

# A Review Paper on Assessment of Construction Waste Management Techniques used in Residential Building Projects

<sup>1</sup>Afreen Bano , <sup>2</sup>Sarthak Singh Rajput,

<sup>1</sup>Student M Tech (CTM), <sup>2</sup>Assistant Professor,

<sup>1</sup>Department of civil engineering, Integral University, Lucknow, 226026, India

**Abstract:** A construction waste is becoming a widespread part of any construction project. Land filling waste materials was the standard solution for almost all construction, but as tipping fees have risen effectively over the past few years, many contractors are looking for alternative methods, such as recycling or waste minimization, to reduce wastes. The goal of this paper is to give understanding into the appropriate technology for 'zero waste' at the construction site and proposes a methodology to address the problem of assessing waste disposal technique efficiently and economically. We recommend implementing a waste minimization method to help achieve the target of zero waste at construction site.

**Keywords:** Construction Waste, Construction Waste management and Waste minimization technique.

## 1. INTRODUCTION

Construction waste minimization and its management has become a serious and challenging environmental issue in developing countries. Waste is a vital issue that is faced by the management of Construction processes to reduce, reuse, recycle and effectively dispose of wastes has a serious bearing on the final cost, quality, time and impact of the project on the environment. Development of infrastructure facilities is conducted by construction, remodelling and demolition of buildings, roads, bridge, flyover, subways, and other similar establishments. The waste generated mainly consists of inert and non-biodegradable materials such as concrete, plaster, wood, metal, broken tile, bricks, masonry etc. Waste generated by the excess use of material, equipment and any other tangible resources. Achieving Zero waste will be a breakthrough strategy for a world in an environmental crisis, however, this a highly challenging target in construction, but by involving and committing all stakeholders to reduce waste at source and developing efficient waste management technology by reusing and recycling materials and components, can take industry closer to the zero waste vision, hence, moving from myth to reality. Minimization of construction waste can occur at the various stages of a project life cycle; and opportunities and responsibilities lie with all supply chain stakeholders, particularly client, designers, contractors and suppliers.

There are two main kinds of building construction waste i.e. structure waste and finishing waste. Minimization of construction waste is important not only from the view of enhancing the project productivity but also from the environmental issue. Many times actual percentages of waste generation are higher than those considered at initial project stage. This study investigates construction waste and proposes a methodology to address the problem of assessing waste disposal technique efficiently and economically. Current waste management resources are discussed to signify of alternative disposal method. An overall waste management plan is developed to provide a contractor for examining material wastes, quantitatively assessing all costs associated with waste disposal, and implementing and improving the chosen waste management technique.

## 2. LITERATURE REVIEW

W. Y. Tam (2004)<sup>1</sup> provided the existing research studied to examining process of waste management during construction on site by using mapping presentation. The examination leads to develop waste management flow model, which is designed to incorporate the good operation embodied in the existing practice function as a standard model of waste management procedures. The model can provide an alternative tool assessing in planning waste management procedures on site. Rupel Symonds (2005)<sup>2</sup> concluded that the sustainable building has become a national catchphrase. In architect offices and on construction sites around the country there increase emphasis on reduction of environmental impacts of renovation and construction. This study provides solution for reuse of construction and demolition waste through better management. (Abdol R. Chini, 2005)<sup>3</sup> In his paper mentioned as the use of technique and tools for dismantling exiting structure are under development research to support deconstruction is on-going at several institutions and some government agencies are realizing the advantages of deconstruction over demolition by funding research in area of deconstruction and material use. Mr. R. B. Surve (2013)<sup>4</sup> aimed at knowing and causes of construction waste

occurrence. Waste is classified in 3R (Reduce, Reuse, Recycle) principle and suggestion for reduction of construction waste generation is carried out; from which the waste can be minimized and cost of project can be saved. S. S. Patil (2013)<sup>5</sup> delivered a much broader concept to the waste in which each wastes were put under various classification and their elimination can be dealt with in the belonging class. Waste is measured in term of costs, including opportunity cost. Construction wastes are classified based on the ratio of prevention investment cost over the cost of waste and source of occurrence. This paper will be very useful to identify the waste and how the waste can be reduced. . (Narendrakumar, J, & Engineering, 2014)<sup>6</sup> examines various reasons for the problem of waste lack of awareness among clients and contractor, lack of skilled labour and lack of proper training etc.) . Gulghane (2015)<sup>7</sup> reviewed on a systematically investigation of management of construction material and construction waste, material management technique, waste generation throughout the construction stages need to be identified and quantified to minimize wastage, control of construction waste and existing situation of construction management and construction waste in industry.(Sheth, Patel, & Devkar, 2016)<sup>8</sup> indicates that the financial incentives for waste minimization and concentrating on waste reduction rather than waste treatment and recycling have the potential to achieve sustainability. (E. C., R., O. P., & O.S, 2017)<sup>9</sup> concluded that the poor materials storage system and vandalism are the most important factors that influence material waste generation during construction. Proper site supervision and management technique, adequate storage of materials on waste management are the measure of minimizing waste and saving cost of disposal. (Mandlik, Mohammad, Morey, & Malik, 2017)<sup>10</sup> said that the construction waste material are being reused in new construction and recycled concrete aggregate can be used replacing fresh aggregates to save the cost of fresh aggregate.

### **3. WASTE MANAGEMENT TECHNIQUES**

#### **3.1. Waste Minimization Technique**

Waste minimization is a general material management technique used to limit or reduce the quantity of new waste material that are left or use on site. Waste minimization deals mostly with using excess material in new construction and preventing the flow of waste in to landfill.

#### **3.2. Just in Time Method**

Just in time management is a technique which is originated in Japanese auto industry to minimize excess supply of material on site and improve production efficiency. A basic definition of the process is 'producing the necessary unit in the necessary quantities, at the necessary time'.

#### **3.3. Landfill method**

Landfill is the most popularly used method of waste disposal used today. In this process, the waste that cannot be reuse or recycled separated out and spread as a thin layer in some low-lying areas across the city. A layer of soil added after each layer of waste.

#### **3.4. Reduce**

It is process of reduction of waste generation in various stages of construction by efficient material planning. Wastage generation can be identified during the design process itself and care should be taken during execution stage to decrease the waste that may generate. Waste reduction can be achieved by design by considering adequate sizes for all required building materials. Design to be flexible and adaptable to changing uses and design for reconstruction.

#### **3.5. Reuse**

It is process of reuse of generated waste material as landfill. Reuse of generated waste material is done at same or at another site under construction. This involves identification of waste that can be segregated for reuse on the current project or another project and that can be donated. Some of these materials may be valuable to reuse on-site during construction work; others may be sold to be used building material in another site.

#### **3.6. Recycle**

The process of converting waste material to usable construction material replacing the natural materials in some proportion is called Recycling process. After adopting all the options to prevent waste, salvage and reuse materials, the next step is to recycle as much of the remaining waste material as possible. Recycling saves money by minimizing disposal costs and replacing fresh materials at some extent. The material which is obtained after recycling of waste materials can be used with natural materials to make concrete and also manufactured sand with the natural sand in cement mortar.

#### 4. CONCLUSION

A number of recent reports and literature review included in this study aim to promote awareness in the building construction industry about the benefits of waste minimization, including cost savings, and environmental issues and use of recycled and reclaimed materials. The 'three Rs' principle of waste (reduction, reuse, and recycle), has been widely adopted. Waste minimization can be viewed as a threat required expenditure on end of pipe technology to meet ever-increasing legislation, or as an opportunity to cut cost and improve performance. This requires re-designing current practice to contribute to a cleaner environment through efficient and cost effective sustainable waste minimization strategies. However, waste minimization method to be effective and self-sustaining, it is important that all stakeholders along the construction supply chain adopt a more proactive approach in dealing with waste, i.e. designing out waste.

#### REFERENCES

- [1] W.Y. Tam (2004), "Mapping Approach for Examining Waste Management on Construction Sites, Journal of Construction Engineering and Management (JCEM)", pp 22-28.
- [2] Rupel Symonds (2005), "Recycling Construction and Demolition of Waste", the Boston Society of Architects, pp 378-402.
- [3] Abdol R. Chini (2005), "Deconstruction and materials Reuse and International overview", CIB Publication 300, pp. 219-233.
- [4] Mr. R. B. Surve (2013), "Construction Waste reduction", IJRET VOL. 2 S.S.
- [5] S.S. Patil (2013), "Analysis of Wastes in Construction Industry with Lean Thinking, International journal of engineering research and technology (IJERT)", VOL. 2, Issue 11 November 2013.
- [6] Narendrakumar, P. M., J, P. M., & Engineering, A. E. (2014). "Economic Evaluation of Reuse and Recycle of Construction Waste in", 2(2), 635–639.
- [7] A. A. Gulghane (2015), "Management of Construction Material and Control of Construction of Waste in Construction Industry", IJERA Vol. 4, pp.59-64.
- [8] Sheth, J., Patel, K., & Devkar, G. A. (2016). "Analysis of Construction and Demolition Waste Management Policies from Sustainability Perspective", (February), 35–39.
- [9] E. C., E., R., S., O. P., E., & O.S, L. (2017). "Assessment of materials waste in the construction industry: A view of Construction Operatives, Tradesmen and Artisans in Nigeria". The International Journal of Engineering and Science,6(4),32–47.,<https://doi.org/10.9790/1813-0604013247>
- [10] Mandlik, P. P., Mohammad, G., Morey, S., & Malik, S. (2017). C & D "Waste Material Management in Construction Industry of Nagpur Region". International Research Journal of Engineering and Technology (IR-JET),4(3),3–6.Retrievedfrom<https://irjet.net/archives/V4/i3/IRJET-V4I381.pdf>