Municipal Solid Waste Management and Sustainable Landfills

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ABSTRACT: *Solid waste is defined as the harmful undesirable substances which are being generated from daily activities like domestic, industrial and commercial. Municipal solid wastes (MSW) can be termed as wastes (solid and semi-solid) generated from kitchen, garden, hotels etc. MSW mainly comprises of food waste, paper, plastic, glass, metals, rubber etc. Proper and effective management of such kind of wastes is a big challenge for the engineers dealing with Solid Waste Management as today we are countering rapid industrialisation and urbanisation. Management of Municipal Solid Wastes (MSW) involves generation, storage, collection, conveyance to collection stations or processing plants, processing and energy recovery and final disposal of residue in environmentally controlled landfills. Here we will try to showcase the techniques of effective solid waste management so as to tackle all environmental hazards like spread of pollution and diseases. Today sustainable solid waste management is gaining rapid pace because of the fact that sustainability is very important when it comes to environment safety and conservation of natural resources.*

Keywords*: Municipal Solid waste, garbage, landfill, recycle, bioreactor.*

Determination of Smoldering and Ignition Temperature of MSW and Understanding the Landfill Fire in an Open Dump Site in Khulna Region of Bangladesh

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ABSTRACT: *This study investigates fire behavior in landfills by looking into the smoldering and ignition characteristics of municipal solid waste (MSW). In Bangladesh, open dump sites are a frequent practice that causes numerous additional environmental issues. Waste is collected from the cities and dumped in open dumpsites in an unorganized way and kept open to the environment. However various kinds of biological and chemical reactions occur at the waste surface and inside the waste body which leads to a heat generation and temperature rise in the waste body and causes fire. The goal of this study was to determine the exact temperature at which each waste kind ignites and maintains smoldering, which would aid in proactive fire prevention and effective waste management. The study finds a significant relationship between moisture content, smoldering temperature, and ignition temperature. Waste with a higher moisture content has higher ignition temperatures and is more likely to smolder. The study comprises a moisture content range of 13% to 71%, smoldering temperatures of 160°C to 325°C, and ignition temperatures of 226°C to 360°C. Notably, waste age is found to be a key determinant of smoldering and ignition temperatures. The smoldering and ignition temperatures of fresh waste are higher than those of waste that has been aged one year (192°C to 295°C and 282°C to 330°C, respectively) or three years (180°C to 267°C and 240°C to 320°C). Five-year-old waste exhibits temperatures between 160°C and 260°C for smoldering and 226°C to 313°C for ignition, maintaining the inverse relationship between waste age and smoldering/ignition temperatures. Additionally, this work uncovers a link between waste age and the amount of time. Smoldering and ignition times rise with waste age, going from 47 to 60 minutes (for smoldering) and 54 to 67 minutes (for ignition) for fresh waste to 26 to 47 minutes for both parameters in five-year-old waste. In conclusion, this study highlights how waste age and moisture content affect smoldering and igniting properties. Higher temperatures are caused by increased moisture content, whereas older waste has lower temperatures and needs less time to smolder and ignite. This type of study is very new and yet to be done, especially in the context of Bangladesh, and offers a better concept for understanding landfill fire.*

Keywords*: Ignition temperature, smoldering temperature, landfill, waste management.*