Ανάπτυξη και Εφαρμογή ενός Σχεδίου Δράσης για την Διαχείριση των Αστικών Στερεών Αποβλήτων στη πόλη της Αθήνας κατά την περίοδο των Ολυμπιακών Αγώνων 2004

Development and Implementation of the Waste Management Plan of the City of Athens during the 2004 Olympic Games

Η Αναπτυξιακή Εταιρεία του Δήμου Αθηναίων στο πλαίσιο των εργασιών και της έρευνας που πραγματοποίει σχετικά με την διαχείριση Αστικών Στερεών Αποβλήτων και πιο συγκεκριμένα τη μελέτη διαχείρισης των Αστικών Στερεών Αποβλήτων που προβλέπονταν να παραχθούν στο Δήμο Αθηναίων κατά την περίοδο των Ολυμπιακών Αγώνων 2004 και το πλήρη προγραμματισμό και οργάνωση της αρμόδιας Δ/νσης για την ανάληψη των απαραίτητων δράσεων στον τομέα της καθαριότητας ενόψει των Ολυμπιακών Αγώνων, συμμετείχε και παρουσίασε τη σχετική επιστημονική εργασία στο 9ο Διεθνές Συνέδριο Περιβαλλοντικής Επιστήμης και Τεχνολογίας, 1-3 Σεπτεμβρίου 2005, στη Ρόδο.

DEVELOPMENT AND IMPLEMENTATION OF THE WASTE MANAGEMENT PLAN OF THE CITY OF ATHENS DURING THE 2004 OLYMPIC GAMES

TR. HARITOPOULOU[1], D. KOMILIS[2], K. LASARIDI[3] and A. TOGIA[1]

1. Municipality of Athens Development Agency (AEDA), 5 Favierou and Mager, Athens,
2. Department of Environmental Engineering, Democritus University of Thrace, Xanthi,
3. Harokopio University, Department of Geography, 70 El. Venizelou, Kallithea, Athens

1. INTRODUCTION

The City of Athens, the largest Municipality of the wider Athens area (**740,000 permanent inhabitants, an area of 37,953,568 m2** and **a road network of 960 km length**), faced the multiple challenges of the Olympic Games in August 2004 and managed to cope successfully in all sectors, including that of waste management. Thus, a **Waste Management Plan for the City of Athens (WMP) was developed and implemented.**

2. METHODOLOGY

In order to face the increased number of visitors during the Games, together with the needs for a clean and well organized city, a geographical classification of the city in 4 different area types was made, in accordance to the waste management masterplan of the Athens 2004 Organizing Committee (Table 1). All data were introduced into the City GIS mapping database (Figure 1).

Table 1: Classification of the Municipality districts into different zones according to the expected visitors burden.

Zones / characteristics	Description	Area (ha)	Number of waste collection programs*
A: Highest priority (places of athletic events)	Waste management by private contractor: Athens 2004		
B1: High priority	Historic center, high importance for visitors, recreation	833	36
B2: Medium priority	Entrances of the city, transportation areas	1.408	48
C: Basic	Not affected by the Games	855	28

Figure 1

To calculate the actual current waste production rates, data for the waste loads from the Waste Management Department were used and an optimisation model for the waste transfer routes (programs) to existing and future transfer stations and/or to the Liosia landfill site was implemented:

- The daily waste production for the M.A. was estimated to be **1.100 tn/day**
- The extra waste load by the incoming visitors was estimated as **0.4 kg/ca/day** in athletic and other areas of the responsibility of the Athens 2004 Organising Committee and **0.9 kg/ca/day** as the expected extra waste load for the M.A. due to visitors.

To design the waste collection and city cleanising programs the following assumptions were made:

- 300.000 visitors within the city of Athens daily, due to the Games
- The load is distributed in the programs of the 3 zones in different percentages (70% in B1, 30% in B2 and none in C);
- No additional placement of bins in the city, only increase of the frequency of collection;
- 7-day per week collection of waste from the bins and a 12-hour per day sweeping of the roads and open spaces.

Table 2 illustrates the additional burden MSW expected during the O.G. Table 3 summarizes the total required trips to the landfill.

Table 2: Production of MSW before and estimate of additional production during the O.G.

Zone	Number of waste collection programs	MSW produced prior to the O.G. (tn/d)	Additional wastes produced during the O.G. (tn/d)	Total amount of wastes during the O.G (tn/d)
B1	35	453	189 (42%)*	642
B2	48	620	81 (13%)	701
C	28	362	0 (0%)	362
Total	111	1435	270 (19%)	1705

*: values in parenthesis indicate additional waste burden in % compared to present amount

Table 3: Required daily trips to the landfill per program in the 3 different zones during the O.G.

Zone	Mean additional waste production (tn/d)	Mean number of additional daily trips per program	Total required number of daily trips per program *
B1	5.4	1	3
B2	1.7	1	3
C	0.0	0	2

Each program covers collection from about 130 containers of 1.1 l capacity.
*: 2 trips per program take place normally on a daily basis

3. AWARENESS CAMPAIGNS

A campaign for different target groups among the city users (citizens, commercial activities, daily visitors) took place to raise awareness for an improved waste management in the city and encourage participation to the effort to keep the city clean, during and after the Games.

4. IMPLEMENTATION – EVALUATION OF THE WMP

For the O.G. the WMP assessed the needs for new equipment, personnel as well as the coordination of the waste management activities. Before the O.G. the M.A. owned 71 collection vehicles, mainly of 13m3 capacity, ranging from poor to very good condition. For the needs of the O.G. **245** new vehicles were acquired. For the waste collection a total of **660** people were employed (219 drivers and 441 workers), while a larger number of workers **(939)** were required in the city cleansing (manual and mechanical). Also, the waste collection programmes and the street cleansing programmes were rescheduled and worked on a 24-hours/d basis.

Additionally, the Municipality of Athens undertook the responsibility of operating a waste Crisis Management Center (CMC), entirely coordinated and managed by AEDA. Its main objectives were:
a) coordination of and provision of direct information to the city's departments on all waste management issues and operation of the Athens Call Center, b) a 24-hour based control operation system of the cities' activities.

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