Modeling of Carbon Monoxide Distribution under the Sky-Train Stations

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Abstract : Carbon monoxide is one of the harmful gases which have colorless, odorless, and tasteless. Too much carbon monoxide taken into the human body causes the reduction of oxygen transportation within human body cells leading to many symptoms including headache, nausea, vomiting, loss of consciousness, and death. Carbon monoxide is considered as one of the air pollution indicators. It is mainly released as soot from the exhaust pipe of the incomplete combustion of the vehicle engine. Nowadays, the increase in vehicle usage and the slowly moving of the vehicle struck by the traffic jam has created a large amount of carbon monoxide, which accumulated in the street canyon area. In this research, we study the effect of parameters such as wind speed and aspect ratio of the height building affecting the ventilation. We consider the model of the pollutant under the Bangkok Transit System (BTS) stations in a two-dimensional geometrical domain. The convention-diffusion equation and Reynolds-averaged Navier-stokes equation is used to describe the concentration and the turbulent flow of carbon monoxide. The finite element method is applied to obtain the numerical result. The result shows that our model can describe the dispersion patterns of carbon monoxide for different wind speeds.

Keywords : air pollution, carbon monoxide, finite element, street canyon
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