

A productive day at the office?

By **DR. VYT GARNYS**

Most Australian office employees spend more than 80% of their time indoors. Green buildings, therefore, also need to cater to their occupants – both in terms of their health and their productivity as acknowledged in the Green Building Council of Australia's Green Star rating system.

After 30 years of research into the effects of Indoor Environment on occupants, there is now intensive research and assessment of the effects of Indoor Environment Quality (IEQ) on occupant productivity and payback cost analysis. Furthermore, from this, a predictive model can be generated to manage office design to maximise productivity.

IEQ is the measurement of the key parameters affecting the comfort and wellbeing of occupants, which include indoor air quality (IAQ), lighting, acoustics, interior design, and occupant satisfaction, among others. A building's IEQ has significant potential to impact workers, presenting a serious business case in today's climate.

The focus of the interior design industry has primarily been on public and office buildings, where the occupants are typically office workers. 'Facility Ecology', which focuses on the measurable interaction of the occupants with the interior of a building, creates a scientific framework based on measured data that demonstrates whether a building can – or is – delivering its primary function of improving the occupant's performance.

Why the fuss?

Most working Australians now spend more than 70% of their working lives indoors (Environment Australia, 2001) with office workers overall, exceeding this amount. Building design, its use and management, influences their comfort, wellbeing and productivity. In addition, tenants are increasingly demanding and specifying

improved environmental quality. This significantly affects the design, construction and ongoing management and maintenance of a facility. This is reflected in the incorporation of IEQ elements in various Australian rating tools and publications.

With about 80% of the annual cost of an office building going to staff salaries and benefits, small changes in occupant productivity (caused by inadequate IEQ) can have a significant cost impact. The Chartered Institution of Building Services Engineers (CIBSE, 1999) has shown that per office building, staff costs are 100-200 times the energy cost for the building. Therefore, these staff costs can be offset by a corresponding 0.5-1% increase in staff productivity. Staff costs are also 20-44 times the heating, ventilation and air conditioning (HVAC) running cost, and so a productivity increase of 2-5% can offset this entirely.

Productivity by the metre

There is now a European Protocol which now measures how organisations can financially benefit from improved IEQ. This work has shown that a 2% office productivity gain can be worth as much as \$270 per m², over the lifetime of the building and involves integrating productivity into the lifecycle cost analysis of building services. Savings of \$2,000-\$5,000 per employee per annum are possible!

In recent productivity studies conducted by CETEC, a productivity gain of 13% was measured at Umow Lai, a leading Engineering Consultancy. Based on CETEC measurement, the organisation



was predicted to have a 13% improvement potential, prior to their relocation; but ultimately this was validated as 12.5% - translating to \$5,000 per person gain per annum or a payback of lease four times over. Significant positive gains have also been shown at a range of government entities including Sydney Water with their recent office relocation to Parramatta. CETEC has now conducted more than a dozen predictive productivity outcomes using pre and post-occupancy IEQ studies.

Internationally, the task of quantifying productivity has focused on arriving at an agreed and specific methodology for assessing office productivity. The European Protocol is based upon internationally accepted research on the relationships between indoor climate and productivity. For example, graphical and mathematical relationships exist between ventilation rate, temperature and the change in

personal performance. Lifecycle cost analysis, based on annuity costing, can thereafter evaluate the magnitude of investment able to be amortised by Facility Ecology initiatives.

Critical elements

A productivity study and IEQ study encompassing Facility Ecology principles would comprise the following components:

1. Perform a pre-occupancy study, comprising an occupant satisfaction survey and IEQ measurements;
2. Perform a post-occupancy study, again comprising an occupant satisfaction survey and IEQ measurements; and

3. Establish productivity metrics, data collection and modelling for productivity outcomes.

This approach is practical and cost-effective, yet sufficiently robust to provide correlation between IEQ and productivity and the resultant financial outcomes. It is essential for the architect to design an office building, or public facility, so that a facility manager can effectively and efficiently control the critical IEQ elements affecting occupant wellbeing and productivity. These IEQ elements and their impact on occupants must be understood, recognised and managed (preferably during design and construction) in a logical, factual and scientific manner. Due to the rapid introduction of new materials, information and rating tools, the inclusion of experienced building scientists in the design team can prevent expensive and embarrassing corrective measures, or deficiencies in the final facility delivery.

Working in your space

Post-occupancy Facility Ecology studies are the only way for rational and factual confirmation of the satisfactory delivery of the facility, and thus allow for effective business improvement. Tenants can, and do at times, negatively influence the Facility Ecology of their own environment. The design and construction teams, as well as the facility managers, need to advise and educate tenants about how they can improve the performance of their occupied space.

With its advances in rating tools, such as NABERS and Green Star, and the understanding of their benefit to

productivity, Australia is well placed to capitalise on the potential \$1.2 billion for every 1% increase in office worker productivity. If the benefits realised in the previously mentioned CETEC studies were achieved, ie up to 10%, this would raise national productivity in office workers by \$12 billion per annum. There is an opportunity for your business to participate in this productivity opportunity. Furthermore you can benchmark your operation for sustainable performance. It is not often realised that 1% equates to less than 5 minutes a day! ■

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