USE OF PREFABRICATION TO MINIMIZE CONSTRUCTION WASTE - A CASE STUDY APPROACH

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Abstract

The increasing awareness of environmental impacts from construction waste has aroused much public concern. Some construction organizations have included waste management as one of the major functions of construction project management. As a result, some approaches and methods for managing construction waste have been developed. Replacing wet-trade activities with prefabrication is advocated as one of the waste minimization techniques on site. However, the adoption of prefabrication is mainly confined to public housing developments in Hong Kong. This paper uses four private building projects as case studies to demonstrate the effectiveness in the use of prefabrication to minimize construction waste in Hong Kong. The wastage levels of the four projects are compared with conventional cast in-situ methods under similar project natures and conditions. The hindrances and the future trend of adopting prefabrication in Hong Kong are also examined.

Keywords

Prefabrication, environmental management, waste management, construction.

INTRODUCTION

In November 1998, the Hong Kong government launched a ten-year waste reduction framework plan (WRFP, 1998), aiming at reversing the rising trend of wastes in order to conserve scarce landfill areas. The WRFP sets out the target of dumping construction and demolition (C&D) materials to landfills limited to 16% (currently 20% of C&D wastes are sent to landfills) by: i) introducing a landfill charging scheme; ii) presenting on-site/off-site sorting of C&D materials; iii) implementing reuse and recycling C&D materials; and iv) avoiding and minimizing C&D materials through better design and construction management. In order to meet the targets, the public needs to transfer emphasis from transport of waste to landfills for disposal to waste prevention and reuse of waste materials. The Environmental Protection Department (EPD, 2003) of Hong Kong SAR suggested taking a five-step action (Figure 1): waste avoidance; waste minimization; waste recovery, recycling and reuse; waste bulk reduction; and waste disposal.

McDonald and Smithers (1998) suggested that the main advantage of engaging waste management was cost saving as 50% of material handling costs was saved in their case studies. However, cost reduction by recycling is difficult to achieve in the short term. Shen and Tam (2002) found that one of the greatest barriers to Hong Kong constructors in implementing waste management is the increase in costs due to additional investment on staffing, technology and facilities. It is necessary to recognize that the materials thrown away are a potential hazard to the environment. The waste created from construction sites can be reduced if the material wastage is managed at the beginning of the design and construction process, and a