

Sick Building Syndrome, and the importance of maintaining IAQ equipment properly



HEVAC: The Indoor Air Quality Initiative

The HEVAC Association forms the Building Services Division of the
Federation of Environmental Trade Associations (F.E.T.A.).

Over the last two decades there have been an increasing number of instances where the occupants of a building have complained of a general feeling of being unwell. Often these symptoms appear to be flu like, however the symptoms usually disappear when they are away from the building. This phenomenon is called "Sick Building Syndrome" (SBS) and can be a major cause of employee absence. According to the Health & Safety Executive, SBS causes ½ million people a year to take time off work. There are a number of contributing factors to SBS including poorly maintained air conditioning systems, incorrect room temperatures or humidity, inappropriate lighting and noise.

When we think about good quality indoor air we think of breathing a fresh, healthy, invigorating atmosphere that makes us feel alert and well. When we are indoors, at home, in a factory, shopping mall, cinema, hospital or any other environment - we should feel as comfortable about the air we breathe as if we were in a meadow. In some ways we should feel better, particularly if the air is maintained at the proper temperature, filtered and suitably humidified.

HEVAC's (Heating, Ventilating and Air Conditioning Manufacturers Association) Indoor Air Quality (IAQ) Initiative has been formed specifically to promote the benefits of good quality indoor air. The initiative is evaluating research on the benefits of good IAQ and on how poor IAQ can be improved. The findings of its research are available to everyone with an interest in IAQ. The initiative's aim is to create a wider understanding of the conditions and constituents of good quality indoor air by underlining the problems that can be encountered if key elements are not employed.

Q : What is Sick Building Syndrome?

A : SBS occurs when people in a particular building or part of it feel their health is being affected by the building's environment. Typically the occupants attribute their unwell feeling to poor Indoor Air Quality (IAQ). SBS symptoms all have potential causes that are unrelated to the building air quality. However, unlike the flu related conditions that they resemble, SBS indications generally occur only when complainants are in the affected building. SBS has become prevalent since the 1970s, following the energy crisis, when many buildings were draught proofed and more effectively sealed in order to be more energy efficient. This resulted in less natural ventilation. For this reason SBS is also known as "tight building syndrome". Often SBS problems occur when a building is operated or maintained in a manner that is inconsistent with its original design and/or operating procedures.

Q : What causes SBS?

A : Despite a number of studies being carried out in this area, many of the causes of SBS remain unclear. However the following have been reported as contributing factors to SBS (acting in combination or supplementing other problems with humidity temperature or lighting):

- Chemical contaminants from internal sources: mainly from adhesives, upholstery, carpeting, photocopiers, cleaning agents and pesticides, especially those that may emit formaldehyde. Tobacco smoke and fumes from stoves, fireplaces and unvented space heaters are also sources.
- Chemical contaminants from external sources: from vehicle exhausts, other industrial sources, plumbing vents and building exhausts. Often this problem is due to poorly located air intake vents and windows which draw in the fumes.
- Biological contaminants: these include bacteria, viruses, moulds and pollen. These can breed in stagnant water that has built up in humidifiers and ducts. One

indoor air bacterium, Legionella, has caused Legionnaire's Disease. The control of Legionellosis in Hot and Cold Water Systems has been published by the Health and Safety Executive (see Further Reading). It applies to many buildings, including hospitals and hotels where the use of hot and cold water can create a risk of legionellosis in baths, showers and other water outlets.

Inadequate ventilation due to buildings becoming more airtight. In many cases reduction in ventilation rate can affect the health and comfort of building occupants.

Q : How does SBS manifest itself?

A : Typical SBS symptoms are reported as acute discomfort or a feeling of being "less than well". More specifically they can include:

- Headache
- Nausea
- Fatigue and drowsiness
- Dizziness
- Strange odour sensation
- Eye irritation
- Dry or itchy skin
- Mental fatigue
- Sore throat
- Sinus congestion
- Difficulty in concentrating

Q : What is the role of IAQ equipment in this?

A : Studies on SBS have indicated a relationship between ventilation and air conditioning systems and the prevalence of SBS symptoms. Natural or mechanically ventilated buildings that do not use air-cooling or humidity control tend to have among the lowest recorded occurrences of SBS. This suggests that poorly maintained air conditioning systems may have an influence on SBS, possibly due to microbial growth within humidifiers and cooling units. However, as stated previously, there are many factors that contribute to SBS (including people's perceptions) only some of which relate to IAQ equipment.

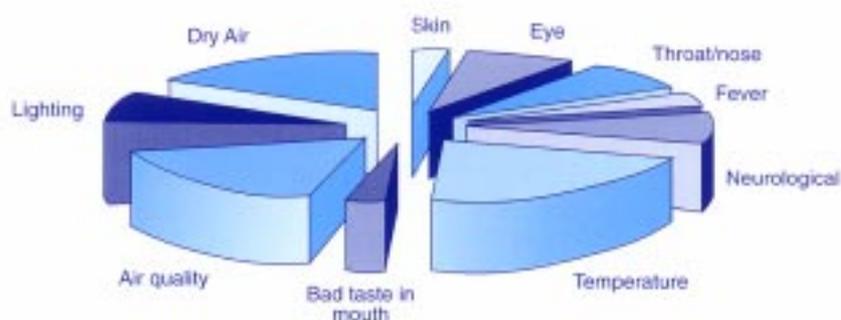
Q : How important is adequate maintenance of IAQ equipment in relation to SBS?

A : As IAQ equipment directly affects the air supply within buildings it is important that the equipment is maintained and operated correctly in order to ensure it is functioning in an optimum condition. The 1992 Workplace Health, Safety and Welfare Regulations Code of Practice states that ventilation systems should be 'regularly and properly cleaned' in order to eliminate anything 'which may contaminate the air' (see Further Reading). IAQ equipment that is not properly maintained will suffer from a build-up of contaminants which will in turn be distributed throughout the system reducing the equipment's performance and degrading the air supply. The occupants of the building will suffer from reduced air quality, contributing to incidences of SBS. In extreme circumstances poorly maintained equipment can allow the spread of Legionella. However it should be noted that serious occurrences are rare; Legionella has been found on many sources, including shower heads.

Q : What are the consequences of poor maintenance?

A : Common examples of inadequate maintenance include poor filter maintenance where failure to clean or change filters regularly can allow fungal growth and subsequent distribution of this and other particles throughout the building. As the filters become clogged the fans have to use more energy to move less air and energy consumption increases as air quality decreases. Other areas requiring particular attention include ducting, drip pans, vents, air intake openings, cooling and heat

Most common complaints



ing coils and humidification equipment and controls.

Q : What are the cost implications of regular maintenance?

A : It is important to adopt a "good housekeeping" policy with respect to the regular maintenance of a building's IAQ equipment. Studies have shown the savings (made by reduced absenteeism and staff sickness, not to mention more efficient operation of IAQ equipment) can easily outweigh the cost of maintenance. It is essential to operate ongoing maintenance programmes with regular audits and complete records. Assign responsibility and make sure it's done.

Other Fact Sheets in the series:

Fact Sheet 1
Indoor Air Quality and Productivity in the Workplace.

Fact Sheet 2
Indoor Air Quality and Health and the Indoor Environment.

Fact Sheet 3
Indoor Air Quality and Asthma.

Fact Sheet 4
Indoor Air Quality, Global Warming and Energy Efficiency.

Fact Sheet 5
Sick Building Syndrome and the importance of maintaining IAQ equipment correctly.

Further Reading

Health & Safety Executive Booklet; How to deal with Sick Building Syndrome - Guidance for employers. Ref: HS (G)132.

Health & Safety Executive Booklet; The Control of Legionellosis in Hot and Cold Water Systems, MISC 150.

The sick building syndrome. I.N. Potter. BSRIA 1996 ISBN 0 86022 212 8

Environmental comparison of air-conditioned and non air-conditioned buildings. I.N. Potter et al. BSRIA 1996. (RR 9/95 76510).

Indoor Air Quality; a comprehensive reference book. Maroni, Seifert & Lindvall (ed.). Elsevier, 1995. ISBN 0 444 81642 9

Our Healthier Nation: A Contract for Health. CM3852 The Stationery Office 1998. ISBN 0 10 138522 6 (tel. 0171 873 0011)

Workplace (Health, Safety and Welfare) Regulations 1992, Health & Safety Commission, ISBN 0 7176 0413 6, (tel. 01787 881 165)

Product Related Indoor Air Quality, Eurovent, 15 rue Montorgueil F-75001, Paris, (tel. 33 1 40 26 00 85)

Further information on HEVAC and Indoor air quality issues can be found on the FETA/HEVAC Internet: www.feta.co.uk/
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