

# A Review On Waste Material Minimization In Construction Industry

R. Shreena Shankari<sup>1</sup>, D.Ambika<sup>2</sup>, S.S. Kavithra<sup>3</sup>

<sup>1</sup>Postgraduate Student, Department Of Civil Engineering, Kongu Engineering College, Perundurai, India

<sup>2</sup>Assistant Professor, Department Of Civil Engineering, Kongu Engineering College, Perundurai, India

<sup>3</sup>Postgraduate Student, Department Of Civil Engineering, Kongu Engineering College, Perundurai, India

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**Abstract** - Material waste has been identified as a major problem in the construction industry. Studies from various sites confirmed that even the materials that are least wasted like glass, electrical fixtures, paints etc..represents a relatively certain percentage on construction cost. These materials also have an adverse affect on environment. Materials are very important on building sites, and all the materials that are delivered are not used for the purposes for which they had been ordered and disappearance of these materials constitute a part of waste and it has a negative effect on environment and also effects the contractors profitability. The study highlights 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 to minimize waste.

**Key Words:** construction materials, waste management plan and factors contributing to materials that are minimum wasted etc,...

## 1.INTRODUCTION

Construction play an important role in developing the infrastructure of the country. But the problem faced by the industry is the construction material waste. Construction activities generate more waste materials compared to other industries. 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. Building material waste is difficult to be recycled. Also there is no sufficient space for the disposal of waste in cities . Generally the materials that gets wasted include concrete, timer, mortar, steel, bricks ,glass, paints, pvc pipes, electrical fixtures, steel formwork etc...among these materials the materials which gets least wasted but affects the profitability and are paints, pvc pipes, glass , electrical fixtures and tiles. These materials as they are least wasted are not given importance in reducing the waste generated. But these materials cannot be easily disposed as they are not bio-degradable and are sure to cause negative impact to the environment.

**Table -1:** Categories of Material Waste

MAJOR WASTED MATERIALS	MINOR WASTED MATERIALS
Cement concrete	PVC Pipes
Bricks	Glass
Cement plaster	Paints
Steel	Glazed tiles
Timber/Wood	Electrical fixtures

## 2. CONCEPT OF WASTE

Construction waste is any substance, matter or thing which is generated as a outcome of construction work. It consists of unwanted materials produced directly or indirectly by construction industries. Construction waste can also be defined as the bye-product collected and removed from construction work places or sites and civil engineering structures.

## 3. NEED FOR THE STUDY

This paper investigates the factors that contribute to materials that are minimum wasted in the construction industry. As these materials wasted also affect the project cost and effectiveness of the project also cause negative impact to the environment. The main aim of this paper is to discuss the factors contributing to materials that are minimum wasted and the importance of waste management plan. Minimizing the amount of waste material generated will also help in solving the problem of removal of waste. The main advantage of implementing the waste management plan is cost saving.

#### 4.OBJECTIVE

- To identify the sources of waste in construction.
- To analyze the factors contributing to waste generation for materials which are minimum wasted in construction.
- To identify possible measures to minimize waste in construction site.

#### 5. SCOPE OF THE STUDY

- Reduces the cost of the project
- Increases the overall quality of the project
- Reduces the negative impact on environment by reducing the need for disposal of waste generated.

#### 6. SIGNIFICANCE OF STUDY

Construction industry represent one of the most significant sectors in the economy of the country. Also it is well known that waste management in construction reduces material wastage on construction site that accounts for cost over runs. For construction, more efficient use of products means reduced costs of purchasing new materials. Waste management reduces waste disposal costs and also improves site safety through better waste management. Also it improves work efficiencies through accurate detailed design, a focus on reducing rework, temporary works and mistakes.

#### 7. LITERATURE REVIEW

**Ameh Oko John et al (2013)** research deals with the identification of most wasteful materials in construction operation and also they identified the top factors that have maximum contribution to material wastage on construction site.

**Muhwezi (2012)** studied to identify the attributes of construction wastes on building projects in Uganda and to propose the feasible measures of minimizing their occurrences. A simple construction waste management system that can provide information on waste quantities, identify areas that are problematic in waste generation, and be able to analyze the causes of these wastes is suggested.

**Ali Asghar Najafpoor et al (2011)** identified the activities that generate the waste in design, transportation and storage. And by questionnaire survey the most causative factor for waste generation was found.

**Jia-Yuan Wang et al (2008)** analyzed the on-site production and sources of construction waste through data obtained from a questionnaire survey and structured interviews conducted in shenzen. Major reasons for waste

generation were found and and suggestions were given to minimize waste.

**Elizara B M et al (2005)** presents a new concept that aids project managers at construction site to improve the accomplishment level of a project in terms of construction waste management practice. It is based on the identification of the construction waste management influencing factors that play an important role in decreasing waste. The factors are found based on the literature and interview from practitioner on construction project.

**Junli Yang et al (2005)** studied the rigorous literature review in relation to waste generation and management system, identification approaches to reduce, reuse and recycle waste construction materials for the future.

**Bon-Gang Hwang et al (2004)** investigated how different project characteristics affect perception on advantages, from construction waste management, based on the survey results. A questionnaire was formulated to gain perception and opinion on the selection of project characteristics and particular advantages of construction waste management.

**Andrew R F Dainty et al (2004)** explored the efficiency of measures used for minimizing waste generation in high profile UK based construction projects. The case studies revealed a wide range of waste strategies, the broader applicability of which was then studied via questionnaire survey from waste minimization specialists. The most effective measures were given to be those that fostered waste minimization partnership throughout the supply chain.

**Carlos T. Formoso et al (2003)** focuses on the results of two studies conducted in Brazil which investigated the appearance of material waste in construction sites and the main causes for waste is discussed and some cost effective preventive measures were identified.

#### 8.METHODOLOGY

The methodology is carried as per the objectives of study. This study is started by reviewing the literature reviews and interviews from various sites supervisors. The factors that contribute to the materials that are minimum wasted are identified from literature reviews and interviews. Based on these factors questionnaire is prepared and survey is conducted to find the top factors that contribute to material that are minimum wasted from various construction industries and feasible solutions are given to minimize the waste generated.

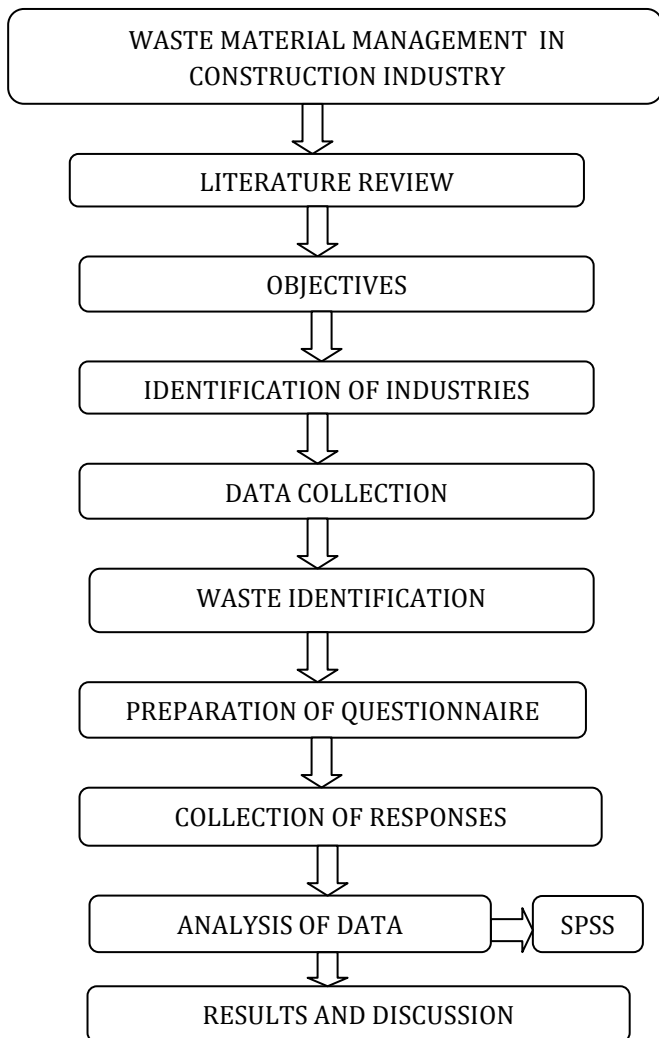


Fig 1 .Methodology flow chart

### 8.1 Factors that contribute to minimum wasted materials

#### PVC PIPES

- Unused pieces
- Poor handling while placing pipes for sewers
- Improper reading of dimensions
- Improper detailing

#### PAINTS

- Over ordering
- Elevated temperature while painting
- wrong estimate
- Usage of tools

#### ELECTRICAL FIXTURES

- Defective materials
- Rework
- Damage of materials at site
- Lack of attention towards materials

#### GLASS

- Improper handling
- Improper storage
- Damage during transhipment
- Care free attitude of workers

#### TILES

- Change in dimension while cutting
- Change in design
- Lack of proper training for workers
- Damages while loading and unloading

#### GENERAL FACTORS

- Attitude of workers
- Lack of on-site material control
- Change in specifications
- Lack of waste management plan
- Bulk purchase of materials
- Absence of site manager
- Theft and Vandalism
- Unskilled labours
- Lack of co-ordination among crews
- Lack of experience

### 9.CONCLUSION

From the study the factors that contribute to materials that are minimum wasted are identified . Also there 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.. It is very important to focus on the waste management plan. Changes in specifications also contribute to material wastage. It is important for the site manager to focus on material minimization strategies. This improvement in waste management plan not only minimizes the material waste but also improves the profitability and decreases the cost over run.

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