waste recovery and recycling at an authorized site, inform everyone working on the site of their responsibilities, agree to report back on progress and identify any compliance issues.

7. Solution

The solution is found out based on the critical factors obtained from the analysis by SPSS software. The solution should such that it will reduce the wastage in building construction by considering the critical factors. In this project, solution will be by using SMART- Waste Planning Tool in the construction site. For that, the details about the SMART –Waste Planning Tool is collected. The details of the tool are collected and properly investigated and the solutions are found out.

8. Conclusion

As environmental protection has been pressing hard around the world, pollution generation from construction activities seems cannot be controlled. Reusing, recycling and reducing construction materials have been encouraged and suggested for the practices in construction activities. Recommendations on reusing, recycling and reducing construction materials will also be discussed. Companies need to be innovative in their use of recycled materials and reduce their dependency on raw materials. Also, more datas and relatively better documentations are needed to encourage the use of waste and recycled materials in the construction industry.

9. Acknowledgement

10. References

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