

Abstract

Mathematical modeling continues to attract attention of applied mathematicians, physicists, engineers, biologists, research institutions and others. This study focuses on air pollution concentration: a case study of γ -ash at Sony-Sugar Company, Kenya. Major sources of pollutants include industrial e_uent, agricultural chemicals and tra_c vehicle exhaust. Air pollutants are dispersed by wind into the atmosphere and within an enclosure. At Sony Sugar factory, air pollution is mainly contributed by γ -ash from unburnt bagasse due to insu_cient combustion. This has had a major negative impact on the surrounding, for instance, on vegetation and public health. The objective of this study was to determine the concentration of γ -ash within the boiler chimney at Sony-Sugar factory. We used a numerical analysis approach that involves two-dimensional _nite element to determine the concentration of the pollutant. We assumed the cross-section of the chimney is polygonal in shape, which was discretized into small triangular elements. The results obtained may be useful to engineers, environmentalists, agricultural and industrial sectors, and research institutions in the assessment, analysis and prediction of temperature distribution and variation of pressure that can minimize the pollutant concentration and volume.