

Sick Building Syndrome

- Building where occupants experience a range of symptoms.
 - Sore throats, runny noses, chest tightness etc.
 - Cause discomfort and a sense of being unwell rather than specific illnesses.
 - Problems increase when in building, go home, gets better.
 - Typically in modern buildings with mechanical ventilation.
 - Much of the evidence is inconclusive and circumstantial.
 - Physical and psychological causes suggested.
-
- Occupants suffer from common symptoms of discomfort, i.e. a variety of people in the building with some problems.
 - For no obvious reason experienced more often than usual.
 - Increase in severity with time in building.
 - Disappear away from building and reappear when go back in.
-
- Common list of symptoms summarised by the World Health Organisation.
 - Eye, nose and throat irritation.
 - Sensitisation of the mucus membrane and skin.
 - Dry or itchy skin or skin rash.
 - Mental fatigue.
 - Headaches, high frequency of airway infections and coughs.
 - Hoarseness and wheezing.
 - Nausea and dizziness.
 - Lethargy, irritability or poor concentration.
 - Stuffy or runny nose.
-
- Symptoms often mild and don't appear to cause lasting damage.
 - Not trivial and can cause considerable distress.
 - Can affect attitude to work.
 - May represent a significant cost to the business in the form of:
 - Reduced staff efficiency
 - Increased staff absence and turnover
 - Extended breaks and overtime
 - Lost time complaining and dealing with complaints
 - Claims for stress and depression
 - Name of company, reputation
-
- Symptoms divided into four categories.
 - Dryness of skin, eye, nose and throat.
 - Allergic symptoms, watery eyes, runny nose.
 - Asthmatic symptoms – e.g. chest tightness
 - General feelings such as lethargy and headaches.

What Causes SBS?

- Despite extensive research the cause is unknown.
- Likely to be a combination of factors
- Physical or environmental factors i.e. ventilation, cleaning and maintenance, and workstation layout.
- Job factors, i.e. variety and interest of job and ability to control aspects of work and environment.

Common features of SBS

- Open plan offices of more than 10 workstations.
- Local authority buildings tend to be more affected, i.e. building quality, rather than industrial.
- Large areas of soft furnishings, open shelving and filing.
- New furniture, carpets and painted surfaces.

Building and office design

- Air conditioning
- Lighting, particularly the type and positioning causing high glare and flickering.
- Low user control over ventilation, heating and lighting.
- Poor design and maintenance of building services.
- Poor standards of general repair.
- Insufficient or badly organised office cleaning services.
- High temperatures or excessive temperature variations during the day.
- Very low or very high humidity.
- Chemical pollutants, new furniture, adhesives.
- Dust particles and fibres in the environment.

Chemical Pollutants

Most indoor air pollution comes from sources inside the building, i.e. adhesives, carpeting, upholstery, manufactured wood products, photocopying machines and cleaning agents. These may give off volatile organic compounds, including formaldehyde, carbon monoxide, nitrous oxide and various solvents.

Chemicals from outside, i.e. car exhaust fumes can enter through poorly sited vents and contribute to the effect. Biological pollutants such as bacteria, moulds, pollen and viruses can breed in stagnant water that has accumulated in ducts, humidifiers or even where water has spilled on ceiling tiles or carpeting.

Job Factors

- Routine clerical works.
- Work with display equipment (DSE).
- Many of the factors are interrelated.

- Badly designed and poorly maintained air conditioning can create problems with ventilation and with temperature and humidity control. All depends on one another.
- New furnishings can release chemical pollutants.
- Insufficient or badly organised cleaning services can create or exacerbate problems with dust.

- Physical and environmental factors can be exacerbated by the organisational factors:
 - Lack of control – personal – over working conditions in open plan offices.
 - Lack of work variation
 - Reduced decision making powers and hence job satisfaction.

- Not all the risk factors occur in each case.
- Symptoms do not necessarily follow when factors are present.
- Factors combine in different ways to create the necessary kind of working environment and working arrangements.

- Who is affected?
 - Any worker can be affected, existing sufferers of allergies etc.
 - Many different types of buildings include hospitals, schools and even in the home.
 - Most reports concern large office buildings.

Planning to prevent SBS

- Many of the causal factors relate to building services and building design.
- Difficult to change things when building and installation work completed.
- Needs to be tackled at the planning stage of new building work, refurbishment or change of use.

A number of different people and professionals are involved in the construction and designing of a new building providing scope for poor decision making, i.e. developers might give quality control decisions to the architect who then brings in the building services engineers to design the ventilation system. If specific user requirements are not known or taken into account the cause of cost constraints a standard system may be installed which is not appropriate for the purpose. Once building work starts, responsibility for quality control shifts to the contractor. Many changes are made as the building is constructed, so design specifications are altered.

Once construction is completed, walls and partitions are put up, machines and equipment are installed often without considering where vents should be sited. A catalogue of poor decisions and errors means problems are built into the structure.

Planning Objectives

- To comply with the building regulations (CIBSE)
- To direct efforts cost effectively towards the best possible working environment.

Apply planning objectives systematically in the following areas:

- Air quality including ventilation, air supply and movement.
- Temperature.
- Humidity.
- Lighting.
- Noise.
- Equipment and furnishings.

- Maintenance
 - Maintenance of the building and building services system
 - Cleaning operation including DSE

Job factors

- Management systems.
- Work organisation, including DSE work.

- Good planning is not enough
- Implement plans vigorously.
- Construction, renovation, installation and final commissioning should follow design as precisely as possible.
- Changes to the plan must be checked and approved.
- Materials should only be submitted when consequences of emissions have been assessed.

Minimising risks

- Building services and indoor environment:
 - Create and maintain a healthy and comfortable environment, i.e. provide fresh air.
 - Remove impurities and pollutants, i.e. odours, smoke, fumes, dust
 - Create and maintain a comfortable temperature and humidity
 - Prevent stagnation and draughts
- Lighting
 - Where possible, individual control
 - Use natural light
 - Avoid glare, flicker and noise
 - Keep clean and replace defective units quickly
 - Be appropriate for the work, in particular for DSE

- Noise
 - Unlikely to cause SBS on its own
 - Disruptive effect on workforce
 - Select equipment with low noise emission characteristics
 - Consider other sources of noise, i.e. air at outlet vents and ductwork, water in pipes, vibrations from air conditioning plant, office equipment

Comfort levels recommended by CIBSE:

- Temperature – 19C – 23C (indoor)
- Relative humidity – 40% - 70% > 55% in carpeted buildings
- Delivery of fresh air – 8litres/sec/person
- Total air supply – 4-6 air changes/hour
- Air speed – 0.1 – 0.3 m/s <0.1 (stuffiness), >0.3 (draughts)
- Sound – 46dB(A) upper limit for general office
- Light – 500 lux (min)

Minimising risks

Office equipment and furnishings

- Release chemicals – volatile organic compounds
- Trace amounts at the limit of detection
- Sampling techniques can be expensive
- More information is becoming available
- Good maintenance is critical and should include –
 - The fabric of the building
 - Building services (heating, ventilation, air conditioning and lighting)
 - Furnishings
 - Office equipment

Management systems –

- Well motivated staff are more likely to give warnings of developing problems
- Good communication and relationships will help
- Little direct evidence that management and work organisation systems cause SBS

Maintenance

- Cleaning operations should be set according to circumstances but as a guide -
 - Wet areas of plant including cooling coils and humidifiers (annually)
 - Ventilation systems, grills and vents (annually)
 - Windows and light fittings (monthly/3 monthly)
 - Internal surfaces, office carpeting, furnishings and furniture (daily)

Workstation design

- Proper job design is probably the most important aspect of work for most people
- Involve staff in designing their own jobs and setting their own targets
- Break up routine procedures i.e. variety, rest breaks and job rotation
- Access to external windows where possible
- Provision of plants
- Colour scheme

Revision questions regarding SBS.

What is meant by SBS? – 1 mark

What factors might affect SBS? – 4 marks

How would you minimise the effects of SBS? – 4 marks