

## Mobile bin: Innovative approach to waste management during cultural and sporting events

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**ABSTRACT:** This work presents an innovative approach to waste management during cultural and sporting events from the mobile bin. Because of the great difficulty that the organizers have in controlling the fluctuation of the production of waste. This study shows that a mobile bin is capable of managing the waste of an event of up to 250 visitors. The fact of presenting itself as a combination carried by the volunteer with four baskets thus fixed two in the front and two in the rear of a capacity of 17L each, allows him to effectively accompany the visitor in the execution of instruction of sorting out, previous in the organization of selective waste collection. This tool through its mobile character, allows one hand to effectively address the prevention of abandonment of waste ground for a better blossoming of the visitors and on the other hand, positions itself as an instrument of communication and awareness of proximity to the public with desired effects on the behavior of the latter, including the deconstruction of cultural barriers visitors have with respect to waste. In addition, through the appropriation of the mobile bin can either by private companies or by the Decentralized Territorial Collectivities, in order to be part of a sustainable development approach, constitutes a source of external financing useful to its implementation.

**KEYWORDS:** Waste; Mobile bin; Sorting out; Selective collection; Prevention; Sustainable development.

### 1 INTRODUCTION

Waste emitted during cultural and sporting events presents huge imperfections in their management [1] [2]. With an average production per visitor estimated at 500 grams. If this figure may seem trivial, it must be realized that a demonstration gathering 3000 peoples will generate 1.5 tons of materials to sort, collect and evacuate. Unfortunately, many organizers continue to be confronted at the practices of waste abandonment on public spaces by the visitors and the effective organization of the selective collection. Because of the sorting instructions that until now have not been respected by the public at all, despite the awareness-raising actions and the necessary devices put in their favor [3]. However, effective management of these detritus can bring many assets to the organizer in terms of image; public blossoming and openness to new networks [4].

Since the waste on the site seems to pose more of an environmental problem, image and cleanliness rather than a problem of cost. The main difficulty is related to the cost of the alternative solution and its implementation. Therefore, a reduction in the cost of waste may not be a very important motivator.

Faced with this situation, what can be the usefulness of the mobile bin in accompanying visitors during cultural and sporting events? Based on the assumption that the mobile bin is a tool to optimize the waste sorting operation while improving the quality of the living environment of event sites and attract external funding for its implementation. The present work is mainly aimed at improving waste management in times of cultural and sporting events through the mobile bin. More specifically, it will be to present the mobile bin, are operating model and its merits whether environmental, social or economic.

## 2 FRAMEWORK AND METHODOLOGY

### 2.1 FRAMEWORK OF STUDY: DEFINITION OF THE CONCEPT OF MOBILE BIN

The mobile dustbin is an equipment in the form of combination presenting more than four baskets of a capacity of 17 L each one, two at the front and two in the rear for temporary storage of waste before being transferred into the large bins of sorting. This combination is worn by a volunteer during periods of cultural or sporting events, in order to express his commitment of more active and visible way to concerns related to the protection of the environment. The mobile bin also has the capacity to assume the function of sorting ambassador to raise public awareness of selective collection through the effective operationalization of sorting.

#### 2.1.1 QUALITATIVE CHARACTERIZATION OF WASTE PRODUCED DURING CULTURAL AND SPORTING EVENTS

Most of the waste streams that are emitted and identified during the cultural and sporting events period consist mainly of paper and plastic packaging waste, plastic bottle waste, yoghurt waste, and beer can waste and organic waste. The table below shows the nature of the waste streams taken into account by each waste basket in the mobile bin.

*Table 1. Qualitative identification of various flows of waste emitted during the cultural and sporting events*

	Type A	Type B	Type C	Type D
Waste stream	Paper and plastic packaging	Plastic bottles; Pots of yoghurt	Beer cans and juice	Organic matter

### 2.2 METHODOLOGY

#### 2.2.1 SIZING OF THE BASKETS

##### 2.2.1.1 LID

Surface:  $\pi \cdot R^2$  with R (radius) = 10Cm for the lid; R = 4 cm for the opening.

##### 2.2.1.2 CONTAINING

Volume: s. H with s (surface) =  $\pi \cdot R^2$  (R = 10Cm); H (Height) = 55 Cm.

#### 2.2.2 FUNCTIONING OF THE MOBILE BIN

The mobilization of a well-defined number of mobile dustbin in times of cultural and sports events is dependent on the capacity of visitors to the site of festivities and the frequency of emptying baskets when filled in large bins sorting. In fact, during this period, starting from a grid of the site by sector, the teams of volunteers of mobile bin are then deployed each in its sector in order to guarantee a uniform distribution on the site. The mobile bin creeps through the visitors to allow them to deposit their waste while making the moments of exchange with the eager visitors. Their movement is punctuated to prevent any eventuality of their grouping in one place. When the mobile bin becomes full, the waste is immediately transferred to the large fixed sorting bins dedicated for this purpose, as illustrated by the operating mechanism below.

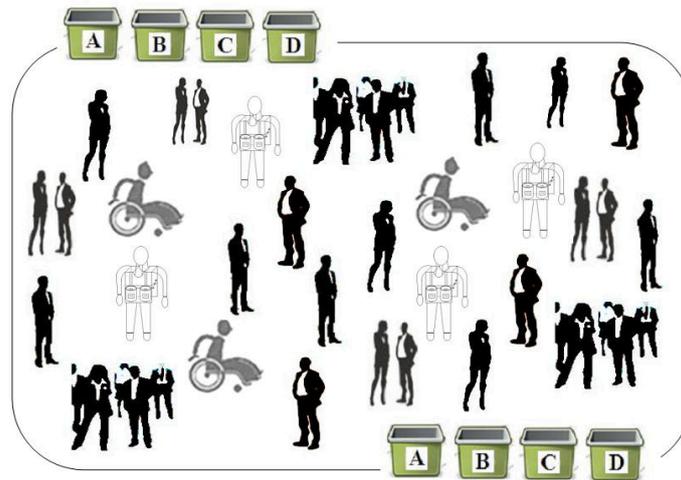


Fig. 1. Functioning of the mobil dustbin.

### 3 RESULTS AND DISCUSSIONS

#### 3.1 PRESENTATION OF THE DESIGN OF THE MOBILE BIN

The mobile bin is in the form of a combination worn by a volunteer, and consists of a belt used to stabilize the combination during the various movements of it. The presence of vertical and horizontal strips of fabric on the combination ensures better attachment of the different waste basket on this equipment. A waste inlet is provided on the lids of the basket to limit any direct contact of visitors or volunteers with the waste and prevent any inconvenience that may be caused by the presence of insects. In addition, the waste is packaged in plastic bags in waste baskets to prevent any risk of odor nuisance and beyond, ensure a good seal of the trash. However, the use of protective gloves by the volunteer prevents any exposure to waste during his activities. In order to allow visitors to easily introduce the waste into the trash bin, it is envisaged the use of a cylindrical support made of plastic material and introduced into the waste basket at its upper part and fixed on the horizontal band of the suit. Its main function is to favour the maintenance of the basket on the horizontal plane.

##### 3.1.1 TECHNICAL SPECIFICATIONS OF THE MOBILE BIN

The technical characteristics of the mobile bin are shown in the table opposite.

Table 2. Technical specifications of the mobil dustbin

Parameters			Values
Combination mass			<3 kg
Fixation element of the combination			Belt
Basket Size	Lid	Area lid	314 Cm2
		Opening lid	50,24 Cm2
	Container	Area	314 Cm2
		Height	55 Cm
Basket Form			Cylindrical
Life expectancy			05 year's
Basket number / combination			At most 04
One mobile bin			roughly 250 visitors

It can be seen from Table 2 that the combination of the mobile bin is designed for mass less than 3 kg. This is to facilitate transportation by volunteers. The capacity of the bin is 17 L, this to ensure the transient storage of waste significantly but enough to make uncomfortable volunteers. In addition, this capacity of the basket allows that the mobile bin can cover the unit 250 visitors.

To ensure a better understanding of this tool, the figures below show the different sections of the combination and the mobile bin.

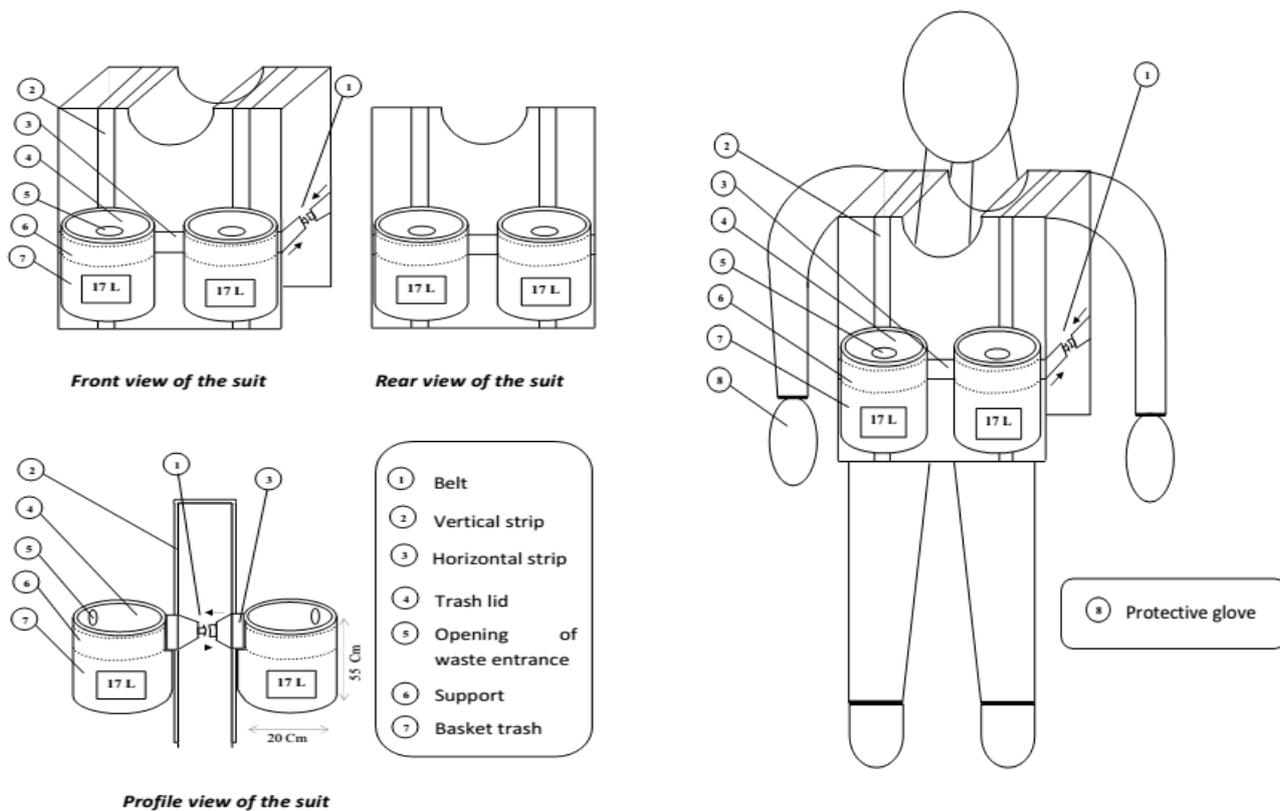


Fig. 2. Presentation of the combination design Fig. 3. Presentation of the mobil bin

The figure above shows that the lower part of the basket of the suit is located slightly above the knee of the volunteers, this to facilitate the movement of the leg during its displacement, while the upper part of the basket is slightly above the waist, to ensure better control of the baskets and the execution of sorting by visitors. The diameter of the bin fixed at 20Cm, makes the basket a compact tool able to sneak easily into the crowd.

### 3.2 THE MOBILE BIN AS A PRACTICAL TOOL FOR ECO-RESPONSIBLE EVENTS

The organization of cultural and sporting events generates a lot of waste, because it attracts several thousand people and thus generates several impacts on the environment. There are simple alternative solutions to reduce them considerably in order to lead to an event less clean-up of site, more waste sorting and more visitor engagement.

#### 3.2.1 THE ENVIRONMENTAL DIMENSION OF THE MOBILE BIN

In terms of the environment, sorting is the basis for a better organization of waste management in the cultural or sporting events. To this end, the organizers propose to the public adapted sorting devices, in particular totems and pedestals [5] [6]. Unfortunately, this operation is unsuccessful, because the public does not follow the instructions and mixes all types of waste. This drives the organizers to focus primarily on bulking collection [3]. Yet, through the mobile dustbin presenting as a combination carried by voluntary with more than four baskets fixed, two in the front and two in the rear with a capacity of 17L each, can effectively support the visitor in the execution of the instructions of sorting out, preliminary in the organization of the selective collection. This provision that offers the mobile bin makes it possible to further increase the sensitivity of visitors to environmental topics including concerns related to ecology, pollution, health and sustainable development. In addition, this tool through its mobile character can effectively ensure the prevention of waste disposal in nature for a better blossoming of visitors. This first gesture of prevention makes it possible to avoid the visual or olfactory nuisances that they could cause by

their mere presence. Given that this public space constitutes a support within which walk heterogeneous populations. In this sense, the mobile dustbin can therefore help visitors to take ownership of this living space.

### 3.2.2 THE SOCIAL DIMENSION OF THE MOBILE BIN

From a social point of view, the behavior with regard to the waste observed among visitors is very close to that of the general population. The main constraint lies in the social representations of waste [7]. In the African context the problem arises more on the negative perception of the waste by the population, this can be observed through the practices of abandonment of the waste on the public spaces and the means of conditioning used which most of time are rudimentary [8], [9]. On the other hand, in western cities, citizens are most exposed to uncertainties related to the language barrier or a lack of appropriation of sorting instructions. Since they mobilize more cognitive skills [7], [3]. Moreover, only local support, through information but also the provision of adapted equipment, seems to be able to break down its constraints and to encourage greater public commitment to issues related to waste management. Although the mobile bin provides efficient management of waste from visitors with reduced mobility in general and in particular those traveling on wheelchairs, the fact that she is carried by a volunteer well equipped on the concerns related to the preserving the environment, she is positioned as an instrument of communication and awareness of proximity of the public with desired effects on the behavior of the latter. This contributes to the deconstruction of the different barriers that visitors have with regard to waste.

### 3.2.3 THE ECONOMIC DIMENSION OF THE MOBILE BIN

The initiatives so far undertaken by the organizers in order to align the events with an eco-responsible approach, in particular that relating on the one hand to increasing the number of waste storage facilities, particularly pedestals and totems for sorting and on the other hand, on reducing the volume of waste through the use of reusable dishes and the consignment of cups. Unfortunately, they have still not been effective in protecting the sites, which continue to be degraded by waste left in the wild by visitors and the effective establishment of sorting to insure their insertion into the circuit of valorization. According to the reference [3], the waste present on the site of festivity pose more an environmental, image and cleanliness problem rather than a problem of cost. So, the reduction of the cost of waste is perhaps not a very significant factor of motivation. However, the implementation of the mobile bin makes it possible to substitute the use of sorting devices with the advantage of a gain in space for a better mobility of the visitors. Moreover, the mobile bin also allows an optimal and effective use of volunteers. The latter being equipped, are able to manage several waste streams while at the same time raising public awareness of the sorting operation. The dynamic character of the mobile bin allows visitors to experience all the moments of the festivities without cluttering waste in their hands. In addition, this mobile device can be made locally at an affordable price and could be reused for other events unconstrained.

Much more, the mobile bin is positioned as a tool to attract external financing useful for its implementation. Appropriation either by private companies such as soft drink companies, mineral drinks or by the Decentralized Territorial Collectivities. On the one hand, they would allow these private organizations in their Corporate Social Responsibility (CSR) initiatives to integrate environmental concerns as part of their visibility and commercial operation strategies. And on the other hand, to the Decentralized Territorial Collectivities (DTC) to inscribe their visions of waste management in general and in particular sorting operations. This will contribute to a sustainable change in behavior by making visitors responsible for the waste issue.

## 4 CONCLUSION

At the end of this work, which consisted in proposing an innovative approach to waste management during cultural and sporting events from the mobile bin. Given the great difficulty that organizers have in overcoming waste disposal practices in public spaces by visitors and in effectively organizing selective collection through the operationalization of sorting out. This work has demonstrated the interest of the mobile dustbin in the environmental, social and economic dimensions. As a combination carried by the volunteer, having at most four baskets fixed two in the front and two in the rear of a capacity of 17L each, to ensure the management of waste of an event of less than 250 visitors. The mobile dustbin accompanies the visitor in the effective execution of the sorting instructions, prior to the organization of the selective collection. Also, through its mobile nature, it plays the role of an effective tool for preventing waste dumping on the ground for a better blossoming of visitors. Although the mobile bin provides efficient management of waste from visitors with reduced mobility, it is positioned as an instrument of communication and public awareness of proximity to the public with desired effects on the behavior of the latter. This contributes to the deconstruction of the different barriers that visitors have with regard to waste. However, the implementation of the mobile bin makes it possible to substitute the use of sorting devices with the advantage of a gain in space for a better mobility of the visitors. In addition, the mobile bin can be appropriated by private companies as part of their

CSR approach or by DTC to implement their vision of waste management; this is a useful source of external financing to its implementation. Finally, the fact that it offers the possibility of giving life back to waste through their recoveries thus facilitates their recycling, which is therefore part of a sustainable development approach.

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