



Sustainable building in Hong Kong:

the past, present and future

by **Angela Tam**

with Foreword by **Nicholas Brooke**

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Foreword

As an advocate and firm believer in the concept of sustainable development, it is with great pleasure that I write the Foreword to this very welcome contribution by Angela Tam to the ongoing debate in regard to the issue of sustainability in the context of buildings and the construction industry. *Sustainable Building in Hong Kong: the Past, Present and Future*, in a convincing and well-argued fashion, sets out the case for a change in attitude and mindset and why this is so important if the industry is to respond to the challenge and improve its sustainability performance.

Angela has succeeded in pulling together the many strands of the case for sustainable buildings in a way which has not been achieved previously. Much of the work and discussion to date has been piecemeal and whilst the CIRC Report of 2001 rightly raised the profile of the issue, the construction industry as a whole has so far not risen to the occasion. In the context of the wider picture of climate change and environmental degradation, sustainability is not an issue that can be ignored. None of us like change, particularly in an area where many of the benefits are of an intangible nature and difficult to value in the conventional sense, but these are factors which Angela's book seeks to address and, more constructively, she identifies potential solutions to some of these obstacles to change. In reality, sustainable building makes business sense and, like it or not, over time the market will judge and differentiate by applying sustainability criteria.

Whilst it involves embracing and applying new techniques and expertise, sustainable building can no longer be dismissed and there is the potential for the Hong Kong construction industry not only to apply the gospel of sustainability in its own backyard but also to pioneer sustainability principles in the vast Mainland China market.

Nicholas Brooke

Chapter 1

The background

Every year, Hong Kong attracts a number of visitors who are here not so much to shop and see the sights but to study our model of high-density living. It is not easy to pack 6.8 million people¹ into 1,076 square kilometres of land, of which approximately 40% is earmarked as country park, leaving just 645.6 square kilometres available for development. To put this in perspective, Singapore, with which Hong Kong is regularly compared, has a population of four million occupying a slightly larger area of 685.4 square kilometres. There are far more people living in this invisible dot on the globe than in many countries in the world.

Hong Kong has thrived on its density. Such a large number of hard-working people concentrated in a small area and mobilised by one of the best public-transport networks anywhere has contributed to the creation of a highly efficient and successful economy. However, this achievement comes at a price. Pollution, both indoor and outdoor, is gnawing at the population's health. The pressure to build quickly that began with the influx of immigrants in the 1960s, coupled with a building code that, in defining the details, fails to consider the big picture, has resulted in a dull domestic building form that prompted at least one architect to describe it as a “bay window city.”

The problem has been compounded by a lack of ecological awareness that has resulted in both pollution and a huge amount of waste. Pollution and waste are generated during the construction process as well as in the finished product, regardless of building type, through the use of materials and equipment that consume too much of the earth's resources. Hong Kong has a startlingly large ecological footprint, defined by the International Institute for Sustainable Development as “the area of land and water required to support a defined economy or population at a specified standard of living.”

Chapter 3

Efforts to improve the sustainability performance of the building industry to date

As in the rest of the world, the concept of sustainable development did not catch on in Hong Kong until the 1990s, but movements in that direction began a decade earlier when the Housing Authority introduced the use of precast elements in public housing projects. It started in the mid-1980s, when contractors would set up precasting yards on site to prefabricate the required concrete elements. The transition to off-site precasting occurred in 1989, when the authority stipulated the use of precast facades and staircases for Harmony blocks. Contractors started to contribute proposals for precast bathrooms and other elements; at the same time they realised that they would do a much better job of producing these elements if they had a precasting yard set up somewhere else. According to the authority's estimate, by 2003/04 the use of metal formwork and precast elements since the late 1980s had resulted in about 1.09 million tonnes of timber being saved¹².

As the percentage of precast elements required for such housing projects increased, large factories started to emerge across the border, where a stable workforce could be maintained to produce precast elements at lower cost.

The HSBC Headquarters building, which was built between 1979 and 1986 in Central, is the first commercial building in Hong Kong to encompass a range of sustainability features. Its design incorporates the use of two computerised "sunscoops" to track the sun and direct diffused sunlight into the building through mirrors positioned outside and above the building atrium. Sun shades on the external facades shield occupants from direct sunlight and reduce heat gain while seawater is used for cooling the air-conditioning system. Extensive use of prefabrication was made. The steel components that make up the building's structure were all prefabricated and shipped to the site for assembly, as were service modules inside the building.

The Housing Authority's efforts to promote sustainable design and construction culminated in the organisation of a design competition for a Home Ownership

Chapter 6

Why should the end user care?

To say that a sustainably developed home or workplace is beneficial to earth as a whole is, for most people, too abstract an idea to be appreciated. There are, however, many reasons why companies and home buyers should choose sustainably developed office and residential buildings respectively, as this chapter will explain.

A question of money

A building developed according to sustainable development principles may incur higher capital costs (which can be minimised through careful planning), but it is always more cost-effective to operate and maintain. Regard for energy efficiency translates into lower energy consumption, which means reduced utility bills. Also, energy-efficient equipment tend to last longer and/or are subject to less wear and tear, which means they are more cost-effective to maintain. Thus, the building occupant saves money in terms of both his/her utility expenditure and the management fee, which covers the energy use of public areas.

Just how much money can be saved? One may take the case of fluorescent lighting to get an idea. It has been estimated that T8 fluorescent lamps use about 32% less energy but provide the same degree of illumination as standard T12 fluorescent tubes with magnetic ballasts, which are fitted in older office buildings. T8s can also sustain the same degree of illumination for much longer than T12s. Used along with electronic ballasts, the latest generation of fluorescent lamps, the T5s, are estimated to save even more energy: about 45% compared to the T12s. T5s last twice as long as T8s and T12s and contain much less mercury. Fitted with electromagnetic ballasts and a central dimming system (see page 44, Chapter 4), they can save even more electricity. T5s also have a smaller diameter than the older fluorescent lamps, so they save on headroom as well.

The Electrical & Mechanical Services Department's Energy Efficiency Labelling Scheme, which aims to inform the public of the energy consumption and efficiency rating of the most commonly used appliances, such as washing machines and photocopiers, is a good guide to the long-term savings that can be achieved by