



A Critical Literature Review on Construction Waste Management

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Abstract- Construction is an important aspect of infrastructure and growth in developing countries. In this process the construction industry produced a large quantity of waste which is harmful environmentally and costly for budgeting the project. So waste management is important for construction industry. Construction waste management defines as reduction recycling and utilize of waste by proper management of resources. In this paper, we are going to review on the major sources and factors of generating construction waste by critical literature review. At last, developed framework for the future research in this area.

Keywords- Waste Management, Construction, Factors, Develop framework, recycling

I. INTRODUCTION

Construction plays an important role in developing the infrastructure of the country. But the problem faced by the industry is the construction waste. Construction activities generate more waste compared to other industries. In construction process waste is generated at different stages. like excessive cement mix processes or concrete materials left after work process is done due to change in design rework and demolition occurred and poor workmanship etc. And all the materials used in the construction activities gets wasted, which in turn increases the cost of the project, reduces the profitability and gives a negative impact to the environment. Construction material waste is difficult to be recycled. Also there is no sufficient space for disposal of waste in cities.

Construction waste management defines as to eliminate or reduce the waste and recycle the waste materials which are feasible and to reuse those materials. Three most important stages of waste management should implement. At project stage which the large quantity of wastes are produced, at planning and complexation stages. In every stage consideration of the material is very important, when the use, and reuse of materials will be efficient in generating construction and demolition waste (C&DW) plans.

II. PREVIOUS LITERATURE REVIEW

Rawshan Ara Beguma et al. (2007) identified some waste minimization factors which are helpful for implementation for construction waste management system in the construction industry. And provided proof on the important stage of contribution and the stage of construction practices among the waste minimization factors the model of weighted average of factors and minimization and practiced index value of factors and analyzed indicate the most important, less important and important factors that contribute to waste minimization and the maximum construction practiced, less practiced waste minimization factors in the construction industry of Malaysia.

Effie Papargyropoulou et al. (2011) focused on Malaysian construction sectors current status of waste management and level of sustainable practices on construction sites of waste management and examined attitudes and response of Malaysian contractors towards waste management by interviews were conducted with Malaysian contractors. Concluded industry's level of awareness and commitment on waste management very low and disappointing.

Al-Hajj A. et al. (2012) identified from data collection from two case studies of construction projects construction practices to reduce construction waste generation in the UAE construction sites by a literature review of research. and concluded that of people are lack of awareness, less importance towards the waste management on sites and showed that contractors are consider that waste management is extra cost of the project.

Mansi Jain et al. (2012) focused on the economical aspects of waste minimization of construction waste materials in terms of cost savings of construction projects of India. And found that Due to lack of site waste management systems, lack awareness of waste minimization in Indian construction industry cause of generation of large quantities of material waste. This affect not only at environmental but also in terms of economically as waste materials handling cost. And found various causes for the waste generation like lack of awareness among owners and contractors, lack knowledge of labor, lack of proper training and education towards waste minimization system.

NitishBagdi et al. (2013) used secondary data for the implementation of waste management practices in construction sector in India. Data based upon results from interviews of stockholders which focused on some of the significant issues

and challenges and connected with the implementation of waste management system of India. And found that lack of awareness of contractors and the construction workforces are major challenges connected with the implementation of waste minimization practices in Indian construction industry.

Job Thomas et al. (2013) enlightened the waste minimizations 3R System of reduces, reuse and recycle for the construction waste management in India. and the resources from construction and demolition (C&D) wastes is yet another benefits for recycle materials for the construction industry of India. And also identified that the some wastes are reduce by proper design in early stage .it can possible to minimize the some level of C&D waste generated taking proper construction and demolition methods.

Manal S. et al. (2014) developed a detailed process for to calculate construction and demolition waste management approaches by use of Decision Matrix technique. And introduced procedure helps the decision maker such as the C&D contractor or Transportation firms as well as the policy maker on strategic level to take the different influencing factors. Provided data, when planning; changing or implementing C&D waste management systems and approaches. And recommended to make a cost and benefit analysis for each stakeholder in the CDWM system considering weighing the discussed pros and cons of every approach.

Shishir Bansal et al. (2014) concluded that there are less amount of natural construction resources so It is necessary to reduce C&D waste generation and increase reuse/recycling as the construction industry .in view of international experiences, shortage of aggregate from natural sources being discovered in many parts of the country, so now recycled aggregate can use in constructions processes. The government Municipal waste laws are required to modify and prepare effective plans and strict rules and regulations are important forget out of this problem. And recycled products are important to promote the use.

NuriaCalvo et al. (2014) described a system based on rules measures which key factor in order to create a 3Rs model (Reduce, Reuse, Recycle) for incorporate universities in the C&D waste management for costs savings. By main objectives like restraint of idle wastes, reduction of unnecessary landfills and imitation of recycled C&D wastes and found a broad understanding of the socioeconomic factors implications of waste management over time and policies in the recycled aggregates market and got the goal of 30% C&D waste aggregates in 12 years or less then it.

AbhijithHarikumaret al. (2014) suggested the reusing of the material waste is very good and helpful especially when it will be useful in minimizing demolition of earth's stone crust and green forest cover by aim of reduced mining. By proper reduce, reuse and recycling, these waste materials will not addition of wastes at dumping and disposal sites. Showed that Construction industry can help by encouraging use of recycled concrete stones and bricks. Towards its commitment to protection of environment.

Sadhan K Ghosha et al. (2015) proposed a model for transportation rates and resale value of recyclable materials which makes use of easily available data that can provide an intuitive and simple optimization model for the basic principles of Reduce, Reuse and Recycle into action. Identified the most common causes of waste on site. And identified the advantages of construction waste management.

Noraziah Wahia et al. (2015) conducted a review of existing waste control practices adopted by the responsible parties in Hong Kong and Malaysia in order to minimize the environmental impacts of construction activities. And also embraces the differences and similarities of waste control practices in both countries reviewed. And concluded, there are still many efforts that the Malaysian government can undertake by taking Hong Kong as a role model to tackle the C&D wastes issue. Suggested that there is future research on creating awareness by means of providing effective training on proper waste management method. And to providing Facilities to support waste management part in recycling need upgrading and improvement.

Sumit Arora et al. (2015) slated that natural resources are limited in nature and will be depleted with time. In order to conserve the natural resources, unnecessary wasting of natural resources should be restricted and regulated. Formulation and implementation of proper waste management plan throughout the life cycle of the projects can minimize C&D waste. With an integrated resource management scheme, most of the construction and demolition material can be recycled or reuse and more natural resources can be conserved for our next generations. The success of recycling requires promotion by means of education and information, in addition to judicial rules from the concerned governing body.

Harish. P. Gayakwad et al. (2015) concluded that it is difficult to manage Construction and Demolition waste in the future. Data should be generated On the basis of Construction and Demolition waste generation on sites. And promote the. Separation of Construction and Demolition waste. The method for collection of waste should be discovered and modified it suitable for future. Reuse and recycling of waste materials also should be in method thus charges should be applied on generation of Construction and Demolition waste

Markandeya Raju Ponnada et al. (2015) studied the sources and causes of demolition waste, its environmental effects and suggested the most effective waste minimization methods. Based on the research, construction Waste management plan was evaluate. For effective and proper use of C & D, it necessary that the governing bodies make the implementation practices of this plan regularly. And suggested increase methods of waste minimization. Questionnaire surveys and interviews were conducted to collect professionals opinions on key issues and factors and found factors like better supervision, human resources, knowledge, technology and policy to improve performance of waste construction management.

Nur Najihah Osmana et al. (2016) slated that Improvement in construction waste management among industry stakeholders especially in Malaysia is crucial in ensuring the industry continues to remain relevant. In addition, developing countries like Malaysia are still lack of awareness of the importance of good waste management practices due to the issue of monetary profit that becoming main target to the industry stakeholders. Awareness of industry stakeholders are seems important in order to minimize the gap between developing countries and developed countries.

MiladNajafy et al. (2015) examined the most affected factors behind the waste management system the lack of awareness among different stockholders of industry about applications of waste reduction and recycle and demerits of an improper System and there is minimum technology available for recycling and reuse materials such as demolition waste recycling, aggregate recycling and mostly reusing methods for on-site construction in Northern Cyprus. And concluded that the most important results by the lack of knowledge were the reasons behind that to reduce waste materials, which is reported to be the lack of knowledge about the benefits and application. And suggested that local governing body should perform effective processes and promote C&DWM plans in the Northern Cyprus among lead contractors, designers and constructors.

Thangjam Somchand Singh et al. (2015) reviewed on systematic investigation on the management of construction materials and construction wastes are presented. Review revealed the requirement of a change in management processes of construction materials. Introduction of mechanized handling of construction materials will improve efficiency and cost effectiveness on the construction site. It revealed that minimization of wastage of construction materials during the construction phases is helpful for reduce the cost of the project.

Sawant Surendra B. et al. (2016) slate the management of construction waste plays important factor in the cost of project. And it can estimate the cost of construction waste and its impact on cost of project. and also observed that by the generation of construction waste not only the cost of the project get increased but also high amount of valuable land is got occupied by waste generated in construction industry and it had negative impact on environment. And suggested that by reducing construction waste can help decrease the cost of project.

Noor zalikhasaadiet al. (2016) reviewed on current situation of construction waste management in Malaysia construction industry by literature. And invented that that have been implemented in the Malaysian construction industry is not serious on the construction waste management. And concluded that, a effective support by the government is needed and providing a most effective policy in managing and reducing construction waste. Otherwise, the sustainability of resources and environmental problems will not be reduced and eliminated effectively.

RoselineIkauet al. (2016) defined a better understanding of the sources, causes and factors affect construction demolition wastes by current waste minimization practices on construction sites in Malaysia by determining various factors causing construction waste generation in the Malaysian construction sector And concluded that Lack of knowledge, lack of experience, poor supervision, improper inventories, lack of storage leading to damage and Rework. Concluded that Malaysian construction need world level awareness to construction waste management.

S.M. Elgizawy et al. (2016) tried to provide an integrated solution for developing countries that combines efforts in slum development and zero waste management to get a higher impact on the local area and the national level. By providing job opportunities to the slum dwellers, enhancing the waste management mechanism and reducing the wastes sent to landfills hence moving towards the realization of the zero waste concepts and at the same time fostering the feeling of identity of the slum dwellers and solving the landownership problem. And concluded that Slum development through zero waste concepts is a comprehensive solution to the current slum development problem and waste accumulation problem and should be encouraged by the government.

Saheed O. et al. (2016) suggested that site construction waste management practices could be important for reduce waste generation. Like strict construction waste management, project drawings, no design changes during construction process. And concluded poor knowledge, poor design documentation and lack of awareness towards waste minimization would increase construction waste generation. Site supervisors should be with the knowledge of waste minimization which could reduce of waste generation on sites.

R. Shreena Shankari et al. (2017) highlighted the importance of waste management in construction, amount of waste generated in construction project, methods of minimizing waste and best methods involved in construction industries for

minimize waste. Identified the factors that can contribute to materials that are minimum wasted. which is a need to concentrate even on materials that are least wasted as any small improvement in reduction of waste generated adds to the advantage in improving the overall efficiency of the project and enhance the construction industries performance with cost saving benefits. And suggested waste management plan which only minimizes the material waste but also improves the profitability and decreases the cost overrun.

Eyong O. P.et al. (2017) assessed the perception of construction operatives, Tradesmen and Artisans on materials waste generation in the construction industry, with a view to encouraging better performance of construction projects in Nigeria by employed questionnaire survey. And analyzed that Design, Poor materials storage system and Theft and vandalism are the most important factors that influence material waste generation during construction and Proper site supervision and management techniques, adequate storage of material, and Staff training and awareness on waste management are the measures of minimizing construction material waste. Recommended that site operatives and craft men should be carried along in every management decision regarding waste management plan development as they constitute the major stakeholders on sites.

IV. CONCLUSION

Based on the critical literature review several points can be preliminarily concluded:

- 1) For site factor, five factors were identified from the previous work as: Theft, vandalism, damage of materials on site, unnecessary inventories in site, rework, Improper cutting of materials.
- 2) For Environmental factor, four factors identified: Waste disposal, weather conditions, improper land filling and act of god.
- 3) For economical factor, five factors identified: separation of sources, transportation cost, and cost of waste disposal, labour of waste disposal, labour of waste disposal, labour cost, and recycling cost.
- 4) For technical factor, eight factors identified: Lack of supervision, poor storage facilities on sites, error in design, design changes, human error, lack of communication on sites, lack of waste management, and ineffective method of work.

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