

## A REVIEW ON TREATMENT STORAGE AND DISPOSAL FACILITIES (TSDFS) FOR EFFECTIVE MANAGEMENT OF HAZARDOUS WASTES IN INDIA

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### Abstract

Improper management of Hazardous Waste (HW) may raise serious environmental threats. Rapid industrialization over the last few years has indiscriminately increased HW generation in India. As per CPCB (2003) records, the total Hazardous waste generation was around 7.4 MTPA till 2017 in India. Treatment Storage and Disposal Facilities (TSDF's) play a special role in management of Hazardous Waste. In India, there are only a few well-established TSDFs, which manage hazardous waste effectively by following regulatory guidelines. This paper focuses on the status of the TSDFs in the country, the parameters of site selection to establish TSDF, regulatory approvals, challenges and future strategies for improvement in HW management system in India. The paper also attempts to provide methodologies available for proper treatment and disposal of HW by using stabilization and solidification technologies and proper collection and treatment of leachate from secured landfill sites. To summarize the current situation, a review on the existing facilities of industrial hazardous waste management is being proposed for attaining sustainable management via alternative resources like Alternate Fuel and Raw Material (AFR), recovery of Refuse derived fuel (RDF) that may be ideal in handling and disposal of hazardous waste.

*Keywords:* TSDF, Industrial hazardous waste, Alternate Fuel and Raw Material, Regulations, Disposal, waste management

### 1. Introduction

As generation of industrial wastes increases, their disposal and treatment has become a serious economic and environmental concern. Various industries play an important role in the economic buildup of the country, but every industry expels numerous types of hazardous wastes (Chin and Yong, 2019). In the last few decades, the government, industrial sector and general public have become more aware about the ways of disposal of hazardous wastes and their effect on health and the surrounding environment. The uncontrolled and non-engineered methods of waste disposal are the major causes of land, groundwater and air pollution, leading to health risks for human beings, animals and ecosystem (Lele et al., 2019). We are faced with the cost of dealing with the current state, future production, and use of products in such a way that they do not harm the environment or human health now or in the future. Hazardous waste management is a global problem comprising developed and developing countries. The really true issue that hazardous waste has created and continues to pose includes the confluence of technological obstacles, the availability of limited financial

resources, the associated risk, and relevant regulations, concerns and procedures. (Kolekar and Agrawal, 2019; Rabbani et al., 2018). There are four major factors that determine whether or not a substance is hazardous: (a) Flammability (b) Reactivity (c) Corrosivity (d) Toxicity (Fodor and Klemes, 2012). Anthropogenic activities such as agriculture, construction activities, medical services, manufacturing of synthetic drugs & chemicals, consumption of fossil fuels etc. are the major sources for generation of the huge quantum of hazardous wastes in India (Saleh and Eskander, 2020; Devi et al., 2018). These were being discharged into the environment over the years in all forms causing contamination, ecosystem degradation and health issues. A review article by (Dixit and Srivastava, 2016), uncovers the percent insightful on waste sharing in India under various categories which were mentioned as municipal waste 72%, industrial hazardous waste 11% biomedical waste 8%, plastic waste 8% and electronic waste 1%. There are adequate documents and visible proofs that focus on irresponsible hazardous waste disposal, which causes pollution in air, water, soil, and ecosystem, leading to bioaccumulation, biomagnifications, leachate generation, contaminated water infiltration, soil erosion, nutrient degradation, dust