

新しい生活様式における学校教室内環境と光熱費の両立のための自然換気方法の検討

Consideration of heating, natural ventilation and air conditioning in school with COVID-19

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It is important to ventilate as part of safety measures in relation to COVID-19. However, natural ventilation significantly depends on the temperature difference between the indoor and the ambient air and the current wind situation. In this summer, many Japanese schools cost more electric bills than last year because of opening windows fully during breaks. The schools need to know both well natural ventilation and comfortable air quality to study with low costs during the winter. In teaching and learning spaces, carbon dioxide (CO₂) is taken to be the key indicator of ventilation performance for the control of indoor air quality. Therefore, some methods of natural ventilation were investigated by measuring CO₂ levels in the classroom.

In two methods of natural ventilation, indoor temperature (°C), humidity (%) and CO₂ levels (ppm) were measured in the classroom with 35 students during classes. Method 1 was keeping windows open about 10 cm across the classroom. Method 2 was opening all windows fully once for 5 minutes at 20 minutes after starting classes.

The indoor CO₂ levels of method 1 were less increased than that of method 2 and weren't over reference value of the standard for school environmental sanitation in Japan (1500 ppm). In method 2, the CO₂ levels were increased over references before natural ventilation. The indoor temperature and humidity were slightly increased in method 2. Thus, method 1 is more effective to achieve heating, ventilation and air conditioning for comfortable classroom. In addition, mechanical ventilation systems including circulators should be useful regardless of the current wind situation. When there is the big difference of temperature between the indoor and the ambient air, the considering will be needed how wide windows and doors are opened.

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