Editorial

Indoor Built Environment

Indoor Built Environ 1996;5:251–252

M. Woolliscroft

Building Research Establishment, Garston, Watford, UK

Indoor Air Quality: How Far Can It Be Standardised?

Getting research into practice is always a frustrating business. The researcher has been working away for years but when he or she comes up with the results, the practitioners either do not understand or are not interested or think the problem was solved years ago anyway, being blissfully unaware of the assumptions or deficiencies of their rule-of-thumb methods.

However, the fact that the existing method is unsatisfactory does not in itself justify a new method. It is one of the requirements of, for example, European standards enshrined in the PNE rules that standards should reflect the state of the art. Researchers often ignore the need to get their research into practice. Getting research into practice involves a lot more than just producing reports. It is well known in industry that development costs are often an order of magnitude larger than the cost of the original research.

There is a similar need in the development of design methods, methods of measurement and other techniques. Before a methodology can be introduced into a standard it must be accepted by the industry and must be simple and above all clear enough to be used by the less able practitioner or firm as well as by those at the leading edge. There is also frequently a need for an industrial infrastructure of test data and design data to support a new methodology. This in itself is frequently costly, both to manufacturers who have to pay for their materials or components to be tested, and for those in the consultancy world who have to obtain and store the data. At the end of the day, the method must be robust. If mistakes and misunderstandings can be made they will be. This is why it is often better for a new methodology to appear first in the form of a detailed research report, widely available to those who wish to use it. However, before this stage, it is important that the methodology has been tried by researchers independent of the originating institution.

Even if the new method is shown to work, before it is widely accepted, the industry will consider whether it is worth the bother. Do the benefits in terms of a better building performance justify the extra costs? Closely bound up with this is the contractual issue. It is no use making designers or contractors responsible for issues over which they have no control. The control of a complex matter like indoor air quality requires control of many diverse issues, such as control of materials and equipment, control of pollutants and maintenance, as well as the design of ventilation systems. Many different authorities are likely to be involved; in UK terms, Environmental Health, Building Control, Health and Safety Executive, and Materials test houses would all be involved, as well as the building services engineer whether as designer, contractor or component manufacturer. One key player, of course, is the developer. Another key player is the occupier, particularly in the case of speculative office development. Nobody has any real control of how accommodation is furnished or decorated.

Besides these practical difficulties there are also more philosophical difficulties which go right to the root of the concept of standardisation. Nobody objects to standardising screw threads across the world. Screws do much the same thing whether used in a desert encampment or in downtown Chicago, but matters like thermal comfort and indoor air quality are closely bound up with social and economic factors, with culture and with relative wealth.

KARGER

E-Mail karger@karger.ch
Fax + 41 61 306 12 34
http://www.karger.ch

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M. Woolliscroft
Building Research Establishment
Garston, Watford WD2 7JR (UK)

Even across the continent of Europe there are differences of culture and differences of wealth from North to South and from East to West. There are also different groups within North Western Europe with different cultural values (cf. the rise of environmentalism). There is a danger in treating what is essentially social science data, which is related to a place and time and a particular set of social values, in the same way as physical data. There is a question about how far one can have meaningful standards for things like thermal comfort and indoor air quality without heavily qualifying them in terms of the values and assumptions on which they are based.

These difficulties are increased of course if, as in the case of the olf and decipol, the basic measurement is in fact a subjective one. The error is compounded by basing a subjective assessment on a subjective measurement. The result is that, as has been shown in the European Audit Project, decipol levels do not correlate usefully with anything, ventilation rate, occupant ratings of air quality, sick building syndrome symptoms or TVOCs. Ole Fanger has done the world a great service by drawing attention to the vast range of pollutants which pollute our indoor air, from building materials, carpets and other soft furnishings to furniture, particularly now so much of it is made of resin-rich reconstituted materials and so on. Many of the problems outlined above apply or have applied to other areas, e.g. noise, and anybody who has had any involvement in the area of noise will be well aware of the acrimonious disputes which can arise. One person's innocuous hum will drive another to distraction, even murder, but at least we have a physical measurement. We can characterise the level and frequency of noise. What it does to different people is another matter. If we are to progress in the matter of indoor air quality then we need agreed ways of characterising indoor air quality physically and that probably means measurements of known pollutants or groups of pollutants and agreement on the relative importance of these pollutants. This in itself is an immense task. There are, in various stages of development, so-called electronic noses, really a series of doped sensors. The hope might be that weightings could be agreed to be applied to the doped sensors to give a real physical decipol.

Many of the problems will still remain. A huge materials testing programme will be required and there will be difficulties in getting agreement about what is acceptable, but at least we should all be talking about the same physical entity. Progress in this kind of area is inevitably slow, depending as it does on people and their perceptions rather than on technology alone. Nevertheless, we should not be tempted to use a technique that does not work, just because it appears to be the only one available. Far better for the present to rely on what the building occupants tell us about their environment; after all, they know it best.