

Meeting Customers' Needs - from Design to Management

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The title of this session is so wide ranging that that it encompasses the whole of the housing process so I have decided to concentrate on the section with which I am most familiar - namely 'design'.

The overall theme of this conference is a discussion on better homes in the next millennium and to address this problem will require some radical rethinking particularly with respect to the design of mass housing. Hong Kong's record for providing housing for its citizens is second to none and those of us who are old enough to remember the large squatter populations that existed in the 50's, 60's and 70's are fully aware that the provision of structurally safe and sanitary housing has been one of the major achievements of Hong Kong. The provision of housing units within the context of a rapidly growing population and rising space and quality expectations has been no mean feat and the commitment of the current government to a stated number of housing units per annum shows continued emphasis on this sector.

But it is time to stand back and take a good look at what is being provided and to evaluate the results in a systematic and logical way. Traditional construction methodologies, traditional design standards and building and planning regulations need to be challenged to see if what we are building today can sustain itself in the future. Conservatism is a major constraint in the design and building industries and research and development process are subjugated to short term economic policies. Hong Kong must change its underlying philosophy from that of an impermanent short-term, minimizing-cost speculative society to one of a mature modern city sure of its future and committed to long term planning. Only then will we be prepared to invest wisely in our children's futures.

This will require major revamping of our present land valuation and land sales attitudes where land is seen as a speculative commodity with buildings as further extensions of this speculation. The added value of buildings, open spaces, landscape and community facilities as quality elements of the city must be part of the overall assessment of worth to the city as a whole and the project with the cheapest initial cost may, in the end, be the most expensive to maintain and support.

With this brief introduction I would like to pose some possible scenarios for future mass housing. The main thrust of my proposal is for a new designation for the type of buildings. I propose that instead of 'intelligent' buildings we attempt to design and build 'holistic' buildings. By this term I envisage buildings that are, to a large degree, autonomous and that respond to adjacent buildings and environments in an interactive way. They may be stand-alone buildings or they may form part of a cell or network group and for particular functions they may not belong to mutually exclusive cells or groups.

Let us begin with the autonomous nature of the building first. Obviously, at this stage, we cannot design major high rise buildings that are self sufficient from an energy point of view but with good and intelligent design we can reduce the initial energy costs and we can most certainly reduce the recurrent energy demands. By careful choice of materials we can reduce the 'grey' energy inherent any building structure and thus reduce the demands made on the environment to provide cement, aggregate, sand, metals etc. By improved design we can rationalize construction methods to reduce, if not eliminate, building construction waste which currently is approaching 50% of the waste products produced in Hong Kong.

Additionally, if better integration of design and construction can be achieved, then site noise and pollution can be reduced, site production times can be shortened and better quality controls can be exercised. With these imposed techniques site safety will also show major gains. But for this to happen research and testing must be carried out and the first products will certainly be more expensive than the current conventionally constructed buildings. The costing methodologies for buildings should move from a single time frame to one of ongoing life-cycle expenditure so that realistic comparisons can be attained.

These rationalized methods do not mean repetitive look-alike buildings but buildings that utilize common components such as cores, stairs, ducts etc. and most importantly are designed to take account of building and construction processes. It is essential that buildings, particularly housing, have individual identities and that the owners take pride in their lifetime investment. The relaxation of building laws that date from the 1800's must be part of this approach with one of the first controls to be challenged that of site coverage. This regulations leads to the podium and vertically unarticulated towers that are the unfortunate hallmark of Hong Kong high-rise housing. Other laws relating to light and ventilation are currently under review but a comprehensive study of the whole legislation is required.

With respect to structural design most of our high rise residential towers are on pile foundations. If a new approach is taken, these foundations could be converted to a hollow tube system that would not only serve as a stable foundation but would also provide storage spaces for water, treatment plants and equipment for the building.

Each building would be equipped with its own sewerage treatment system to eliminate the need for massive dumping of raw sewage into the sea. The treated output would be a fraction of the current output and the ability to isolate each source would lead to easy and fast maintenance. The collection of rainwater would be used to supplement current inputs of fresh and flushing waters and these storage systems could be integrated with fire fighting equipment. By returning to separated sullage and sewerage systems the recycling of grey water would dramatically reduce the demands on the infrastructure required to pump and process water borne systems. With minimum flush systems and eco-conscious water fittings the increasingly diminishing water supplies would be conserved. It is predicted that the major environmental problem facing the next millennium will be the adequate supply of unpolluted drinking water.

The solar energy falling on buildings in Hong Kong can be harnessed in several ways. Firstly it can be used to heat water thus reducing the need for electricity and gas (and their associated production pollutants) whilst simultaneously generating electricity through the use of photovoltaic panels. This electricity can be supplied directly to the grid or can be used to generate an intermediate storage medium such as hydrogen which is generated from water from air. Secondly with innovative design the solar energy can be used to help drive ventilation systems to the building thus reducing air conditioning demands. The active funneling of natural wind sources by computer controlled surface can assist in effective ventilation in high rise buildings. Wind generators can assist in electrical generation or pumping solutions for lifting water. Local area networks will obviate the need for individual heating and cooling and mini-centralized plants will use heat recovery to optimize energy usage.

These new 'holistic' buildings can stand alone or can form cellular networks to support each other. Comprehensive Environmental Impact Assessments will ensure maximum interface activity between buildings for gains in air movement, heat shadowing, and energy transference. These buildings will interactively respond to microclimates so that the building shell will not be a static element. Day and night facades will vary to help with heating and cooling of the building. Kinetic elevators will reduce the high energy consumption of conventional buildings.

Robotic cleaning and inspection of exteriors will be carried out automatically and projecting roofs at intervals will provide protection for wall and window systems as well as access points for the robots. Micro robots will move through the service systems monitoring internal operations and sophisticated building management systems will be learning-capable to respond to usage and climate patterns.

If you think these ideas are far fetched and not achievable it is interesting to note that each one is already being used somewhere in the world today. If Hong Kong is to become a true leading world city we must be prepared to invest in this vision to reduce our demands on both the local and world environments so that we may provide a vibrant and sustainable home for future generations.

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