Quantification Methods for Construction Waste Generation at Construction Sites: a Review

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Abstract. Estimation of construction and demolition (C&D) waste amount is crucial for implementing waste minimization program. Estimation of C&D waste amount generated is a mean in assessing the potential for waste reduction. Thus, a better understanding of C&D waste generation in terms of causes and sources can be achieved. The aim of this paper is to conduct a review on available construction waste quantification methods from previous studies, which have been utilized in certain countries, while attempting to choose the most suitable and applicable method, and to direct future studies for better quantification methods. This review is applicable only for building construction projects and did not include civil/infrastructure, demolition, renovation, and excavation projects. Six quantification methods and/or waste audit tool available from literatures are discussed, which include their limitation and future direction for this study. It is believed that some combination of these quantification methods could make a good impact in accurate numerical estimation of construction waste amount generated in building construction projects. A strong and accurate database as presented by Soliz-Guzman, combined with effective, vital, and resourceful estimation suggested by Jalali’s Global Index (GI), also with the aid of user-friendly software tool like the SMARTAudit could provide an effective and reliable waste quantification.

Introduction

Construction industry is a major contributor of negative impact to the environment. Construction materials production accounts for a significant percentage of energy consumed, and it is vital that the industry strives to reduce waste at all stages of construction [4]. The first step in implementing waste minimization program is to categorize and estimate the quantity and composition of construction waste generated. Usually waste is estimated around 5-10\% of materials ordered while true amount and type of waste remains unknown and adequate management of waste is hindered [1,5,6]. It is also believed that decision-making should be based on quantified measurements/predictions expressed in numerical terms, so that contractors will be able to pinpoint critical points in the generation of waste, thus, effectively minimize waste produced [3]. Lack of benchmarking will hindered the implementation of more sustainable and innovative practices in industry. Quantification provides a necessary tool for evaluating the true size of the waste and hence, making the adequate decision for their minimization and sustainable management [3]. This vital information can be obtained by construction waste assessment or audit. Thus, a better understanding of construction waste generation in terms of causes or source, amount, and compositions can be achieved [3, 4].

There is a need in establishing system to record quantitative data in order to extract accurate waste assessment data [4]. Construction authorities have a crucial role, as enforcement is essential.