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## Smelting of Waste Nylon and Low-Density Plastics (ldps) in a Fluidized Bed System

Abdul Wahab Ogunbiyi<sup>a</sup>, Adeshola O. Openibo<sup>b</sup>, Olasunkanmi M. Ojowuro<sup>c,\*</sup>

<sup>a</sup> Mechanical Services, Lagos State Ministry of Woks & Infrastructure, Lagos Waste Management Authority, LAWMA, Nigeria <sup>b</sup> Operations Department, Lagos State Ministry of Transportation, Nigeria <sup>c</sup> Technical Services Dept., Ministry of Physical Planning and Urban Dev., Waste Management Authority, LAWMA, Nigeria

#### Abstract

In view of urbanization, industrialization, increase in socio-economic activities and technology growth, solid waste generation increases daily in Lagos State both in quantity and in complexity. Consumable and non-consumable goods come out of factories with new and complex packaging materials. Solid wastes thereby generated cannot be disposed with same method. Of these materials are nylon and low-density plastics (LDPs). Most foods, drinks and house-hold products are now plastics and nylon packages. To reduce the impacts on the global environment, the Government and private individuals in Lagos State have been working on ways of managing these materials for other purposes. The current research work is one the ways proposed and it intends to smelt the waste nylon and low-density plastics in a fluidized bed system. The paper is focussed on the research procedure, equipment design and heat source for the system.

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#### **1.0 Introduction**

The problem of waste nylons started in Lagos in 1997/98 from nylon used as package for pure water. A sachet is a 50cl water packed with thin nylon sold on the city streets, roads, schools, and some other gathering at very low cost. In searching for solution, the Ministry of the Environment called for technical meeting of engineering institutions in the State in May, 1998. Faculty of Engineering, University of Lagos was among engineering

<sup>\*</sup> Corresponding author. E-mail address: sojowuro@yahoo.com

institutions called. Others included The Nigeria Society of Engineers (NSE), Engineering Department, Yaba College of Technology, Engineers from Adebowale Industries and other private companies. Some solutions were proffered at the meeting and worked upon by engineers but could not be concluded as the Ministry failed to put the right commitment in place then. The problem not only remained on ground but escalated in size and type every day. Today, it is not only pure water package but also various types of nylon as wrapping and packaging materials for commercial and domestic goods, low and high density plastic bottles for table water, soft drinks, milk, drugs, foods, oils, paints and chemicals. All these are at high increase per day.

#### 1.1 Waste Nylon/Low Density Plastic (LDPs) and Environment

By character and property, these materials are very light in weight and not biodegradable. When disposed along with other wastes particularly organic wastes at dump sites, Nylon/LDPs remain intact for ages and support the fire burning during dry season, generating series of greenhouse gases to the environment. Because of their light weight, large percentages of waste nylon/LDPs are blown away from their point of generation/storage into drainages. As they do not decay, they remain there & accumulate (fig. 1.1) causing blockages of drainages & eventually flood during raining season.



Fig. 1. Waste Nylon and LDPs in Drain Channel

#### 2.0 Solutions So Far (Literature Survey)

Problem of waste nylon/LDPs is not limited to Lagos State and Nigeria only, it is a problem of international dimension. Just as the Sachet Water Manufacturing Association of Nigeria in Lagos State received threat of banning their products in the State in 2004, related associations in other parts of the world had faced similar threats in the past (Doris Menke, 2003),. The difference in this case is that both governments and associations in other parts of the world were much more sincere, serious and committed in finding permanent and acceptable solution than the case at hand in Nigeria.

In solving the problem, international associations along with their engineers, scientists and relevant agencies of government carried out researches into alternative uses to which these waste materials can be converted (Bryan Martel & Associates).

Research was also conducted into plants, machines and processing techniques required for converting the wastes. From series of research, wastes nylon, low density plastics and rubbers can be used for fence posts or plastic pallets, chipboard, carpets, foot-wears, foot-mats, toys (Engr. A. Ogunbiyi) etc. The processes required for these can be summarized as in a flow chart shown below.

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