

PERFORMANCE TESTING OF THE SOLID WASTE SORTING PLANTS

NI-BIN CHANG and YING-HSII CHANG

Department of Environmental Engineering,
National Cheng-Kung University
Tainan, Taiwan, R.O.C.

ABSTRACT

The rising prices of raw materials and environmental benefits from solid waste recycling have resulted in an increasing concern in the material recovery and reuse from both management and technical aspects. Although Taiwan has set a bold agenda of solid waste incineration programs to conserve the landfill space in the last few years, the continuing subsidy to the local government for promoting waste recycling activities has never been tempered. However, the impacts of material recovery on waste-to-energy facility remain unclear. This analysis evaluates a typical sorting plant developed by a local engineering firm in Tainan County, Taiwan. This pilot plant consists of several standard units, such as mechanical shredding, magnetic separation, trommel screening, and air classifying. By conducting a series of sampling and analysis programs, the performance of such a pilot plant is characterized such that subsequent economic feasibility study for the integration of material separation and refuse-derived fuel incineration would be feasible.

INTRODUCTION

Continuous economic development and population growth have inevitably resulted in a rapid increase of municipal solid waste (MSW) in Taiwan. According to an investigation conducted by the

Environmental Protection Administration (EPA) in Taiwan, the generation rate of MSW was increasing from 18,468 tons/day in 1990 to 23,268 tons/day in 1994 [1]. Table 1, in general, shows the characteristics and generation rate of MSW in Taiwan. A recent investigation shows that material recycling and waste-to-energy facilities may be coordinated together to deal with the desperate situation of continuous landfill closing. As the sources and prices of raw material become more and more critical, recyclables, which constitute more than half of the physical composition in MSW, would be a valuable resources in the secondary material market in Taiwan. But the heterogeneity, uncertainty and variability of waste composition make the expensive pilot study become essential.

Many studies have been focused on the evaluation of material recovery systems. Experiments were independently conducted for the evaluation of various types of unit operations, such as the shredder [2]-[5], magnetic separator [6], air classifier [6]-[11], trommel [12]-[14], and the vibrating system [15]. General design principles and issues relating to recover ferrous metal, aluminum, plastics, glass, and paper were discussed [16]-[24]. It is noticed that the integration of appropriate equipments to form a workable system is a function of the characteristics of waste inflow and the specifications of the recovered products [21].