

COMMENT

Architecture & Global Warming

The winner this year of the world's most prestigious and financially rewarding architectural prize, the Pritzker is the Tasmanian, Glen Murcutt who has practiced most of his professional life in Australia. He takes home US\$100,000 and worldwide recognition for his lifetime commitment to design in tune with its environment. I had the pleasure of listening to him give a three-hour lecture on his work at the Royal Institute of British Architects in the late Eighties. Never before had a speaker addressed a capacity audience for so long and at the end of it he received an unprecedented standing ovation.

What it is about his work that is so special and what particular lessons can we learn from his approach?

Despite many invitations to work elsewhere and on much bigger projects Murcutt has confined his repertoire of buildings types to mostly single-family dwellings in various parts of Australia, although he has recently completed work on larger projects. He has used these schemes to refine the integration of natural ventilation, aspect, sun light and the surrounding landscape in his architecture and to define his concept of building as flexible shelter that exists in harmony with nature's rhythms. He has rejected the European Colonial style as a suitable model for building in the tropics and instead has developed a unique response generated from first principles developed from observation, calculation and sheer determination. His houses can open and close to respond to changes in temperature – not by expensive 'high tech' solutions but by simple mechanical openings such as shutters, louvres and roof vents.

Generally Murcutt uses a limited palette of widely available and inexpensive materials. Roofs are usually made of corrugated alu/zinc, (which is a cheap and easily available material here as well as Australia) with low wide eaves for shelter from glare. Plywood is often used as a finish as well as for construction. Lightweight louvres of baked enamel or glass also feature in his work as well as steel, concrete and beautifully finished joinery. All of these materials are lifted into the realm of the extraordinary by the design of their composition and the perfection of the detailing which looks incredibly simple, but which is achievable only by a craft like attitude to building.

Although Murcutt's oeuvre is tiny compared other winners of the Pulitzer Prize such as Norman Foster, his work has influenced a generation of younger architects who are increasingly aware of the need to find environmentally engineered solutions which address the growing problems facing the world due to global emission of CO₂. This should be a subject of considerable interest to Trinidad, which generates an enormous amount of CO₂ relative to its size. If we are to go any way to meeting the targets of CO₂ emission reductions set by the Kyoto Protocol, we must start to look seriously at our materials, methods of construction and at the various appliances we put in our buildings to provide a comfortably cooled environment (often to counteract designs which ignore our natural environment). For example how many of our recently completed buildings use external shading devices and orientation to reduce solar gain?

A staggering 40% of all materials used in human activity is directed into the built environment making the construction industry a major player influencing the impact these materials have on the environment. – both in their manufacture and their use in buildings What are we doing here to examine the ecological sustainability of commonly used construction materials such as concrete?

Concrete is the most dominant construction material on earth, making up 60% of the infrastructure in many developed countries. Approximately 5bn tonnes of concrete is used annually worldwide, requiring some 1.5bn tones of cement. The annual global production of Portland cement contributes

between 3 and 5% of global CO₂ emissions from human activity and uses in excess of 7bn GJ of energy.

The CO₂ emissions are the result of high temperature combustion and calcination reactions in cement kilns. So it is not surprising that the impact of cement usage on the environment has come under increasing attention. Other countries – Australia being one of them – are making a concerted effort to find ways of making cement which produces less CO₂ and also to use by products from the manufacture of cement for other construction purposes. The point is not to 'ban' concrete, but to find ways to make it a more environmentally friendly product and to use its thermal properties in buildings to reduce heat gain not increase it.

Personally I am not persuaded by arguments about lower expectations and standards for developing countries. These two islands are fortunate to have significant resources of oil and natural gas. There is also an unacceptable level of pollution in the air, the rivers and the coastline. Our resources are finite and it is time for the construction industry including architects and engineers as well as contractors, manufacturers, suppliers and end users to start thinking seriously about how we can meet the challenges facing us now. Glen Murcutt may well be a good place to start.

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