A CASE STUDY ON 'WASTE TO WEALTH': BUILDING MATERIALS FROM INDUSTRIAL SOLID WASTE

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Abstract

'Waste to wealth' is a motto coined up recently by the Malaysian government to encourage resource recovery from various waste materials generated from industrial and agricultural activities. The introduction of this concept and subsequent implementation is due to the fact that many of the waste generated may still contain materials which can be transformed into value added products directly or indirectly. The emphasis is now on the types of waste generated in huge amount. One such waste is sludge generated in waste water treatment plants. In this work the concept of 'waste to wealth' is put into implementation where the content of this waste was first analyzed to determine how much can be recovered. From the analysis, it was found that big portion of the dry sludge contain aluminia, calcium oxides and ferum oxide. These materials are commonly used for making clay based materials such as brick, floor tiles and roof tiles. Therefore, fired clay samples were produced using this waste. The samples were firstly evaluated for their engineering characteristics where up to an addition of 20% wt of waste, the samples met the minimum criteria as an engineering building material in terms of strength and water absorption. Economic benefits that one can expect from this project were briefly discussed. The paper will also further explore other routes to create more wealth from this waste.

Keywords: Sludge, building materials, resource recover, 'waste to wealth'

1.0 Introduction

Malaysian living style has tremendously transformed for the past 50 years. The modern living style has resulted in more invention and innovation of consumer products. Therefore, the production process and raw materials has become more complex. The complexity has actually posed menace when it comes to waste treatment and disposal. Heterogeneous waste requires several stages of treatment prior to disposal. It gets tougher and costly when it comes to handling industrial hazardous waste.

According to Department of Environment (DOE), from 1987 to 1993 Malaysia has been generating an average of 15,625 tonnes of hazardous and toxic waste. From 1994 to 2003, the average amount has hiked up to about 400,000 tonnes per year due to booming country's economy (Ikwun and Agamuthu, 2004). Of the total waste, metal finishing industry has been the main contributor. Amongst them, heavy metal sludge from water treatment plants from electroplating and electronic industries ranks the top of the list.

Gone were the days when industries only thought of allocating more and more budget to treat and dispose waste. The government is out of space for landfills. Today, both industries and government has begun to allocate fund to do researches to turn waste to wealth. There are a handful of options to recycle waste into useful products such as hydrometallurgical recovery of metals, waste exchange, energy recovery and substitute of raw material for building and construction material. Prior to making decision on the recycling method, the composition and thermal characteristics of the waste has to be studied. Then, an optimal solution that benefits economically and environmentally is adopted.