

REVIEW ARTICLE ON ATTITUDE OF CONSTRUCTION PARTICIPANTS ON BUILDING MATERIALS WASTAGE

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Abstract - Building materials wastage has been considered to have high impact on construction projects. It affects both environment and economy of a country. India is a developing country which requires a lot of construction materials for its sustainable development. Building materials wastage leads to shortage of materials which causes delay in completion of projects as well as it increases the cost of the projects. This study focused on the attitude of construction participants towards building material wastage. Sources of waste are characterized by four key causes such procurement, handling, operation and culture. The finding of this study is to identify the attitude related causes of materials wastage, materials most wastage as a result of human attitude and key guidelines to reforms the attitude of construction participants. Garrett's ranking technique will be used to rank the most significant factor affecting material wastage.

Key Words: Attitude, material, waste, participants, management, construction

1. INTRODUCTION

Construction is a key sector of the Indian national economy after agriculture. The construction industries in India is growing at high rate which also create waste. These wastes are produced during construction, repair and disposal phases of a building construction. The construction sector is consuming a significant quantity of resources, with possibly the most common material like sand to the valuable natural resources such as timber. Construction material and components contribute around 50-60% of the total construction value. It is estimated that about 10% of all material delivered to site either end up as waste in the course of construction phase. The majority of construction waste of resources (materials) occurs not only because of poor workmanship, inadequate supervision, improper design or poor organization of a site, but because of the pre-notions of the construction participants that wastage is part of the normal procedure. These views often make construction participants show a nonchalant attitude to resources application (Fapohunda, 2011). Waste resources (physical, solid or latent) in nature are non-value added resources (Howell 1999). That is, construction material waste adds no value to the overall outcome of a product. These wastes occur mainly through inefficient use of construction materials. The existences of these material

wastes are both intentionally or unintentionally, which could be avoided during construction production phase through adequate evaluation of attitude and practices of the construction participants. Increase in number of construction project throughout the world, construction wastefulness stems from pre-notion of construction operatives and managers on site that materials wastage during construction is normal occurrence. It is also logical in sense of increase in construction waste which leads to landfills. The perception regarding the attitude of operatives and managers in the delivery of construction projects has led to most project not achieving worth of money. In spite of the fact that many have researched in this area still their exit a gap as far as studies exploring the attitude of operatives are concerned. Materials wastage throughout construction has the potential of making shortage which might adversely have an effect on the quality of work produced. Regarding this an efficient waste management plan should be implemented. However, the labor- intensive nature of construction activity suggests that attitudinal impediments are likely to influence waste level. While some research has been conducted on how existing work process contribute of waste, this perspective is insufficient to tackle the problem, hence the need for this research study.

2. LITERATURE REVIEW

2.1 ATTITUDE

Attitudes are a key object of research in social psychology have studied (Lind, 1984; and Kelman, 1974). From the practical point of view that "attitude is alive and well" (Kelman, 1974). An attitude consists of integral aspect i.e. affective and cognitive aspect. In cognitive, there is a strong self-awareness between an object and its worth similarly, in affective aspect operative handle the object according to its level of worth attached to the object. Knowledge and the affective aspect which is related are important in materials management during construction operations. This is because knowledge of construction operatives will affect the manner in which they handle materials on site which consequently will determine the rate of wastage.

There are lots of definitions given to attitude by different researchers according to Lind (1984), attitude is the degree of positive or negative effect consistently associated with a

person's response to a well-defined class of psychological objects. Baron & Byrne (1984) state attitude as relatively lasting clusters of feelings, beliefs, and behavior tendencies directed towards specific persons, ideas, objects or groups. Chaiklin (2011) opined that a psychological definition of attitude considers verbal expression as a behavior while the sociological definition of attitude borders on the verbal expression of the intention to act. Chaiklin (2011) considers attitude as the mental position with regard to a fact or state or feeling or emotion towards a truth.

2.2 Attitude and perception of the construction workers on materials wastage

Waste has been accepted as an unavoidable by-product, with a strong faith that waste lessening activities will not be capable of eliminate the generation of waste wholly (Teo and Loosmore, 2001). These negative perceptions are the main obstacles for effective waste management. As the construction firm is labor incentive, the attitude and perception of the individuals influence the growth of it. This statement is definitely true for the generation and monitoring of waste. The importance of attitude in waste management was acknowledged by Hussey and Skoyles as early as in 1974, when they state that "it is a change in this attitude rather than a change in technique which is likely to have most effect overall". Teo and Loosemore. (2001) found that attitude towards waste lessening have turn out to be one of the reasons behind the problems for the management of waste in the construction firm. Loosemore et al. (2002) and Skoyes et al. (1987) highlight the importance of human factor for the minimization of waste and argue that waste could be prevented by changing the attitudes of the people.

For the effective execution of waste management measures on a project, the combined effort and the responsibility from the parties involved in it is essential. According to Teo and Loosmore (2001), attitude about waste vary from one organization to another, liable on their culture and waste management policies. In addition, many occupational corporations have different attitudes towards the generation and controlling of waste (Teo and Loosmore, 2001). According to Fapohunda and Stephenson (2011), carelessness is without doubt one of the attitudes of material wastage in construction site operation. The perception of construction material wastage as unavoidable by operatives on site is also a causative factor to material wastage. The belief systems of construction operatives that the wastage of construction material is inevitable and allowance made by procurement for wastage are all attitudes which make a contribution to material waste on site (See for instance Fapohunda & Stephenson, 2011). Other attitudes related to material wastage on construction projects include ignorance of operatives; nonchalance on the part of operatives; and displeased attitude of operatives towards material management (Sawacha et al., 1999).

The above arguments help the opinion that the waste produced by construction is not something to be ignored and

the attitudes of the persons involved in the industry play a main part in controlling waste.

2.3 Factors and sources responsible for material wastage on construction projects

The construction industry is responsible for generating an entire form of construction waste, depending on factors such as the stage of construction, type of construction work and practices on site. (Agyekum et al. 2012). Material waste due to Over ordering/excess, wrong storage, wrong handling, overproduction, manufacturing defects, Theft or vandalism further stated the most dominant causes of waste generation are Late Information, Uncompleted design, Inadequate information, Untrained labor, Work not done, Poor technology of equipment, Changes to design, Damage during transportation. (Garas et al. 2001) Al-Hajj and Hamani (2011) agreed on lack of consciousness as a factor for construction waste generation. Attitude allied issues among construction workers to material waste generation include poor communication among the parties involved in a project; rework due of mistake/ poor workman skill, poor communication among the parties involved in a project, human error and carelessness, improper interaction between engineers and workers and provision of insufficient information to project participants among others (Gandaa 2014).

Furthermore, (Gandaa 2014) through the review of extant literature opined that sources of waste are characterized by four key causes such procurement, handling, operation and culture.

2.4 Waste Minimization

Proper instruction and training is crucial for the site operatives to improve their attitudes towards waste minimization. According to McDonald and Smithers (1998) operatives that were trained were found to be highly motivated towards reducing levels of waste. The perception amongst all workers with different categories including site operatives and head office management that: waste management is not financially beneficial; and the company are lacking of incentives towards effective waste management (Sanders and Wynn 2004). A survey conducted in Australia by Teo and Loosemore, (2001); Teo et al.,(2000) found that; Operatives are only able to contribute in the direction of waste minimization according to the given support by the higher management. Also the contribution can be more powerful if high priority were given to waste management similar to the priority level given to other project's objectives like cost, time, and quality. Waste minimization involves any method or process that evades, removes or reduces waste at its source or permits re-use or recycling of the waste. Materials waste minimization comprises measure the flow of materials into as well as out of the site and evaluating what steps may be used to lessen the quality and range of materials discarded. The reduction

of materials wastage in construction is of importance because wastage will have direct effect on cost, time and quality of a construction project. Material waste is considered one of the basic problem in construction industry. Material waste causes negative impact on economy of the country and environment (Rao et al. 2014).

Recently, Rao et al. (2014) explored waste minimization in construction firm and came out with findings which are related to attitude of workers on construction projects as far as material wastage is concerned. Table 1.1 below provides one of the crucial key reasons of material wastage which are linked to the attitude of construction workers.

Table 1: Attitude related causes of material waste

S.No.	Attitude related causes of material wastage on construction site`
1	Determination of types and dimensions of material without considering waste
2	Lack of attention paid to dimensions of products available in the market
3	Mistakes, and changes in specifications
4	Slow decision making processes
5	Provision of insufficient information to project participants
6	Poor communication among the parties involved in a project
7	Rework due to workers mistakes/poor workmanship
8	Improper interaction between engineers and workers
9	Using wrong equipment/tool for execution
10	Using damaged equipment/tools which leads to rework
11	Unnecessary cutting of bars instead of using short pieces
12	Unnecessary chipping of plaster due to lack of interaction between finishing , electrical, plumbing teams
13	Using excessive thickness of plaster
14	Using excessive quantities during mixing more than the required
15	Cutting unnecessarily instead of using small pieces

Adapted from Rao et al. (2014)

3. CONCLUSION

In this study it is concluded that attitude related factors of building material wastage are identified. Also materials most wastage as a result of human attitude are also identified and their minimization will certainly play important role in minimizing building materials wastage. For improving the attitude of construction participants some key guidelines to

reform their attitude are also identified. Since the construction industries are labor-intensive, the attitude of the workers affects the growth and minimization of waste. Therefore, this study has focused on detecting the different factors related to the attitude which causes material wastage during construction.

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