

The Dirt Devil: Cleaning and the Culture of Responsiveness

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When you read this article, you will probably be sitting in an artificial environment of some kind - your home, perhaps, an office within your home, an office at your workplace, or in transit somewhere, in a train, plane or hotel. You may well also be uncomfortable; especially if you are in an office or you have to share the space with others. Discomfort comes about both because prevailing conditions do not suit you and because you cannot effectively intervene to change them for the better. In the home, there is a greater chance that you can affect things, because the environment is likely to be more controllable, and the control systems themselves more responsive.

Lack of perceived control over the environment is linked to discomfort and also to poor health [Reference 1]. The growing body of evidence on “sick” office buildings (that is, buildings where staff have symptoms of chronic malaise, such as lethargy and headaches, which disappear shortly after they leave the building) show that the lower the perceived control, the higher the incidence of chronic symptoms. Poor health in the office, in turn, appears to be linked to dissatisfaction and low staff productivity, which is not surprising but, nevertheless, still poorly quantified.

Satisfaction, intriguingly, is also linked with good energy efficiency [Reference 2]. A further link is that healthy buildings are also more likely to be clean [Reference 3]. Cleanliness, it seems, was the only factor which clearly explained the presence of chronic ill-health symptoms in a office building known in advance to be “sick”.

With all this information, it is easy to get lost in a miasma of statistics, but there is a basic message. It seems that office buildings which are comfortable also have the most satisfied staff, who are also likely to say that they are more productive in their work, and are more healthy. Their buildings overall are also cleaner and more energy efficient!

What is common to all this? The over-simplified answer is “good management”. Buildings which allow their managers to respond quickly and positively to changing requirements, especially when these are driven by basic human needs such as comfort and health, are much more likely to help create this virtuous cluster. The relationship between buildings and management is two-way. Buildings which have complex services (such as air-conditioning) are often fundamentally more difficult to manage and maintain, and so require more management time and effort. Sometimes, the building services are too costly for an organisation to run properly and, consequently, break down and fail in various ways. Sometimes they are just plain unmanageable.

This is one reason why ill-health in offices is so often related to open-plan spaces and air-conditioning [Reference 4]. These bigger, highly-serviced spaces are more complicated to control and manage. In open-plan offices, people have less ability to control their physical environment (furniture, thermal comfort, ventilation, lighting and so on) to suit their individual needs. They are also used more intensively, which increases the likelihood that not everyone within them will be satisfied with the conditions. This “extra” complexity is often an invisible additional cost to management which has often not been anticipated and only emerges when the design teams or consultants are long gone.

The expectation is that technology such as building management systems (the automatic control systems that govern heating and cooling systems) and systems furniture (modularised office furniture) help to reduce management costs while improving the amenity conditions and helping to intensify the use of space. The actuality is that, without careful management, many of them can unwittingly add to the complexity, reduce comfort conditions, thereby adding to the cost and increasing the chances of discomfort or others types of failure [Reference 4], and ultimately making the spaces less usable .

One of the most telling pieces of evidence comes from a British office building studied in 1988 [Reference 5]. In order to investigate the likely causes of ill-health and absenteeism amongst the occupants of the building, interventions were made with features such as the ventilation system, lighting, air filtration, heating system, chimneys, window sealing and “wet” cleaning of fabrics. The interventions were carried out without the knowledge of the occupants. Occupants were surveyed before and after to assess their building-related health symptoms. Of all the interventions, only wet cleaning had a measurable effect. This finding was corroborated in another similar study in 1992 [Reference 3]. Again the wet cleaning intervention measurably improved the levels of symptoms. In this study, the application of liquid nitrogen (to control dust mites) also had an significant effect. Thus there is some convincing evidence that wet cleaning (in these cases, hot water extraction (“steam”) cleaning of chairs and carpet, wet wiping of surfaces of furniture, and vacuum cleaning of paper files) effectively reduces the level of surface contamination within a working area and can reduce symptoms related to sick building syndrome.

As for the link between diligent cleaning and healthy occupants, there is also evidence which establishes relationships between comfort, control, and energy efficiency [Reference 6]. Figure 1 shows

that energy efficient buildings (which are at the bottom of each group of buildings - air conditioned and naturally ventilated) are also likely to have more satisfied occupants. Figure 2 shows how occupants' perceptions of control over the physical environment are also related to energy efficiency - the more perceived control, the better.

The crucial factor is forward-thinking building management. Occupants will be more satisfied if the building - through its manual or automatic control systems or through its managers - can respond quickly to any discomfort the occupants may experience. A culture of responsiveness will often also be carried over into the use of energy. The more the energy-intensive systems - especially air conditioning and, and to a lesser extent heating and office equipment - respond accurately to the energy demand, the better for energy efficiency because systems will not be left running "just in case".

Cleaning is a good indicator of this culture of responsiveness - it almost goes without saying that the better buildings in Figure 1 and 2 (B, E and G) are also much more likely to be clean. Why should this be so? In the authors' experience, a dirty plantroom will mean an inefficient and probably uncomfortable building, and this will probably also mean that the cooling towers, hot water systems, and ducts are all in a similar poor state. This can be compounded by lack of forethought in design and refurbishment so that cleaning and maintenance is made more difficult - cramped plant rooms, or perimeter heating and air-conditioning devices being "walled-in" by furniture layouts, for instance.

Sometimes it is easy to see the implications of cleaner's behaviour for energy efficiency. If cleaners come in early in the morning, the heating and air-conditioning often have to come on early too. Of course, lights have to go on early as well, and if on when people arrive they often stay on all day as the default state. Sometimes cleaners switch on all the lights initially, and then switch them off in turn to signal that they have finished the areas concerned. These default settings (of lights, blind and windows especially) are often most important for the comfort of the occupants during the day as, for example, shutting windows in the evening may lead to over-heating the next afternoon. Some buildings have cleaners' lights at half intensity or less. Is this too low for cleaners to find the dirt properly? Much cleaning is carried out out-of-hours (out of sight, out of mind?). Recently, companies have

experimented with cleaning (except hoovering) during occupied hours which both improves cleaner's morale through identification with the organisation, and allows occupants to point out areas that particularly need attention.

Cleaning budgets, of course, are easy victim of cutbacks, and often facilities managers are less than diligent in ensuring that performance standards are met. Where cutbacks have been especially severe and long-lasting, as in the public sector, the cumulative effects of dusty and dirty buildings - both visible and hidden - may have often led to the occupant health problems which became obvious in the 1980s.

The research reported above has been largely in modern office buildings and, although the evidence on cleaning is still poor (there are remarkably few studies on this subject), it is clear to many that cleaning is an essential part of a quality control process fundamental to effective building management, and satisfied, productive occupants. Attitudes to cleaning can be very different in historic buildings, such as country houses and churches. The Manual of Housekeeping [Reference 7], for example, is a masterly and practical summary of how the National Trust cleans its buildings. For those who see cleaning not simply as routine chore, but as a means of monitoring performance on a daily basis and providing crucial feedback information for effective maintenance (which means quality control writ large) then this book is to be strongly recommended.

So too is an understanding of the hidden benefits to be gained by diligent, though not necessarily costly, cleaning. A regular "wet clean" in your office may make the difference between tolerable comfort and potentially chronic illness or absenteeism. Not only will the office be rid of superficial dust, but the likelihood is that floors will be tidier and there will be less clutter. People will care more about their working environment, standards will rise, and tolerance of defects will fall. To some managers this may sound like hard work and a hostage to fortune; to others it may sound like the promise of large cost savings gained through a happier and more productive workforce. And, as the evidence shows, there are environmental benefits as well!

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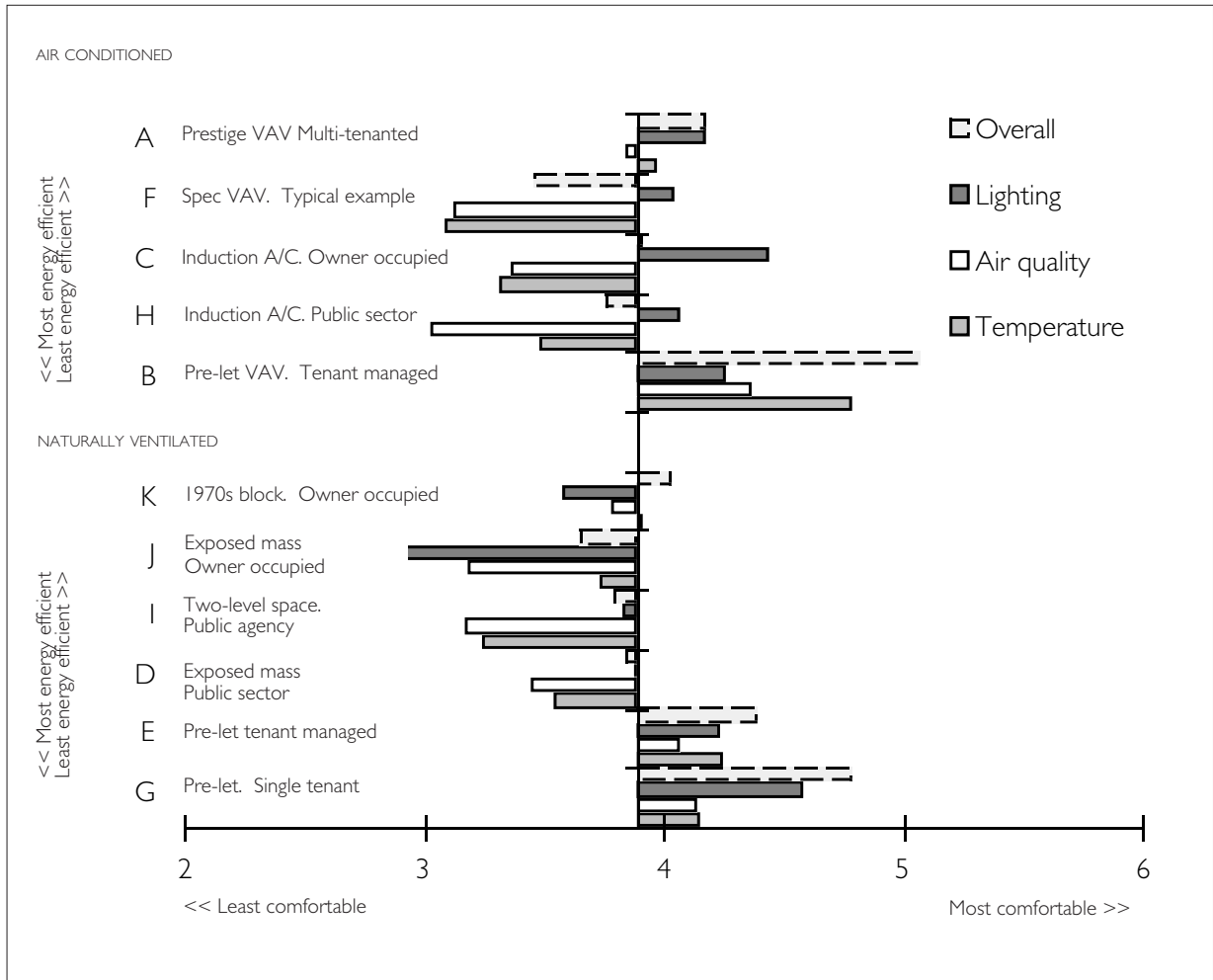


Figure I
Occupants' perceived comfort

Buildings A,F,C,H and B are air-conditioned; K,J,I,D and E naturally-ventilated. For each group, buildings are ranked by energy efficiency (best at bottom). The scale is a 7-point satisfaction scale (1=low, 7=high). Individual building occupants are surveyed by questionnaire. The scores are hinged at 3.8 (a 50-building average for overall comfort from reference I).

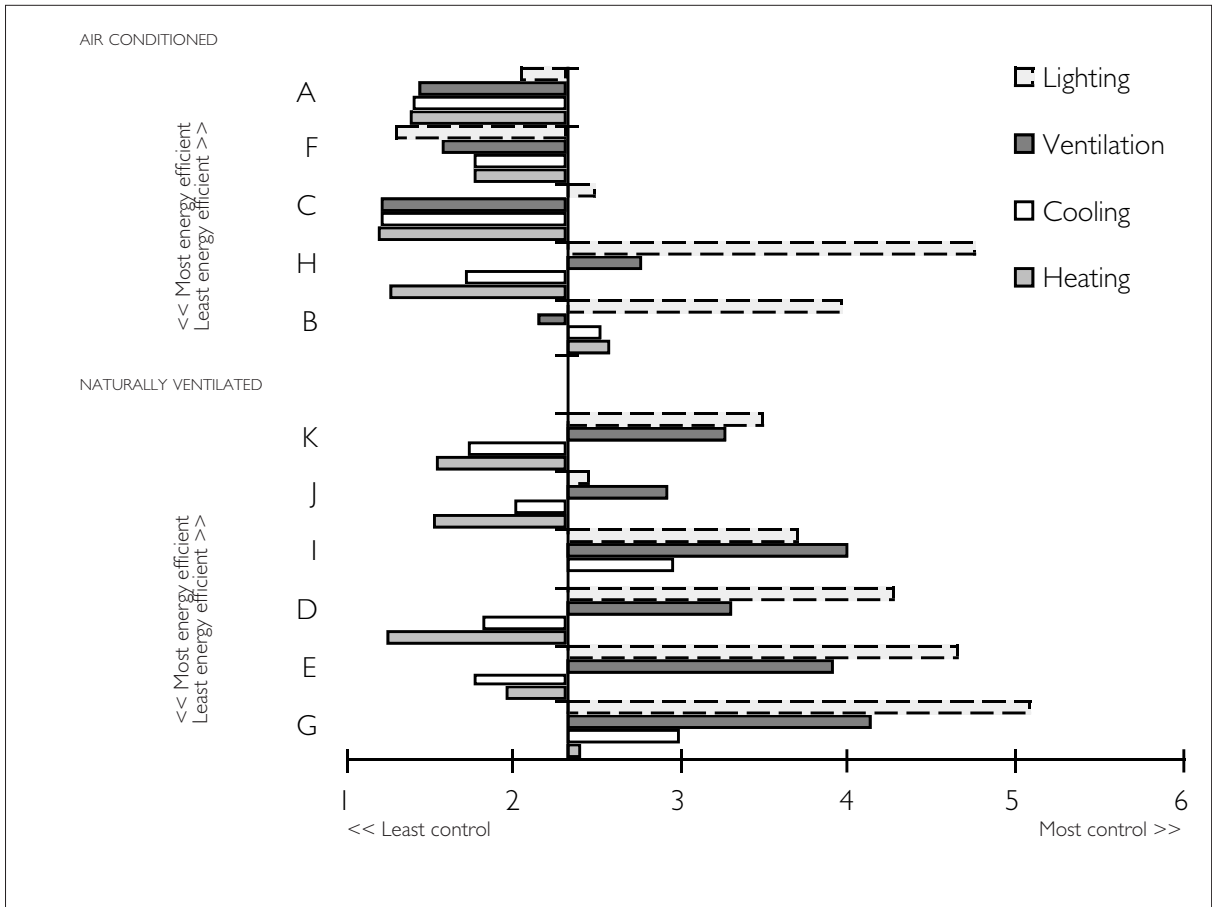


Figure 2
Occupants' perceived control

Figure 2 is similar to Figure 1, except for the hinge point, which is a 50-building average control rating of 2.3 from reference 1.