

Lead Smelters Pollution Abatement in Egypt

ZEINAB S. SAFAR
PROFESSOR , MECHANICAL ENGINEERING DEPARTMENT
CAIRO UNIVERSITY
EMAIL: ZSAFAR@CAIP.COM.EG
MAILING ADDRESS: 20 EL-MANSOUR MOHAMED STR., APT. 51
ZAMALEK , CAIRO, EGYPT
TELEPHONE NO.: 202-3405482
FAX : 202-3360549

Abstract

Secondary lead smelters are the main predominates source of lead particulate in the atmospheric air in Cairo. Lead is very harmful to the human health and affects the rate of growth in children. About 81% of the lead smelters in Egypt are located in the greater Cairo area, and their production represents about 86% of the total production of Egypt. Only 16% of the lead smelters are located in industrial zones, while 84% are located in agricultural, residential, and remote areas. The lead smelters in Egypt are using obsolete technologies, almost no pollution abatement measures are taken. A typical lead smelter emits about from 8000 to 10000 mg/m³ of lead particulate, while the Egyptian law allows a maximum of 20 mg/m³. The Egyptian Environmental law has been enforced since March 1998, and this forced many lead smelters to relocate to remote areas and 48% of them became unlicensed.

It was found that the lead particulate in Cairo ranges between less than 1 microgram/m³ and can go up to 20 microgram/m³ in near by areas of lead smelters. Relocation of lead smelters from residential areas in Cairo to industrial zones is the first step to reduce lead in the atmospheric air in Cairo. New technology which is economical feasible must be introduced to the lead smelting industry.

This paper addresses the technology management of lead smelters, including the suitable level of technology and optional technological management of the facilities to ensure its continuous compliance with the Egyptian environmental law. Some emission control devices are used now which comprises cyclones, wet scrubbers, and small bagfilters. The filtration efficiency of the existing systems ranges between 20 and 60 percent, thus the concentration of the lead is higher than the limits as specified by the environmental law. It was found from the distribution of the particle size of the emitted lead , that 99% of the particulates has a diameter less than 10 micrometer. Therefore the only efficient filtration system is the baghouse. It is proposed to use simple baghouses that may be manufactured locally in Egypt. In this case the lead smelters' owners can use economical feasible devices with filtration efficiency of more than 99%, thus complying with the Environmental law, hence maintaining this important industry which produces annually about 60 thousand metric tons of lead ingots.