Barriers to improving the environmental performance of construction waste management in remote communities

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Abstract

The construction sector represents one of the most significant contributors to global waste production and is responsible for over 30\% of the waste that ends up in landfill. Sending construction waste to landfill results in a broad range of environmental consequences including: degradation of land, habitat destruction, contamination of soil and groundwater, and release of methane. There is a growing awareness of the need to divert construction and demolition (C&D) waste from landfill for reuse or recycling. This helps maximise the value of the resources embodied in these materials and reduce the demand for virgin raw materials and the associated environment effects resulting from their extraction, processing and manufacture. However, diversion of C&D waste to reuse or recycling in remote communities can be difficult and costly. This poses a significant challenge for improving the environmental performance of construction waste management in these communities. A housing refurbishment project in Alice Springs, a remote town in central Australia, was used to identify the barriers associated with improving the environmental performance of construction waste management in remote communities. This study considers the materials removed as part of the demolition phase of the project. Material types and quantities were documented and on-site and off-site waste management practices observed. Reasons for waste management decisions were recorded. The study identified a range of barriers to improving the environmental performance of construction waste management in remote communities. These include cost and time associated with on-site waste management, industry culture, lack of education, competing project priorities, and lack of financial incentive. Greater incentives to encourage the diversion of C&D waste from landfill are needed, in particular. This and other strategies for improving construction waste management practices in remote communities must be targeted at the context of individual communities though, due to their unique characteristics.

Keywords: Construction waste; remote communities; environmental performance; recycling; waste management.

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1. Introduction

The construction sector produces a significant amount of waste as a result of both the construction and demolition processes. This waste results from surplus or damaged materials, on-site processing, packaging, refurbishment, replacement and eventual demolition. Waste materials are either sent to landfill or diverted to resource recovery and recycling facilities. Approximately 6.25 million tonnes of construction and demolition (C&D) waste is sent to landfill in Australia on an annual basis, representing around 34% of the waste that ends up in landfill [1]. The disposal of construction waste in landfill results in a broad range of environmental consequences including the use and degradation of land, habitat destruction, contamination of soil and groundwater, and release of methane.

A considerable amount of resources is needed to produce construction materials, including energy, water and raw materials. Material manufacturing processes as well as the associated processes of resource extraction, processing and transportation also result in the emission of pollutants and greenhouse gases into the environment. The disposal of these materials into landfill means that they are no longer available for use and their embedded resources are ‘locked-up’ and lost forever. Environmental concerns as well as resource availability issues have led to a growing awareness of the need to divert C&D waste from landfill for reuse or recycling. By recovering materials that would otherwise have been disposed of in landfill, not only are the landfill-related consequences avoided, but the resource value embedded in these materials can also be maximised. Materials can either be reused in their current state or recycled into new materials. This reduces the demand for virgin raw materials as well as a large proportion of the associated energy and water requirements and waste and emissions that occur as a result of the material manufacturing processes. Avoiding or reducing waste and recovering waste materials for reuse or recycling are considered to be much more environmentally beneficial strategies for waste management than sending waste to landfill [2,3].

Diversion of C&D waste to reuse or recycling in highly populated cities is becoming increasingly common due to ease of access to resource recovery and recycling facilities. Increasing landfill levies and raw material prices have also been key contributors to increasing waste recovery rates [4]. However, in remote communities, diversion of waste materials to reuse or recycling can be much more difficult and costly. Recycling facilities are often not easily accessible or are limited to only a small range of materials. In many cases the only option is to travel long distances to the closest recycling facilities, but this is usually cost prohibitive. Because of this, the most feasible option is usually to send the waste to landfill. This poses a significant challenge for improving the environmental performance of construction waste management in remote communities. There is also likely to be other reasons why diverting waste from landfill in remote communities may be difficult. Despite this, there is limited research into what these barriers are. A deeper understanding of the critical barriers to improving waste management in remote communities is needed in order to identify policies and solutions for addressing the environmental concerns associated with current waste management practices.

1.1. Aim and scope

Therefore, the aim of this study was to identify the key barriers associated with improving the environmental performance of construction waste management in remote communities. This study considers the waste produced from gate to grave. It does not include waste produced as part of the material manufacturing processes, but rather the waste generated as part of the construction, refurbishment and demolition of a construction project.

2. Background

The proportion of C&D waste sent to landfill and recycled varies considerably across the various jurisdictions within Australia. The most populated and urbanised jurisdictions (NSW, Vic, Qld, SA) have a much higher rate of waste recycling than jurisdictions with a larger proportion of remote communities (Tas, NT, WA) (Fig. 1).
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