The Working Day and Building Design

by Petra Perolini

There is a direct connection between how and when we work and the buildings we work in. By implication, addressing the imperative of building and workplace adaptation needs work practices and construction methods to be both engaged and modified.

The standard working week in Australia is 38 hours per week, usually worked Monday to Friday between 8am and 5pm. These working hours have been standardised in most Western cultures. Predominantly, this has meant that people travel to and from work at more or less the same time. However, there is now a need to allow more flexibility so that working schedules can be adjusted to specific climatic circumstances (especially to avoid the hottest time of the day), thereby cutting down on energy consumption. Traditionally working hours were directly linked to daylight hours and temperatures. In fact, in many parts of the world where it is hot, it has long been recognised that especially heavy work be undertaken before or after the hottest part of the day. Of course traditionally, some countries with hotter climates cease business hours during lunch hours to allow staff to rest and have ‘siestas’ (nap or rest after lunch). In addition to this practice being beneficial in conserving energy in peak periods, health science shows it also has health benefits.

To allow for a productive, comfortable working environment and to shield people from the heat, air conditioning has been an integral part of office building design for decades. Meanwhile, natural non technological approaches (like good cross ventilation, shade, working during the cooler hours of the day) have been neglected in favour of engineered solutions.

Technically, buildings (especially commercial buildings) are designed and engineered for maximum comfort in both cold and hot climates. This often means that windows are fixed and there is no means for natural ventilation. Likewise it is common for energy generated by burning fossil fuels to be used to power a building’s heating, ventilation, air-conditioning and cooling (HVAC) system. In the Western economy, buildings account for half of the fossil fuel consumption, shared by air-conditioning, heating and artificial lighting. In hotter climates, mechanical ventilation has been increasingly designed into buildings that we both live and work in. It is against this backdrop that three strategies need exploration and development – all of which require cultural adjustment as well as organisational change. De facto, what is implied is that the culture of work itself be retrofitted.

Working hours need to be climatically and seasonally linked and organised to a few sets of agreed patterns (habits have to die). Likewise, and in association, working hours need to be staggered so that the workforce travels in a broader time band. The introduction of heat holidays, where offices are shut during extreme heat waves could also be explored; as could the introduction of siestas to avoid activities taking place during mid-day hours to alleviate fatigue.

In many occupations the relation between home and work needs to change – this is not a matter of a conventional pattern versus working at home (via a home office – although in some cases this is appropriate). Rather the ratio needs to change (e.g., dividing work equally between home and workplace). Because of contemporary technologies the physical and the virtual workplace are already integrated. Many people now travel to the same building to interact
with colleagues remotely. Working dress also needs to be climate dictated – current conventions need breaking.

All of these measures obviously have significant implications for workplace design and retrofitting (its size, rest places, mechanical services, communication infrastructure and so on). The rapid increase in mobile technologies has increasingly provided organisations with the ability to work in previously unanticipated ways and has the potential to radically change workplace practices. Much research has been done on how mobile work differs from desk work and its implication on productivity and workplace psychology. But there is a lack of knowledge and understanding of how this affects the physical form of workplace design. Although technology has alleviated the need for individual offices with desk space, and the laptop connected to a network has replaced the need for large central office storage, there is still a need for a fixed space: a common office space with a certain degree of familiarity and certainty, a space with a familiar structure to exchange information and collaborate. However these spaces will differ significantly from current office designs.

Technology has accelerated and revolutionised the way the world collaborates and conducts business. Already, a significant number of companies are shrinking their employees' work spaces. For most companies, this change has an economic driver. They are simply realising that there are better ways of accommodating an increasingly mobile workforce. There are opportunities for designers to find creative and innovative ways to do more with less physical space and to give companies a better return for the cost their physical environment. Existing large offices have the potential to be re-designed into smaller offices, shared office space and collaboration rooms. While work practices need to change, evidence shows that people are able to adapt quickly from existing habits.

While the idea of flexible working hours is not new, they are commonly associated with ‘employee friendly’ employment policies (so called work/life balance) and not attributed to environmental gains. Research shows that flexible working hours could reduce office space by up to 30 per cent. This would add up to a substantial reduction in CO2 emissions and energy savings. By allowing people to work partly from home and allowing them mobility within the office environment, the benefits would be advantages to both the environment and the company. We already have most of the buildings that we will occupy in 2020. However we don't use them efficiently. A re-design of existing buildings to accommodate flexible working hours would free up existing buildings and this in turn could prevent building new ones.

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Current trends in office-building architecture predominantly favour lightweight large span structures with large glazing areas. These types of structures are simply not inhabitable without air conditioning systems. Some studies indicate that without air conditioning such buildings would heat up to over 50º C internally in summer. Moreover, office buildings are not designed to promote optimal performance. Often, glass buildings are designed with no external shading provisions which do not allow buildings to adapt to the changing climate at a time when high electricity costs are becoming increasingly prohibitive to many building users. Thousands of sealed buildings and air conditioned cars make our urban heat-islands even hotter. Better designed buildings are clearly tailored to suit the local climate conditions. There is a definite need to re-structure expectations and habits to refocus on what is at stake. There is a need to challenge outdated office building technologies and implement necessary change.

It is necessary to naturally ventilate buildings to reduce energy usage. Perhaps we can take inspiration from countries which cope with extreme heat for most of the year. Without mechanically cooled systems the only viable strategy for cooling in buildings is to move as much air as possible across the floors and to use thermal mass for night cooling. In extremely hot climates of the Persian Gulf, large windcatchers coupled with ventilated wall and parapet systems help circulate the air. If there is a basement, parapet ventilators are linked by narrow ducts to the cooler basement floors. Hotter areas on the top floor can be avoided in favour of cooler basement floors.

Other hot climates have optimised the cooler and more stable ground temperatures by building structures that are partly or wholly underground by taking advantage of added mass to keep temperatures stable. Heat-island formation, which was discussed earlier, could be partly alleviated by having a large percentage of structures underground and increasing green space.

Re thinking the formal working week can not be divided from improvements in the ‘quality of life’ – which might mean more leisure time used to grow food, walk, play games, and watch movies and so on.