

Case Study

A Revised Control Strategy to Reduce CO₂ in an Under-Ventilated Classroom

The Problem

AEI reviewed classroom ventilation for a New England school when classes resumed in the fall of 2015. Most classrooms in the school maintained CO₂ levels below the 1000ppm setpoint, but one classroom recorded levels above 1500ppm two to three times per week. Even though this level is not considered a direct health risk, it does indicate the classroom may be under-ventilated. The CO₂ levels in this classroom were frequently higher than the classroom setpoint of 1000ppm and outside the 1000 to 1200 ppm range most facilities try to attain. Even though increasing the ventilation rate would result in increased costs to condition the air, it was necessary to identify the cause of the high CO₂ levels.



Solution

AEI analytic & visualization tools were used to review the 15 minute Building Automation System (BAS) trend data and identify the root cause of the higher than desired CO₂ levels. The outside air dampers were not directly controlling to maintain the CO₂ setpoint of 1000ppm. The dampers were observed to be operating in an “economizer mode” to cool the classroom when the space temperature became too warm and outside air temperatures were favorable for “free cooling”.

The addition of outside air to cool the classroom did help reduce the classroom CO₂ levels, but the outside air dampers were not directly controlling to the CO₂ setpoint. A revised BAS control strategy was implemented to allow the outside air dampers to meet the requirements of both (1) CO₂ setpoints and (2) economizer mode setpoints.

Even if your outside air dampers don't have feedback sensors to indicate damper position, AEI analytics can (1) confirm outside air dampers are providing free cooling when appropriate, (2) verify minimum space ventilation levels are maintained, (3) verify spaces are not over-ventilated and (4) identify CO₂ sensors that may need calibration. Excessive ventilation in winter months in New England typically results in excessive use of fossil fuels.

The following article provides a good discussion of the importance of maintaining minimum classroom ventilation rates:

<http://www.airtesttechnologies.com/support/reference/CO2&SchoolClassrooms.pdf>



