Green Buildings – Better Quality of Life
11th June 2010

Russell Jones

Aide Memoire

Good afternoon. I have some good news for you. This is a PowerPoint free session. So you may either close your eyes and focus on my every word, or you may just close your eyes. I will never know the difference. That is not to say I have come completely unsupported by visual aids, but I am following the lead of James Cameron by offering a truly three-dimensional display but with the added feature of not requiring polarizing glasses. Here it is…. but more of this later.

My name is Russell Jones. I work for Kumagai Gumi, a Japanese contractor and I am also representing the HKConstruction Association today. You may not know Kumagai, but you will know some of the things we have been responsible for building: Bank of China, East Harbour Tunnel, West Harbour Tunnel, Sydney Harbour Tunnel, Taipei Tower 101, until recently the tallest occupied building on the planet. I make a living by building tall buildings and long tunnels, but also roads and railways, offices, retail malls, ports and container terminals, drainage systems, oil terminals, factories, power stations that others have decided they want built either to use, to rent out or to sell on. I am not involved in the decision to build or not to build. I am rarely given the opportunity to select the nature of the materials to be used in the permanent works. To make a living, I must build what my customers have decided they want, in the most economical way. Realistically, the opportunities I have to reduce the environmental impact of that work is, in the overall scheme of things, miniscule. So why am I here? Well, I have no axe to grind, no position to defend, but I have a will to improve our industry's performance.

You may consider it odd for a civil engineering and building contractor to stand up and say that we can and should build far less than we do. We can make do with what we have. We can actually make do with less than we have, if we just make a few life-style changes as employers, as employees and as responsible citizens. I was very encouraged by the announcement that there would be measures put in place to reuse old industrial units for other uses, and whilst I have seen little evidence of this initiative so far, it does serve as an example of the direction we should take. Whilst the total carbon emission due to construction of buildings is a mere fraction of the total carbon emissions over the building's life-cycle, the idea of reusing buildings for other purposes, rather than knocking down and starting again is very sound. This process of reuse would inevitably involve a degree of refitting the finishes and the building services, and as a recent study by Arups reported in SCMP has indicated, replacing the services in a building is an easy win. If my memory serves they called it "low hanging fruit". I agree with that conclusion

Talk of building services brings me to a long-running irritation on the subject of repairs. The skill-sets that our craftsmen used to employ have all but disappeared. I am referring to the ability to repair broken or faulty items and put them back into service. This seems to have come about partly from the equipment suppliers who assemble their products from components and assemblies brought in from their subcontract suppliers. As an example nothing to do with building, when I first owned a car, a not very new car even then, I

maintained it myself. When the starter-motor failed, which it did from time to time, I would take it off the engine and dismantle it to its constituent parts, find the fault, usually a worn bush, replace it for pennies, reassemble the motor and replace it on the engine block. No waste, no pollution. Today, the whole starter motor assembly would be binned and replaced, irrespective of the fault, and at huge expense. Then sooner or later, the manufacturer would stop making the starter motor, run out of stock and the entire car becomes irreparable if the starter motor fails again. What's that got to do with building? I'll tell you about a current situation on a development my company has a share in. I have been told that the Uninterruptible Power Supply must now be replaced in its entirety because the spare parts for it are no longer available from the original equipment manufacturers. It is working perfectly well, but if it were to break down, it could not be repaired for the lack of spare parts. In those circumstances, it is in my view a shocking waste of money and resource to replace that UPS. The fact that it is not easily repaired using basic component parts makes it a very poor machine in terms of environmental protection and its green credentials. The ability to repair buildings and the component parts of buildings must surely be an important criterion for any green building assessment method.

Returning to the theme of building less, I remember the great expectation of years past being the "paper-less office". Well, in my business for one, that never happened, and I see little evidence of it happening elsewhere. What appears to be commonplace is to scan every incoming document, distribute it electronically, archive the original and this allows each recipient to both print and then archive a hard copy for their own use. E-mails have not so much reduced paper but increased unnecessary information supply and actually reduced communication and understanding. E-mailing has replaced telephone conversations. But I am not going to pursue this today, nor the fact that passenger transportation generally and air-travel in particular has not been more severely curtailed by conference calls and other mature technologies. What I would have expected to see by now is a much greater adoption of the office-less office or virtual office. If businesses can make use of overseas call-centres, why then not employ the same technology to have offices operated by people working at home. This has enormous potential for the demand for office space, and the consequential demand for transportation, utilities, support industries and therefore on carbon emissions. An alternative to working from home, if that is socially too difficult to buy into right now, is the idea of work-centres, which are located in residential areas and people can work there using again the same technology, but reaping benefits of shared workspace, less travelling time and reduced demand for transport infrastructure. Even if we cannot work exclusively from home, we could share office space with others who come in on alternate days.

In my opinion it is a lost opportunity whenever prime harbor-front sites in our cities which have the best views are used for government offices, carparks and shopping malls. Most office workers in HK do not have a window seat, and those that do rarely enjoy the view outside. Such space is frequently used for meeting rooms and common areas. Many of those who have a window seat will chose to have their backs to the window to face the door. Shopping malls do not generally want or need grand landscape vistas. It would have been so much better to have turned-over such sites to residential uses that could double as home-office, hotels and serviced apartments. Green buildings are not only those which are more healthy and energy efficient to build and operate, but also make the most of their location and give something back to the community.

As just one test of sustainable development, no new building should be constructed unless the carbon released over its life-cycle, including site preparation, construction, use, refits and

refurbs, and eventual demolition, after considering the performance of the best alternative, is negative. But that is not something I, as a contractor, can have much influence over. Yes, maybe I can source the specified materials from local manufacturers, but I have no idea what the carbon value at the factory gate is, or where the raw materials were sourced, or the fuel used in the conversion processes. Without some form of comprehensive carbon-labelling system (and I mean comprehensive!) which accurately and reliably informs the buyer of the total carbon emissions caused by each product, how can we judge what is a responsible product to buy? Presently, we do not have the tools to make informed decisions, nor even to make intelligent guesses.

Let me try to illustrate this with a single example of a material which is in common use throughout the world in building and civil engineering construction. Steel reinforcement. Infrequently I have the opportunity to make a choice between the use of structural steel or reinforced concrete for a particular application. It is usually the designer or the building owner that makes that decision, and I can only assume that the choice is a mixture of economy to build, speed to build and maybe, just maybe, some concern about the BEAM or LEED rating of the finished building, as this may affect the value put on the building by tenants or owners. More commonly I have the choice as to supplier of the steel I buy. As usually is the case I am looking for the best deal on the day, as I won in job for being the most competitively priced conforming tender. Let us suppose that I have an incentive for reducing the carbon footprint of the building as constructed. Just as a starting point I would need to determine the carbon footprint of every material, component and assembly in that building which I thought had potential to reduce significantly the carbon footprint. Say I decided that reinforcement had such potential because of the sheer quantity to be used, and the theoretically diverse sources of this common and uncomplicated material.

BSI published in October 2008 a Publicly Available Specification 2050 for assessing the carbon footprint of goods and services. This requires that to determine the carbon footprint of my reinforcement I need details, details that my suppliers are not going to have readily to hand, and some will be impossible to determine ...

For example:

- The location of the body of iron ore used for my reinforcement
- The grade of iron ore and the waste arising at the mine
- The method of recovering the iron ore and site transport from the working face to the loading point and the type and quantity of fuel used
- The method of transporting the iron ore to the steel plant and the type and quantity of fuel used
- All the above for all other metals and minerals used in the particular steel, such as carbon, nickel, chromium, manganese, phosphorous,
- The proportion of scrap metal incorporated into the product
- The method of converting the ore into pig iron or pellets
- The types, quantities of fuels and energy used in the processes and transportation
- Other material used in the processes and the carbon footprint of the quantities consumed
- Transport and disposal of bi-products and waste products in the manufacturing process, the obvious one being slag, in the case of blast furnace reduction
- The method of converting pig-iron or pellets into molten steel and the type and quantity of fuel used, and heat recovery in cooling to steel billets

- The method of forming the steel billets into bars and the type and quantity of fuel used
- Fuels and energy for packaging and shipment to stockholder and then to site

From this it is easy to imagine that reinforcement steel or rebar produced in a plant near the iron-ore body using hydroelectric energy and shipped to HK by sea, as is the case for rebar produced in a modern integrated iron and steelworks at Puerto Ordaz in Venezuela, will have a quite different carbon footprint to rebar made in China from Australian ores with electricity produced in low-grade coal-fired power stations and transported to Hong Kong by rail and road. [I know this because I spent four years building that plant on the Orinoco River.]

Given the diverse nature and alternative sources of building materials, from cement to glass, from aluminium window frames to copper cable, from plastic pipes to marble tiles, ceramic bathroom fitments to timber joinery, aggregates to ironmongery, you can imagine the task that confronts the compilers of a catalogue of carbon footprints for building materials imported into and used in Hong Kong. An awesome task, but how else can we compare options?

I note from a recent article I read in Newsweek that the highest rated LEED certified building in the US today wouldn't meet the minimum standards required in Germany. I do not know where BEAM sits in that line-up nor whether Newsweek was referring to DGNB or CEPHEUS, but BEAM is more frequently compared to LEED than anything else. It seems that it would be useful to review BEAM to determine how far in front or how far behind we are with other developed nations, and reset our targets accordingly.

Newsweek went on to say that in the next 25 years 75% of all buildings in US will either be new (i.e. not yet built) or substantially renovated. With such turnover, there is plenty of opportunity to apply new ideas.

Yes I can build buildings that have windows that will convert sunlight into electricity, that collect and reuse rainwater and grey water, that are festooned with wind turbines, decorated with living plants and built from recycled materials, but it is not me who decides what to build. It sounds awful, but I am only following the orders of my customers. They are the drivers of change…….

What then to conclude?

- Building and civil engineering contractors are not the prime movers in the creation of Greener Buildings. The responsibility for driving change lies with owners, developers and their designers and of course the regulators. At present, we are all driven by costs, despite all the fine words that you may have heard. If we contractors are engaged in the process, we can of course be able to play a significant part, but whilst we are side-lined, we cannot. The switch will come when a green building is the most economical building, and this can be done through pricing of energy and water. This is how the electric and hybrid cars are making an impact now, in the higher capital costs are being compensated with lower running costs.

- There is much government can do by leading by example and formulating and encouraging green building initiatives, but these should not be designed such that the developers are the sole beneficiaries. The benefits of any concessions on GFA or any other basis should be passed down to the retail buyer and occupier.

- Technology has a part to play, but their costs must give an adequate return. There is a lot of mature technology that still does not make a business case. Are fuel and energy costs priced too low to be driving change at the necessary pace? Similarly is water priced too low to make water conservation viable?

- Building commissioners should consider whether the new building is the most appropriate solution to their needs, or can an existing building be adapted perfectly adequately

- We need to review the standards we are setting ourselves for green building awards and recognition of outstanding performance. Are the benchmarks we use to measure our performance ambitious enough?

- Any green building assessment should consider how easily the building and its components can be repaired and reused rather than replaced

- The industry is in dire need of appropriate tools to help us make considered decisions on choices of building materials and their sources. It has been referred to as Carbon Labelling within CIC but to be useful it must be both comprehensive and reliable

That is all this particular contractor has to say. Thank you for your attention.