



Temporary structures as a generator of waste in covered trade fairs

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ABSTRACT

Events like trade fairs are a complex service activity with a considerable economic, social and environmental impact due, among other factors, to their high level of waste generation. There are few studies of the environmental impact associated with waste generation and typology. An environmental analysis methodology has been developed to characterise the waste associated with the temporary structures used at trade fair events: stands and communal spaces.

This methodology has been checked in a pilot test at 6 closed trade fairs in Barcelona, with a range of between 60 and 4400 exhibitors. The methodology developed has made possible to obtain a waste generation profile according to the size of the fair and the types of stands. The stages with the largest amount of temporary structure wastes generated are the assembly and the dismantling of the trade fair.

The results indicate that the most common wastes generated are the protective plastic from carpets at the assembly stage and the carpet itself at the dismantling stage. The stand carpet is collected in bulk, while the carpet from the communal spaces is recycled. As the size of the fair increases, and with it the proportion of stands with customised design (or non-reusable stands), the quantity of wood and hazardous waste increases.

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1. Introduction

Trade fairs are commercial events with a specific duration, normally taking place periodically, at which organisations, normally businesses or industrial firms, give information and promote and sell the goods and/or services they deal in. Trade fairs may be aimed at professionals and/or the general public (UFI, 2007). Another important criterion for classifying trade fair events is the place where they are held, as this can be either a closed trade fair complex or an open space.

In Europe they constitute a service activity with a considerable economic and social impact. A study of large European trade fair complexes highlights that, at regional level, their economic impact is 23.65% of GDP (gross domestic product) and this increase is translated into 352,000 jobs (Triviño, 2006).

At the trade fairs held in Europe in 2005, 1.5 million exhibitors and 160 million visitors were counted (EFS, 2005).

Spain is among the most important countries for these events, together with Germany, followed by Italy and France. In 2006, 471 fairs were recorded in Spain, with 118,468 exhibitors, of which 74,382 have been identified as direct exhibitors, receiving 15.9 million visits made by 6.4 million visitors. This accounts for 4% of the sector in the EU (BCF Consultors, 2007).

1.1. Environmental impact of wastes in trade fair events

Disposable products or those with a short useful life are the main responsible for the urban waste generation. This includes light packaging and some paper and cardboard (Aarnio and Hämäläinen, 2008).

A large amount of wastes in a short time is generated in fair events. Annual waste generation per m² at a typical trade fair is 20.4 kg/m² per year – year 2003 – (Domènech et al., 2004), while the annual waste generation of an average Spanish home (2.9 people and 102.4 m²) was 15 kg/m² per year (INE, 2006).

A quantitative study carried out at the Barcelona Trade Fair Complex shows the magnitude of waste production, in terms of mass, at various fairs between 1993 and 2003. In this period of time, a clear rising trend of more than 197% can be observed. In 2003, the total waste generated by the Barcelona Trade Fair Complex was 7966 ton.

A detailed analysis to determine waste production at the different stages in the lifecycle of one of the biggest trade fairs held at the Barcelona complex (Construmat) in 2003 shows significant differences between the amount of wastes associated with each of the stages of the trade fair, as indicated in Fig. 1. These results confirm that the majority of waste is generated at the assembly and dismantling stages.

According to this study (Domènech et al., 2004), a covered trade fair with a large quantity of non-reusable stands would involve

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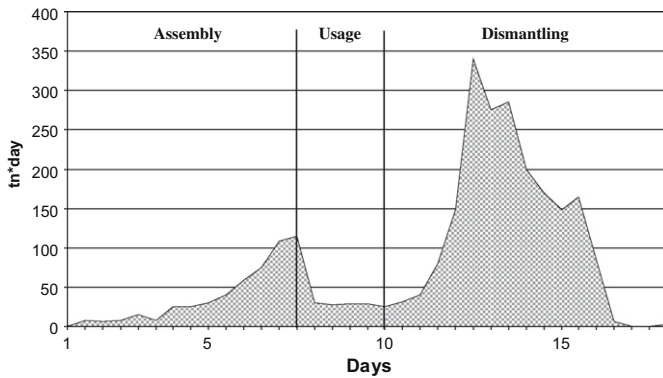


Fig. 1. Waste production during the cycle of the Construmat trade fair, 2003.

greater waste generation than a covered fair with predominance of modular stands at the dismantling stage. In fairs where more than 75% of the stands are non-reusable, waste generation is $5.9 \pm 4 \text{ kg/m}^2$, almost 3.5 times more than in fairs where more than 75% of the stands are modular ($1.7 \pm 1.3 \text{ kg/m}^2$).

Concerning the total waste generated at the Barcelona Trade Fair Complex in 2003, it can be detected that the stages when most waste is generated are dismantling (73% of the total waste generated) and assembly (15%); both these are related to temporary structures, as well as the design stage for these.

Holding a trade fair must be considered as a complex system where up to 17 different types of agent relate with each other (Rieradevall et al., 2006). A trade fair is divided into successive stages in chronological order. In total, five stages have been identified, three of them prior to the stage of actually holding the fair (or usage stage) and one subsequent to it. Fig. 2 shows these stages.

Some projects and studies of trade fair events promoted by government bodies in Australia (NSW EPA, 1997) and the United States (CIWMB, 2002) have been made. These studies have been largely held in open air fairs and were focused to the general public. Their main aim was to act as an incentive in order to reduce the waste generation and to increase the recycling of the generated wastes at the usage stage, without concerning themselves with

temporary structures. They show how to implement a plan to prevent and recycle packaging waste from the contents exhibited, as well as other waste largely generated at the stage of holding the fair: organic waste and packaging waste (cardboard, paper, plastic and metal) from contents exhibited and food. Proper planning and communication with the agents involved are emphasised.

According to these studies focused on the usage stage, the types of waste generated at this type of event are similar to solid urban waste (ARC, 2006).

Other studies have focused on long-lasting trade fair events, such as the studies carried out in Spain (ICLEI, 2005), whose general aim were to improve the environmental sustainability of the public events.

Despite the importance of waste generation at trade fair events, there is a lack of data about their environmental impact, and more specifically about the environmental effect of temporary structures used (Rivela et al., 2007; Rieradevall et al., 2006). In this sense, four open trade fairs have been studied in Rieradevall et al. (2006). The results showed that 100% of the stands utilised in this kind of trade fair events are modular and normally reused in forward trade fairs. Therefore, it is to be expected that at this kind of fair the waste generation associated with stands should be smaller than in fairs where customised-design stands (or non-reusable stands) are utilised; non-reusable stands term will be used from now on to define customised-stands.

Trade fair events in covered places (business buildings, sports centres and similar places) are standardised, enclosed systems that potentially allow more controlled waste management than open-air fairs.

A lack of specific studies of the typology and quantity of wastes associated with temporary trade fair structures and the agents involved in generating and managing it has been detected. From this derives the need to develop a methodology for studying the stages associated with temporary structures in covered trade fairs, in order to obtain useful information to propose improvement actions for reducing their amount of wastes generated.

This study is focused at the covered trade fair stages of assembly and dismantling (Fig. 2), as the temporary structures wastes are generated when both take place. Moreover, from the study of Domènech et al. (2004), it is expected that assembly and dismantling are the two stages with the largest amount of waste generation.

2. Objectives

The objectives of this study are: (1) to develop a methodology in order to evaluate the waste generation and management profile of the assembling and dismantling stages associated with temporary structures at trade fair events in closed complexes; (2) to check the developed methodology in a pilot study case carried out in Barcelona (NE Spain); (3) to identify the profile of waste generation typology and its management in the assembling and dismantling stages of the pilot study fairs; and (4) to propose improvement actions for preventing and recycling wastes from temporary structures suitable for the trade fairs in the pilot case, which can be extrapolated to trade fairs with similar characteristics.

3. Materials and methods

The elements and key concepts of the covered trade fair system necessary for properly understanding it are presented below.

Definition of the fair stages

- i) Design: planning the infrastructures for the trade fair (stands and accessory items).

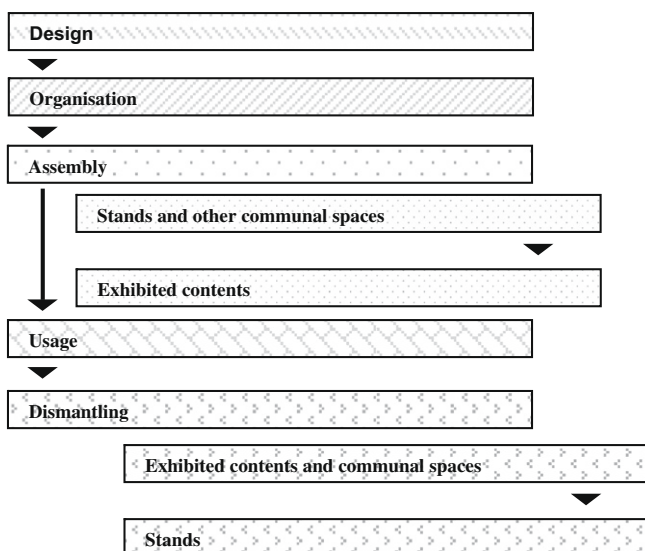


Fig. 2. Stages and sub-stages in the life cycle of a covered trade fair.

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