



Determination of Ash Characteristics Results of Sewage Treatment Plant Sludge Burning of Fajrpetrochemical and it's Stabilization with Cement Mortar

Navid nasher ahkami¹ , taghi ebadi² , seyed hosein hashemi³ , morteza nikravan⁴

1. Civil Environmental Engineering, M.S., Amirkabir University of Technology

2. Department of Civil & Environmental Engineering, Amirkabir University of Technology

3. Environmental Science Research Institute, Shahid Beheshti University

4. Civil Environmental Engineering, M.S., Amirkabir University of Technology

⋮

navid_nsh@aut.ac.ir

tebadi@aut.ac.ir

h_hashemi@sbu.ac.ir

m_nikravan@aut.ac.ir

Abstract

Fajr petrochemical company produces principle utilities for other petrochemicals and also it treats their sewage. It is located in Petrochemical-Economic Specific Zone at northwest of Persian Gulf and near Imam Port. Burning the sludge is an option that has been chosen for industrial sewage treatment plant before disposal in hazardous waste landfills. Stabilization/solidification (S/S) is one of the options has been widely applied for the immobilization of hazardous wastes containing heavy metals. In recent studies, cement-based S/S method is used for industrial and municipal incinerators ash management. The objective of this study was to investigate whether incarceration oily sludge followed by stabilization/solidification could be proper option as a management method for this kind of sludge or not. In this study, at the first step, oily sludge was burn in laboratory kiln and chemical and physical characteristics of incinerated ash were determined. Afterwards, S/S technology was studied on ash as an option before disposal. In addition, the leachability of the heavy metals was studied by using the Toxicity Characteristic Leaching Procedure (TCLP). TCLP test was applied on specimens with replacement of cement in varying proportions i.e. 0%, 5%, 15% and 25% by incinerated ash. Also, heavy metals measurement was specified by inductively coupled plasma (ICP). Chemical and physical characteristics results show that incinerated ash has fine grained particles and it was remarkably without porosity. In addition, metals leaching test results on the ash and compare with reliable standards show that Zn content in leaching test is more than allowable criteria. Hence, ash was introduced a hazardous waste. Nonetheless, metals leaching tests results on the stabilized specimens with cement mortar express safe disposal for this hazardous waste.

Key words: hazardous waste, stabilization/solidification, Fajr petrochemical, ash, sludge

1. Introduction

The term of hazardous waste has been used in year 1970 for the first time and has remained in use ever since [1]. Hazardous waste may be found in different physical states: solids, liquids and gases. In fact, waste characteristics are the only factors, on which the definition is based [2]. According to EPA (Environment Protection Agency), the waste that exhibits one of the four characteristics defined in 40 CFR part 261 subpart C, i.e. ignitability, corrosivity, reactivity and toxicity, is categorized as hazardous waste [3]. There are several methods to minimize the volume and toxicity of hazardous waste before final disposal. In general, these methods are categorized as chemical-physical, biological methods, thermal, stabilization/solidification and depositing in hazardous landfill [2].