Analysis of Material Wastage & Time Overruns In Construction Project Using Descriptive & Inferential Statistics: A Review

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Abstract- *The construction industry is one of the industries through which physical development of nation is achieved, and it is truly the locomotive of the national economy. The more resources, engineering, labor, materials, equipment, capital, and market exchange are provided though this industry to the national economy. The increasing complexity of infrastructure projects and the environment within which they are constructed place greater demand on construction managers to deliver projects on time, within the planned budget and with high quality. The successful execution of construction projects and keeping them within estimated cost and prescribed schedules depend on a methodology that requires sound engineering judgment. To the dislike of owners, contractors and consultants, however, many projects experience extensive delays and thereby exceed initial time and cost estimates. This problem is more evident in the traditional or adversarial type of contracts in which the contract is awarded to the lowest bidder- the awarding strategy of the majority of public projects in developing countries including Western Maharashtra Strip.*

Keywords- Wastage , ISO 9001 , C & D Waste , Time Overruns , Waste Management

I. INTRODUCTION

One of the main objectives and policies of any public or private sectors dealing with the execution of projects is to upgrade projects performance, through reduction of costs, completion of projects within their assigned budget and time constraints, and improve quality. Construction industry in Western Maharashtra Strip is suffering from many problems which affect time, cost and quality, these factors related to political situation and techniques used in. Western Maharashtra Strip, these problems are summarized as following. [4]

- Large number of workers in comparison to the number of projects (the large number of unemployed labour in Western Maharashtra Strip)
- Shortage of materials in markets;
- Continued increase in material prices;
- Dependency on donor countries to get the fund of implemented projects in Western Maharashtra Strip

These factors above and others contributed to large proportion in making many problems in construction industry, which usually related to time and material wastages. Delay of project and material wastages in Western Maharashtra Strip is one of most important problems at construction management field. In addition, research and studies in this field in India are few compared to worthy expected results. Despite the importance and the significance of the construction sector in India, it is noted that the parties of project (owner, consultant, and contractor) don't give the time and material wastages the importance at the evaluation at the end of project [7]

II. STATE OF DEVELOPMENT

Our primary aim of this research is to study in depth about the different properties of construction and demolition waste, perform various tests, so that the recycling processes can be designed accordingly for optimum efficiency. Because of these test results and projections, we will get a rough estimation about the total quantity of recycled aggregate and recycled sand that can be obtained. Further with the help of the obtained recycled material we intend to make various products such as concrete, paver blocks, hollow blocks, kerbstone etc which will in turn be less costly as well. These recycled materials and products made from it are economical without any considerable change in the strength and durability aspect. Not only the cost effectiveness but it will also be aesthetically pleasing. [3]

A. Time Overruns

Time overruns is defined as the extension of time beyond planned completion dates traceable to the contractors **(Kaming et al 1997).** Delays are incidents that impact a

project's progress and postpone project activities; delay-causing incidents may include weather delays, unavailability of resources, design delays, etc. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship **(Vidalis et al 2002).Choudhry (2004) and Chan (2001),** defined the time overruns as the difference between the actual completion time and the estimated completion time. It was measured in number of days. Project delays are those that cause the project completion date to be Delayed **(Al- Gahtani and Mohan 2007)**. From above, time overruns is defined as the time increased to complete the project after planed date, which caused by internal and external factors surrounded the project. [11] [12]

B. Factors Causing Project Time Delays

Kaming et al. (1997) investigated that design change, materials shortage, and, inadequate planning, was the most significant contributors to time delays on construction projects. Similarly **Sambasivan & Soon (2007)** divided their findings into client, contractor and consultant categories, with all three categories listing, poor site management, inadequate contractor experience and poor subcontractors among the top five causes for time delays on construction projects. **Ogun Lana, Promkuntong & Jearkjirm (1996)** investigated 12 high-rise buildings and differentiated their findings into client/consultant related, contractor-related and external causes for time delays. The weighted findings among these three categories indicated that material shortages, overstretching of technical personnel, and design changes were the most important causes for project delays. **Assaf, Al-Khalil & Al-Hazmi (1995)** used 56 questions in three categories, namely owner, architects/engineers and contractors, to determine the main causes of delays on large building projects. Their survey showed that contractors believed that preparation of shop drawings, delays in contractor's progress and payment by owners were the most important factors contributing to time delays. **(Mr.Salim S. Mulla and Prof. Ashish P. Waghmare, 2015)**. [11] [13]

C. Sources Of Waste Generation

All over the world, the growth of construction industry is enormous in the past decade. The pace of generation of C&D waste is also significant. In general, there are two sources for generation of waste materials, namely, bulk generators and retail or small Generators. The classification of sources is given in Fig 2.1 the infrastructure development sector and real estate sector are the bulk generators of waste. Construction and repair of roads, bridges, flyovers etc. are classified under infrastructure development sector

Real estate sector consists of housing, industrial, and commercial building construction, demolition of unauthorized structures etc. Small commercial enterprises and individual house building teams are considered as retail or small generators. The contributors of C&D waste in a project are given in Fig 2.2 The project activities are to be planned at every stage by every personnel, who are involved, to minimize the overall waste generation. Construction industry is largest economic expenditure in India. According to eleventh five-year plan, it is the second largest economic activity after agriculture. The impact caused to the environment by Indian construction industry is also large. Construction industry consumes high volume of raw materials and products. It generates high employment opportunity. Based on an analysis of the forward and backward linkages of construction, the effect in the construction on economy is estimated to be significant. **(Minaxi Rani, Alisha Gupta , 2016).** [14]

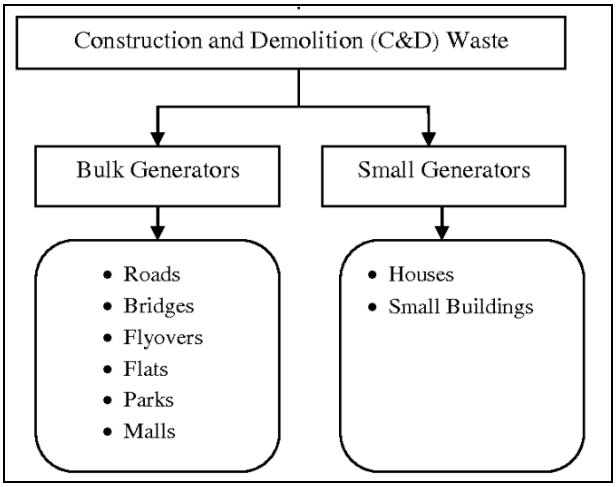

Fig 1 C & D Waste Generators

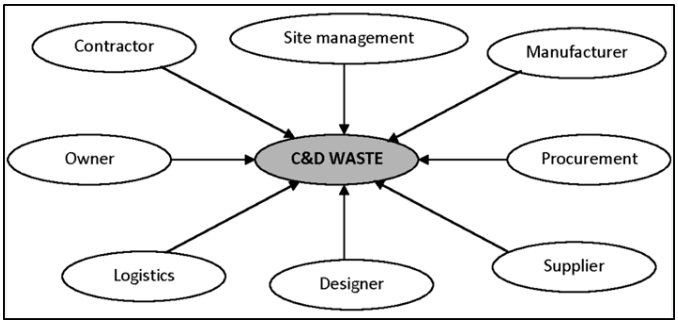

Fig. 2 Contributors of C&D Waste

Thus, cost saving potential for India is expected to be millions of dollars by adopting suitable measures for waste management. This is particularly essential for a development that responds to the challenges of environmental

sustainability, low carbon emission and minimal resource depletion. The total quantum of C&D waste generated in India is estimated to 11.4 to 14.69 million tonnes per annum **(TIFAC, 2000).** The distribution of various components of C&D waste in India is given in Fig 2.2 the concrete, brick and masonry together constitutes more than 50 percent of the total C&D waste. This shows the importance of developing C&D waste management plan for these components.

D. Construction Waste Management In India

The management of construction waste is important today. The scarcity in the availability of aggregate for the production of concrete is one of the important problems facing by the construction industry. Appropriate use of the construction waste is a solution to the fast degradation of virgin raw materials in the construction industry. This paper enlightens the importance of reduce, reuse and recycle (3R) concept for managing the construction waste in India. **(American Journal of Engineering Research (AJER) e-ISSN: 2320-0847 P-ISSN: 2320-0936 Volume-2 pp-06-09) (Siddhartha Patel et, al; 2014)** [15]

E. Reuse of C&D Waste

There is an urgent need to understand the reuse and recycle potential of these C&D waste, which on one hand will generate potential business opportunity, employment generation and above all environmental sustainability. Useful products like reinforcement, Mild Steel, doors and windows, Structural steel, Bricks and other metal items can be taken out easily and again put to reuse without much processing (Winkler 2010). Not only building material but also asphalt toppings can be used as the base for new asphalt pavement. As it is well said that reuse is the most beneficial form of recycling the waste products. In developing countries like India and China where there is poverty and massive requirement of low cost housing these products can be consumed easily and also reduce cost of construction of affordable houses. Once the reusable item is taken out rest of the C&D waste can be processed for recycling. **(A. Bansal et, al; 2016).** [16]

III. FINDINGS

All over the world, the growth of construction industry is enormous in the past decade. Reuse of C&D waste can generate potential business opportunity, employment generation and above all environmental sustainability. Useful products like reinforcement, Mild Steel, doors and windows, Structural steel, Bricks and other metal items can be taken out easily and again put to reuse without much processing. Material wastages are considered the most important factors of successful projects, which help to decrease problems for all parties and give new chances to construct another related project. It also helps to increase the Profits and development of construction industry in Western Maharashtra Strip. Most Construction projects in Western Maharashtra Strip are exposed to delay to the extent that it may extend to the double period specialized for that project, causing loss of project's profit, increasing cost and leading to technical and managerial problems between project's parties. Material wastages is also considered another a big problem, which hinders project's progress, since it decreases the contractor profit leading to huge losses leaving the project in a big trouble

REFERENCES

[1] Job Thomas, Wilson P. M. (2013). "Construction Management in India". American Journal of Engineering Research. Volume no.2, pp 06-09.

[2] Adnan Enshassi, Sherif Mohamed &SalehAbushaban (2009). "Factors Affecting the Performance of Construction Projects in the Gaza Strip". Journal of Civil Engineering and Management. pp 269-280.

[3] Vaishali Anagal (2012), International Plea Conference.pp 1-7

[4] Eze, E. C., Seghosime, R., Eyong, O. P., Loya, O.S (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 (IJES). Volume no.6, pp 32-47

[5] B. A. G. Bossink and H. J. H. Brouwersz (1996)."Construction Waste: Quantification and Source Evaluation". Journal of Construction Engineering & Management. pp-55-60

[6] Minaxi Rani , Alisha Gupta (2016). "Construction waste management in india".International Conference on Recent Innovations in Science, Engineering and Management.pp287-294.

[7] Sandeep Shrivastava and AbdolChini. "Construction Materials and C&D Waste in India". University of Florida, USA. pp 72-76

[8] Kimberly Marie Cochran (2006), "a Dissertation Presented to the Graduate School of the University of Florida in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy".

[9] Prajwal G Gudigar, Devanand R and Harsha H N(2014). A Study on Waste Management in a Construction Industry: A Value Engineering Perspective. International Journal of Research (IJR).vol no.1 .pp 557-571

[10] A.K.Kasthurba, K.R.Reddy and D.Venkat.Reddy (2014). "Sustainable Approaches for Utilizing Waste in

Building Construction: Two Case Studies in India". International Journal of Earth Sciences and Engineering. Vol no.7 .pp 838-844.

[11] Kaming, P., Olomolaiye, P., Holt, G. and Harris, F.C. (1997), "Factors influencing construction time and cost overruns on high-rise projects in Indonesia", Journal of Construction Management and Economics, Vol. 15 No. 1, pp. 83-94

[12] Vidalis, M.S. and Najafi, T.F. (2002), "Cost and time overruns in highway construction", paper presented at 4th Transportation Conference of the Canadian Society for Civil Engineering, Montreal, Quebec, June 5-8

[13] Sambasivan, M. and Soon, Y. (2007), "Causes and effects of delays in Malaysian construction industry", International Journal of Project Management, Vol. 25 No. 5, pp. 517-26.

[14] Minaxi Rani, Alisha Gupta International Journal of science and technology vol.5 issue 2016 www.ijstm.com 2016

[15] American Journal of Engineering Research (AJER) e-ISSN: 2320-0847 P-ISSN: 2320-0936 Volume-2 pp-06-09) (Siddhartha Patel et, al; 2014

[16] Ankur Bansal "Recycling and Reuse of Construction and Demolition waste : sustainable approach" December 2016