

Indoor Air Quality and Energy Conservation Effect of Natural Ventilation On Office Buildings

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This paper suggested the decision method of the opening and shutting judgment of the natural ventilation which controlled the inflow of the outdoor pollutant for prevention of deterioration of the indoor air quality at the time of the natural ventilation.

A feature of this method is to connect the wind direction and velocity, indoor contaminants from outdoor. Then it is possible to inhibit the natural ventilation when the expected concentration is increased.

In order to use this method, first, we calculate the diffusion of the pollutant in the room from the outdoor source by CFD analysis.

Then, the wind velocity that the indoor mean pollutant concentration becomes the acceptable value is calculated in each direction of the wind. We can prevent an inflow of the pollutant to the room by adding the wind direction and velocity decided in this way to a judgment of the natural ventilation.

We calculate the airflow and contaminant concentration distribution with CFD analysis, to reflect the results, thermal and airflow network analysis was performed by annual weather data.

One result that openings were restricted to prevent the flow of pollutants, total natural ventilation time was about 50% shorter. And the cooling load was decreased by 10%.