Sizing of a Composting Plant and a Reception and Storage Center for an Ecological Park in Mexico

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ABSTRACT

The management of the 86,388.00 tons of solid wastes generated every day in Mexico is a complicated matter. In order to help solve this problem, sustainable buildings that include solid waste management plants and community awareness programs are being constructed. The objective of this research is to propose the building of a reception and storage center for storing the economically valuable wastes as well as a composting plant for treating the organic fraction within the installations of a sustainable park. The methodology is based on Laws, Regulations and Standards related to sustainable buildings, reception and storage centers and composting plants. From a generation study conducted in an ecological park, the volumetric weights of the generated wastes were obtained, the most abundant ones being polyethylene terephthalate (better known as PET), 38.75 kg/m³; food wastes, 110.5 kg/m³; and gardening wastes, 2443 kg/m³. PET wastes and plastics were added and a volume of 7.8 m³ in three months was obtained. This volume was used to design the four specific areas into which the reception and storage center was divided, each area being 2 meters long, 1.5 meters wide and 2 meters high, plus one meter for ventilation purposes. A movable partition was proposed in order to accommodate the eventual need of a larger space for a given type of wastes. As regard to the composting plant the method applied in the FAO (Food and Agriculture Organization of the United Nations) workshop - composting techniques was used, in which compost density is established at 250 kg/m³ and the daily volume of organic wastes (2.25 m³) was obtained to design a weekly mound being 1.5 meters long, 0.8 meter wide and 1.2 meters high, forming a 16-meter-long pile in three months. These areas will help promote awareness among the visitors.

Keywords: Composting Plant, Ecological Park, Mexico, Reception and Storage Center, Waste Generation

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INTRODUCTION

In Mexico, an average of 86,388.00 tons of urban solid wastes, mainly generated in housing, parks, gardens and public buildings, are collected every day. In Veracruz, on average, 4,451 tons of urban solid wastes are collected daily (INEGI, 2013).

However, a substantial part of the wastes is clandestinely disposed of in open pit dumps, provoking a serious problem because of the lack of control associated with this practice and the consequent environmental contamination. It is thus necessary to implement plans to appropriately manage the solid wastes generated in different sustainable constructions, including parks.

Government institutions such as the Secretariat of Environment and Natural Resources (SEMARNAT), the North American Center for Environmental Information and Communication (CICEANA), universities such as the National Autonomous University of Mexico, Autonomous University of Mexico and the National Polytechnic Institute among others, are involved in some parks, currently labeled as sustainable and/or ecological. Said institutions and universities carry out projects for the protection, restoration and conservation of the natural resources within the installations of said parks.

Different definitions of an Ecological Park have being given and the most commonly accepted are offered hereinafter:

An ecological park is a place characterized by the special care received by the species living in it. The purpose of an ecological park is to protect the ecosystem in which it develops. It can also serve as recreational area and promote the knowledge of the nature of a given place among the population.

It is a highly biologically valuable area that, because of its location and access conditions, is contemplated for the preservation, restoration and sustainable exploitation of its biophysical elements, for environmental education and passive recreation.

It is a zone that, because of its quality, location and general characteristics, relates to an ecological reserve or forest area were the community is allowed to develop passive, contemplative recreational activities, and environmental education, while maintaining its ecological and landscape characteristics (Rodriguez, 2009).

Depending on its formal characteristics, an ecological park can be classified in various way and receive different denominations. Within the group of protected zones, it is possible to talk about national park, sustainable park, or ecological reserve. The specificity of each name depends on the regulations of the country in question.

In Mexico, few parks can be considered sustainable or ecological. Among them the Xochimilco Park, Luis Donaldo Colosio Park, Xochitla Park and “Sendero del Abuelo” park can be mentioned, Huayamilpas Park as well as the Jaguaroundi Park which is one of the most recent.

Sustainable parks can help promote the environmental culture of reutilization and recycling, leaving an impact on visitors and workers who, in turn, may transmit an environmental consciousness onto their children, the environmental managers of the future. The importance and success of the above does not depend only on waste awareness courses, but also on practical and concrete implementations, and thus parks integrating a reception and storage center and a composting plant in a global solid waste management program are essential.

The reception and storage center is an appropriate area to attract waste collection, recycling and/or co-processing companies since once at least one ton of waste is stockpiled, its market value is economically interesting.

The purpose of this study was to design a specific reception and storage center for the Tuzandepetl ecological park, and to promote among visitors and workers the habit of separating and commercializing solid wastes as an environmental education alternative.
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