

Articles

Create your own Climate Change. The Sick Building Syndrome

Sick Building Syndrome (SBS) is a relatively new phrase in the vernacular of facility operations and management.

SBS is a result of internal toxic emissions, toxic materials, poor daylighting, heating, cooling and inefficient or outdated operational practices affecting the internal environment of your facility or residence. Remember the old lead paints? They were an example of a toxic product living in your building. The good thing is, our 'unhealthy' building is curable. We can heal our 'sick' building.

A sustainably designed building is not sick. It will have cured the illness! A sustainable building, by definition, must be healthy to live in.

As with the climate change issue, many in the past have been tempted to view the issue of SBS as an 'invention of the tree huggers.' But like climate change, the evidence for SBS can no longer be ignored!

What causes sick building syndrome?

There are many components that make up 'SBS' and the emissions from these components contain many dangerous chemicals. Emissions can come from lack of fresh air through poor ventilation strategies to materials that emit cancer causing chemicals such as Volatile Organic Compounds (VOCs), like toluene, emitted by paints or materials such as carpets, laminex or particle board timbers, glues, curtains, plasterboards etc. Organic acids are also a major contributor to SBS. These are found in carpets and linoleums as well as glues etc. PVC found in pipes etc tends to be a long time emitter of chemicals. Don't forget the moulds found in all different parts of the building like air conditioning ducts and poorly ventilated laundries etc.

In addition there are important issues such as higher or lower indoor air temperatures, reduced daylighting, increased air conditioning, poor water quality and overall low levels of comfort found in a non sustainably designed facility.

Odours and pathogens are also a contributor to SBS and obviously have more impact in a Health facility such as an Aged Care or Hospital facility.

Then of course we have all the chemicals we wash our clothes or utensils in. We place these chemicals next to our skin, breathe them in or ingest them through using our utensils.

How much chemical residue is left on our plates and cups after washing up?

How serious is the problem of SBS?

Sick Building Syndrome is a major and growing issue on two principal fronts – firstly the measurable health impacts on those people living and working in the 'sick' buildings; and secondly because of the flow on effect these issues have for productivity and bottom line business viability. Why are we treating patients with cancer in hospitals where the environment of the hospital is full of cancer causing chemicals?

In a report from 2005, the Green Building Council of Australia cited over 1000 reports from around the world attesting to the importance of SBS and its negative impact on the inhabitants of buildings. The Environmental Protection Agency, USA, rates SBS as "one of the top 5 health issues of the 21st century". (EPA, 2003)

The EPA (USA 2005) indicates the internal building environment is 10-90% more toxic than the external environment! Surely important when people spend over 90% of time indoors! (CSIRO, 2005)

Symptoms of SBS, as cited in the Journal of the 'American Society for Heating, Refrigeration and Air Conditioning Engineers' (ASHRAE), are "usually acute such as headaches and eyes and nose irritations" 1.

Acute Respiratory Illness (ARI) is just one prominent affliction resulting from a sick building. ARI is a major concern for all health facility operators

The longer term impacts of living in a chemically induced environment are yet to be established. But there is compelling evidence as to the costs of SBS (see below)

The World Health Organisation, (WHO) 2004 says SBS affects:

- 1.34 million U.S. office buildings (OSHA)*
- 20 million U.S. workers daily (OSHA)
- 20-35% of workers in modern buildings (EPA)*
- Costs California about \$6 billion annually (LBL)*
- The EPA (USA) said of healthy buildings in 2005:
- Healthy buildings can reduce illness and costs

So what do we do about SBS?

Committing to a sustainable approach to your building design and operations is the first major strategy in the war against SBS.

The ASHRAE Journal article by Bill Fisk, 2003, details a "drop of between 23-76% in ARI in sustainable buildings."

The benefits of this approach are applicable to new or refurbished buildings. In a new building the performance requirements of glazing, daylighting and ventilation are important considerations. Toxic emissions can be controlled by correct material selection, installation and operation procedures.

Refurbished buildings receive benefit as well. When renovating you are generally going to remove and replace heating, cooling, lighting and materials so sure to specify the low toxic and efficient versions. These will reduce your poor internal environment quality while improving efficiencies.

- In addition the costs of these materials or systems are generally equal to or not much more expensive than the traditional toxic product. Certain manufactures now offer low or non toxic paints, floor coverings, curtains, laminex, Particle boards etc in addition to PVC-free pipes and fittings. The range of these materials is increasing. It is important to also remember the measurable financial benefits gained from curing SBS in your facility. (See table below)
- Estimated annual staff productivity increase by \$30 - 150 billion
- 10 - 30% reduction in respiratory diseases
- 20 – 50% reduction in SBS symptoms
- .5 - 5% improvement in office worker performance
- \$17 -\$ 43 billion annual health care savings
- \$12 - \$125 billion direct increase in worker productivity
- (WHO ,2004)

What	How
Poor lighting	Increase window size, Daylighting, review lighting design
Toxic floor coverings	Use Linoleum, Marmoleum. Timber. Excellent products available
Poor air quality	Review air conditioning design, change lighting type and design, control humidity, improve daylighting
Air conditioning	Use natural ventilation, improve building design, use double glazing
Room overheating	Use double glazing, shading, suitable building thermal envelope, sustainable design concepts
Toxic carpets	Use non toxic carpets. Excellent products available
Toxic paints	Use low VOC paints ,tiles, hard plaster
Other toxic emissions	Use low toxic laminex ,MDF, plantation or recycled timbers, glues etc
PVC Emissions	Use copper pipes or other alternatives-plenty available

So where to from here?

The process of designing and constructing any facility whether it is new or refurbished, involves certain milestones that must be adhered to. In the case of a sustainable building, the first milestone is to decide you require a sustainable outcome from your facility. The next step is to accept SBS exists and then investigate and discuss the numerous solutions to the SBS issue. The outcomes from this process, if well coordinated and managed, provide the design backbone for a sustainable building outcome that is comfortable and healed from SBS.

A healthy building.

*OSHA –Office of Safety and Health Administration, USA

*LBL –Lawrence Berkeley Laboratory, USA

*EPA- Environmental protection Agency. USA

*ASHRAE –American Society for Heating ,Refrigeration and Air Conditioning Engineers.

1. Fisk, Bill (2002). “How IEQ Affects Health, Productivity”; Journal of the American Society for Heating, Refrigeration and Air Conditioning Engineers. 2002