



# The contribution of environmental management systems to the management of construction and demolition waste: The case of the Autonomous Community of Madrid (Spain)

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Received 6 February 2006; received in revised form 15 June 2006; accepted 28 June 2006  
Available online 1 September 2006

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## Abstract

The construction industry has both positive and negative repercussions on the environment. One of the main negative impacts is the generation of waste. Various types of instruments exist to manage construction and demolition wastes (C&DW). These include voluntary agreements between economic agents, planning, and technological development applied to specific projects. The present state of C&DW management is different in each country and/or region, and is determined by the management instruments used and the degree to which their content has been developed. As elsewhere, the rise of the construction sector in the Community of Madrid in recent years has brought about a notable increase in the generation of C&DW. In order to deal with this situation, the Autonomous Government has initiated several management instruments, including the Plan for Integrated Management of C&DW in the Community of Madrid (2002–2011). At the same time, some construction companies have implemented an environmental management system (EMS) in accordance with ISO Standard 14001, with a view to controlling the main environmental aspects associated with their activities, such as the generation of waste. These companies have established practical measures for the appropriate management of waste generated in their work centres and sites, whether permanent

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or temporary. This paper presents results of an analysis and evaluation of the application of ISO Standard 14001 to construction sites in the Autonomous Community of Madrid, with specific regard to practices of control and management of wastes generated on site, and to the fulfilment of legislation on waste management. The study aims to detect the deficiencies of EMS and current waste management instruments, and to determine the measures which may be necessary for improvement at all territorial levels (autonomous, national and supranational). In addition, some recommendations are made for promoting management of C&DW based on reuse and recycling in construction companies.

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*Keywords:* Environmental management; ISO 14001; Construction and demolition waste management; Construction sector

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## 1. Introduction

Construction and demolition wastes (C&DW) are generated on active building sites (Stein, 1996) and include a wide range of materials depending on the source of the waste: excavation materials (e.g. earth, sand, gravel, rocks and clay), road building and maintenance materials (e.g. asphalt, sand, gravel and metals), demolition materials (debris including earth, gravel, sand, blocks of concrete, bricks, gypsum, porcelain and lime-cast), as well as other worksite waste materials (e.g. wood, plastic, paper, glass, metal and pigments) (Fatta et al., 2003).

These wastes are problematic not so much for their hazardous nature as for the sheer volume generated. However, between 50 and 80% of construction waste is reusable or recyclable (Bossink and Brouwers, 1996). Accordingly, many countries are presently directing their efforts towards adopting the necessary measures to promote waste minimization, as well as to reduce the quantities of waste disposed in landfills or eliminated illegally (CICA, 2002).

Among measures to minimise C&DW are reusing, recycling and reducing generation through control of aspects such as design quality, applied technology and habitual construction methods (Ekanayake and Ofori, 2004; Huete et al., 1998).

With regard to the origins of C&DW recycling, the practice arose in Europe and the United States in the mid-20th century, in response to the shortage of construction materials and the costs of disposal after the Second World War (Stein, 1996). Today, recycling techniques are applied not only in industrialized countries such as The Netherlands or Denmark, but also in developing countries such as Bangladesh and in countries in expansion such as Kuwait (Lauritzen and Hahn, 1992).

Generally speaking, recycling is competitive in situations where both raw materials and adequate disposal sites are scarce (Lauritzen, 1998). In addition, recycling helps to preserve areas of land for future urban development, and to improve the general state of the environment (Kartam et al., 2004).

An alternative to recycling is reusing C&DW. To give just one example, the inert portion of C&DW may be used as filling material in land destined for reclamation (Poon et al., 2001).

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