

# CENTRE FOR ALTERNATIVE TECHNOLOGY UNIVERSITY OF EAST LONDON

## Practical: **Environmental health at work in Offices**

Unit 5: February 2006 (DL)

### Introduction:

This assignment was aimed at people who work in an office, generally Monday – Friday, and normal working hours. Its was intended to investigate a wide range of symptoms which can be caused as a result of Sick Building Syndrome (**SBS**). These symptoms could be both **Physical** or **Physiological**, affecting employees' productivity, general health and well-being. We comprised a questionnaire, which was then handed out to various offices, each of around 10 employees. Our aim was to highlight any problems within an office, and give a general feeling as to what the employees thought of their immediate environment, whether they had control over this, any management issues they may have, whether they feel they have a say or not etc. etc.

### What is Sick Building Syndrome?

Sick Building Syndrome, also known as Building Related Illness (**BRI**) is the common label used to describe a range of symptoms which many people experience in specific buildings, especially offices.

The symptoms are irritation of the eyes, nose, throat and skin, together with headache, lethargy, irritability and lack of concentration. Research by Rennie and Parand (1998:22) suggest that 'the symptoms diminish when the afflicted persons leaves the building concerned.' SBS symptoms are regarded as minor, since apparently no lasting damage is done. Never the less, an uncomfortable work place effects productivity and can lead to serious lack in concentration. In one UK survey, Rennie and Parand (1998) state that 55% of staff in air-conditioned buildings were affected by SBS - many of them mildly but still to the extent that they said their work was adversely affected. In more serious cases of SBS, it has been suggested that staff have taken time off sick, due to uncomfortable working conditions.

Possible causes of SBS vary between work places, during the working day and week. Numerous minor causes lead to the build up of SBS and no one factor is the sole cause of the syndrome. Possible environmental causes include poor ventilation, indoor pollutants such as gases and vapours from the office, fine particles, micro-organisms such as fungi and dust mites, and physical factors such as temperature, humidity, flickering lights and working at computer screens. Possible physiological and management causes, include the individual characteristics of the persons involved, how complaints are managed and whether individuals feel they have a say or not.

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### Methodology:

Firstly we planned to read through the lecture notes for Unit A5, especially the lectures on 'Indoor Air Quality' (**IAQ**) and 'Sick Building Syndrome', this would allow us to gain a general feel of the topics in question. We would then brainstorm ideas and possible questions in the Distance Learning (DL) Forum online. (Message No.1861: *Tue 28.02.06* & No.1871 *Fri 03.03.06*)

After everyone had had an input, our ideas would be gathered by Damien Randle who would summarise colleagues' contributions and suggest a collective consensus. The outcome of this would be a questionnaire (see attached), covering all the points we thought would allow us obtain the information needed for this study. This would be in five sections:

- Section 1 – Investigating the individual in the workplace.
- Section 2 – Investigating the office environment.
- Section 3 – Investigating health at work.
- Section 4 – Investigating comfort in the workplace.
- Section 5 – Investigating job satisfaction.

The results would be gathered after a week and compiled into a large spreadsheet holding everyone's collective data. This would then be analysed to see if there were any patterns, areas of interest or anything that indicated a connection with SBS and BRI.

### Results and Conclusion:

We obtained a large amount of data, which comprised of the results from **forty-two questions** and **122 participants**. I felt the best way to analysis the data in the time given was to make some assumptions; to allow the results to become more focused. In making these assumptions it would allow me to study specific employees, environments and buildings rather than 122 people in various offices, with different job requirements etc. Therefore, please note the following:

### Assumptions:

From the data gathered, I assumed that the type of people most likely to suffer from any symptoms of SBS in an office are people ranked 'Middle' – 'Junior'. I assumed that in most cases, the management team would have their own office, allowing them (as well as their status within the company) to take control of their immediate environment, whereas employees of a more junior rank would probably work in an open plan office of some description, amongst a number of other employees, with little control over their immediate

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environment. Therefore, I deliberately chose to study the data gathered from employees with a 'Middle' – 'Junior' ranking.

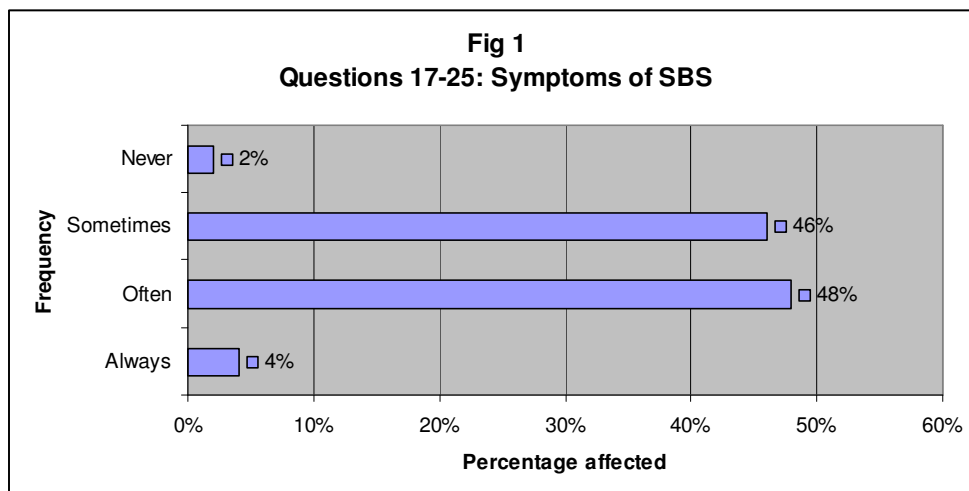
I also assumed that the average employee would spend most of the working day in the office, reducing the amount of time for any possible symptoms of SBS to diminish; therefore I deliberately chose to disregard any response that indicated an employee spent under 6 hours in the office (the average time an employee works is 9:00 – 17:30, 8 ½ hours a day with 1 hour lunch break).

To obtain a more focused investigation into the causes of SBS I felt I should look at buildings from a certain period, the best being buildings constructed during the era when SBS was most noticeable, around the 1960's 70's and 80's. This was post World War II when the economy was growing and changing, from industrial to a more office based society. In the post war period people were unaware of SBS and it was only later, during the mid-80's, when thousands of complaints were being made about their work environment, that people became more aware of this possible syndrome. Many of these buildings still stand today, even though most have now been renovated. I chose therefore to exclude buildings post 1990.

From making the above assumptions I feel it has allowed me to make a more focused study. **I chose to investigate forty-eight 'Middle' – 'Junior' ranking employees, who spend the majority of their working day in an office that was built pre 1990.**

### Results:

The results show that out of the forty-eight employees, **98%** of them suffered from one of the symptoms listed in the questionnaire (questions 17-25) at some point; **4%** of them on a very regular basis.



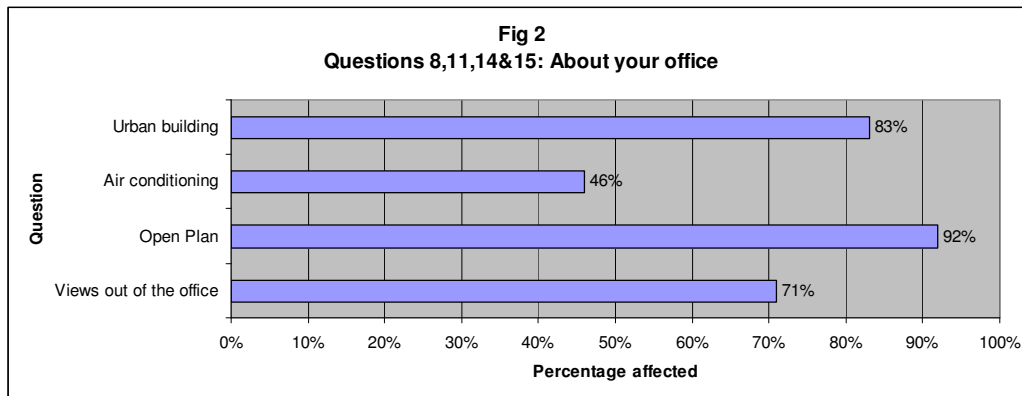
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As is obvious from Fig 1, the majority of people (in the target group) in the pre 1990 buildings, suffered from at least one of the symptoms of SBS. This is a significant number, (although it should be noted that symptoms could range from a headache to a fever or rash). But this does give us an idea of the amount of people who suffer from some sort of discomfort at work. The results might have been more accurate, if I was to have studied every symptom to see how many people suffered from each one, and how frequently. However I felt this would take too long, and would not be suitable for this Practical. For this purpose, as already explained, I made various assumptions to enable me to keep my investigation more focused.

To develop my investigation further I chose to study the 52% of people in Fig 1 who **often** or **always** had one or more of the symptoms listed in Questions 17-25 (Fig 1).



From the results in Fig 2 above, it was apparent that out of the 52% of people who suffer from a symptom of SBS on a regular basis, the majority of these were in urban, open plan buildings. Around half of them were supplied with air conditioning.

It appears one of the main contributors to SBS is Air Conditioning (**AC**), so it was not surprising to see this result. Essentially, indoor air is outdoor air plus anything that has been added, (pollution). The tighter the building envelope is the more likely Indoor air pollution (**IAP**) is to occur. This is due to air being recycled again and again, with indoor pollutants such as carpets, fixtures and fittings being added every time the air does a cycle. In an article on Healthy Buildings by the WHO (1984), it was suggested that 30% of new and refurbished buildings are unhealthy. It was found that indoor air is between 5-10 times more polluted than external air, and that the use of Air conditioning is a false economy, as it is expensive and only recycles already polluted air.

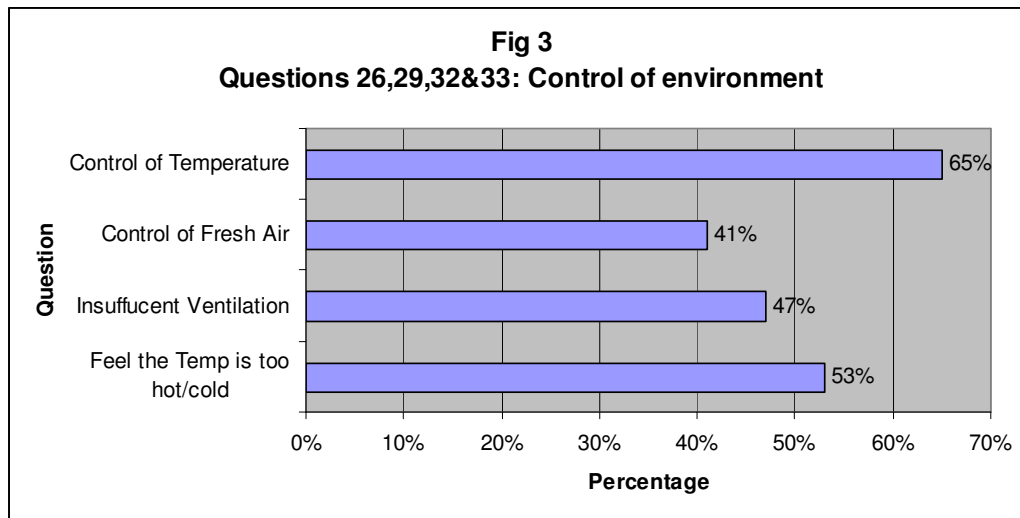
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One surprising result however was the fact that out of the 52% of people who often or always suffered from a symptom of SBS, 71% of these had views out of the office. BS8206 states that 'All occupants of a building should have the opportunity for the refreshment and relaxation afforded by a change of scene and focus... Unless an activity requires the exclusion of daylight, a view out-of-doors should be provided irrespectively of its quality.' This suggests that no matter how poor the view, looking outside and focusing on anything is better than not been able to see outside at all. It is particularly important that people working at computers have a distant point to focus on every so often. Therefore I was surprised that such a large percentage of those who suffer from a cause of SBS have a view of the outdoors. I decided to investigate this further.

I decided to investigate whether the 71% of people who had views of the outdoors, actually had any other control over their environment (Questions 26, 29, 32 & 33 – Fig 3).



The results demonstrate that out of those who **do** have views outside from where they work, 65% of these have control of the temperature, but then 53% of these feel that the temperature is normally too hot/cold (Fig 3) – they do not however choose to change it. This suggests that even though people **can** take control of their environment, they choose not to. Around half of these feel there is insufficient ventilation as well, but do not appear to choose to take control by opening accessible windows (Fig 3).

In conclusion, I have discovered that in pre 1990 buildings, which have been refurbished, (with around half of them fitted with AC) nearly everyone in 'middle' – 'junior' ranking suffers from some sort of symptom of SBS. The results also show however that the majority also work in open plan offices in

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urban areas, **with** views to the outside. Even though 71% of the people studied **do** have views of the outside **and** have control of the temperature in their immediate environment, the majority choose **not** to take advantage of this. This could be because of other factors which I have not studied (such as for example noise pollution from outside). People may have the option to open windows etc. but choose not to as they are in the city centre and it is too noisy.

Even though the practical has outlined some interesting points, which prove my initial theory correct, being that I believed buildings built pre 1990 would have **some** symptoms of SBS, and this would be clearly noticeable in people who spend the **majority** of their time in the office, mainly in front of a computer. I believe there could have been some discrepancies in the data collected, and the way the questionnaire was constructed. It is possible that participants didn't fully understand the marking system, making it difficult for them to mark the correct box i.e. providing too many variables. It is also possible that by allowing them to mark a 'natural' box it produced answers which were not focused enough. Therefore, the results could be slightly inaccurate due to the questionnaire. Although overall, asking 122 participants, the questionnaire was adequate to produce sufficient information for this length of investigation.

Even though this investigation has clearly highlighted some issues related to renovated urban buildings, I feel our initial questionnaire was extremely broad and agree with some of the points made by people in the discussion forum. Alan Burgess (Message No.1921) says that the questionnaire design was not sufficiently directed to a clear definition of SBS. I agree with this point to a certain degree, as I mentioned earlier, and feel that SBS is such a broad 'disease' that concentrating on a particular aspect wouldn't look at a building as a whole, and that SBS should be combated as a 'sick building' not one particular aspect of a building. This was again mentioned by Darren Iversen (Message No.1922).

From research I have carried out in connection with SBS and buildings from the period I chose to study I was able to make a connection with the practical and actual situations where SBS has been such a problem an investigation had to be undertaken.

### Milton Keynes Job Centre

During the 1980's members of the Civil and Public Servents' (CPSA) at the Milton Keynes job centre suffered from working in a sick building. This was due to the poor way in which the building was designed, which lead on to cause what was known as the 'three o'clock flush'. Symptoms included itchy eyes, chest problems, coughs, cold and sinusitis and a general lethargy in the afternoons. Even after many employee complaints, management refused to

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act, until in 1984 when a union meeting finally demanded something to be done. A survey was finally carried out by an independent and impartial engineer on the building to find that: incoming air was lost straight away up the Formalux 'egg-crete' louver false ceiling instead of being circulated around the building, the louver also allowed fibre glass particles to pollute the air in the room, humidity was much too high and lighting was poor with extremely high glare levels. The costs to put all the faults right ended up costing the company around £30,000. (London Hazard Centre) The design, by Development Corporation was based on creating an eye-catching building, using untested technology without the user in interest. Had considerations been taken into account, with the air tight sealed, funnel shaped building, with two floors covered in mirrors; the problems would have made them self clear at an early stage.

### Ealing Council, West London

In 1987, Ealing Council in West London moved 1,000 employees into the Great Western Centre, a prestige office development which promised a 'new era' of modern and luxury design for workers. Within weeks, employees started to complain of symptoms such as headaches, sore eyes, sore throats and stomach upsets. It took several months for management to take notice of unionists and commission London Scientific Services (an ex-GLC body) to conduct a survey of the building, to find out that bacterium responsible for Legionnaires' disease was in stagnant water in ducts for the air-conditioning system. This was ignored by management for a further two years until 1989 when workers walked out on strike when the majority of people in the switchboard room fell ill, some ending in hospital. An investigation revealed that a breach in the internal ducting allowed a direct connection between a leaking sewage pipe, a laboratory where hazardous chemicals were used and a service duct contaminated with fungal growth which fed the switchboard room with apparently 'air-conditioned, clean, cool air'. (London Hazard Centre) Had the building been designed to take advantage of natural ventilation and independent manual controls for staff, such as open able windows, this problem might never have happened.

This clearly shows the connection between the practical and the real world. There have been numerous cases where SBS has been a problem. Even though SBS has not been confirmed as a disease or sickness, it has been discussed at the highest levels; including the World Health Organization (WHO), Health and Safety Executive (HSE) and Building Research Establishment (BRE). One of the leading factors in preventing bodies from confirming this is a syndrome is due to the number of factors involved. Architects and designers **have** to take care when designing, and take advantage of research carried out into SBS to help combat such symptoms within the workplace.

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I feel the limitations of this practical was actually its open-endedness. I felt that if we put a questionnaire together that focused on a certain building, or period building, or a certain rank of employee it would have controlled the breadth of the investigation and allowed a more focused practical – which is what I did.

Any further learning would be to distribute a questionnaire to the people I decided to focus on, with a more in-depth approach to some unanswered questions in this paper, for example the problem of noise pollution. I would possibly consider visiting the sites involved, or looking at the layout of the office, how often it is cleaned, social integration of employees etc. If more time were available, I would consider investigating employees outside my chosen target group, but again, a more focused approach would be needed.

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