

ANALYSIS OF THE FACTORS AFFECTING THE DISTRIBUTION OF CHIMNEY EMISSIONS TO THE ATMOSPHERE – SIMULATION APPROACH

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ABSTRACT

In this work, a computer program has been constructed for investigating the factors affecting the dispersion of stack emissions. These factors are wind speed, wind direction with respect to source, wind direction with respect to receptor, ambient air temperature and atmospheric stability conditions. The analysis is done via a 3-D graphical model which simulate the reality. A case study is applied for four stacks. The results indicate that the effect wind speed on total concentration, from the four stacks, is directly proportional to the increase of wind speed, while the distance of maximum concentration is inversely proportional to it. Also it is found that the total concentration is inversely proportional to the increase of wind angle direction with respect to receptor, while the distance of maximum concentration is shifted towards the source location. Total concentration is directly proportional to the increase of ambient air temperature, while the distance at which the maximum concentration occurs is almost constant. With regards to atmospheric stability conditions, the study indicates that Stability classes E and F give higher concentration than other classes while stability classes C and D give the lowest concentration.

KEYWORDS: Chimney Emissions, Graphical Model, Atmosphere