

SICK BUILDING SYNDROME AND INDOOR CLIMATE CONTROL

The problem of high levels of CO₂ in ambient air appears to be a modern one. Yet, this is not one of the new fads that crop up from time to time and then disappear again, never to be mentioned again. It is, indeed, a modern problem, caused by the improvements in building standards and especially window manufacture. These improvements, hailed as a triumph over the age-old problem of draughty buildings, have nevertheless created a new negative effect. Ventilation was never a matter for discussion in most cases, it happened naturally as the wind blew and the air in rooms was replaced on a regular basis. With the new, draught-proof buildings this no longer happened, particularly since central heating made it unnecessary to have an air flow for any reason. This has given birth to the concept of indoor climate control.

The result was stale air. Air that has been used and breathed and not replaced, seen as a rising concentration of carbon dioxide, not to mention humidity. These effects had a detrimental influence on the buildings, promoting the growth of mould and other unwanted plant life. This was not the only effect. Slowly, the level of days off for sickness rose and the quality of work sank in these newer or refurbished buildings, leading to something referred to as Sick Building Syndrome, since it appeared to affect everybody in one building. The causes were not known for a long time, but now it is recognised that this is a result of breathing stale air with a high concentration of carbon dioxide over an extended period. Studies have shown that a level of 1000 ppm carbon dioxide will reduce the ability to concentrate by about 30 %, a significant drop by any means.

The obvious solution to this problem of indoor climate control was ventilation, and ventilation or air-conditioning systems were installed in all of these buildings leading only to the next problem: the heating bills in winter rocketed and staff complained of stiff necks and other maladies. Sick Building Syndrome was still here, but in a different form. How to provide adequate ventilation without simply heating the environment in winter? The only viable solution is control of the ventilation to reduce the exchange of air to the minimum required to keep a healthy atmosphere in the rooms, which is where indoor climate control becomes an active instead of just a passive discipline.

The real problem is the carbon dioxide, which is best measured with a NDIR infrared sensor. These are available in one or two channel technology for CO₂, but the single channel version is quite accurate and stable enough for this purpose today. Older types of sensor used to drift, as do cheaply manufactured ones, but a good-quality single channel sensor today will remain stable over years, only requiring a reference point occasionally to set a relative zero point. Such infrared sensors for CO₂ are now available from a number of manufacturers such as Madur Electronics in Austria. These come complete with an appropriate analogue output to allow the CO₂ level to control the function of the ventilation system. Industry standard for these control functions is the 0...10 V output, but there are other varieties in use. These can be readily accommodated in the construction or calibration of the system to ensure a high quality of indoor climate control. Perhaps we have finally seen the end to Sick Building Syndrome and can now enjoy the benefits of a controlled climate indoors, if not outdoors.

Further details are to be found under <http://www.habmigern2003.info/>

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