WASTE NOT, WANT NOT

With construction waste making up around half of New Zealand’s total waste by weight, a new industry-based group has plans for voluntary industry-wide targets to minimise what goes to landfill.

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The World Business Council for Sustainable Development reports that the construction industry is responsible for about 40% of landfill waste globally, and in ‘clean green’ New Zealand, the industry is the single largest consumer of resources and producer of waste. So although we successfully promote our clean green image to the world, landfills are hardly a symbol of a modern, ecologically aware, resource efficient or 100% pure economy.

As part of the growing discomfort with the landfill concept, the Labour Coalition Government passed new legislation addressing waste as one of their final actions in Parliament. Then, on 1 July 2009, the Waste Minimisation Act 2008 came into effect. The stated purpose of the Act is ‘to encourage waste minimisation and a decrease in waste disposal in order to protect the environment from harm and to provide social, economic and cultural benefits’.

Waste taskforce set up
A group of Auckland construction industry professionals who agree with the aspirations of the Act have established a construction and demolition waste taskforce. Their focus is to develop practical ways of integrating effective waste minimisation techniques into the industry.

The taskforce first had to agree on relevant definitions of waste. In particular, they wanted to clarify ‘construction and demolition waste’. They did this by specifying a list of waste products that originate from construction and demolition and currently have alternatives to disposal in landfill.

The taskforce has also produced a draft methodology statement for construction and demolition material recovery facilities. The aim is to promote a standardised, safe, cost-effective and environmentally sound method of operation.

‘Half waste to landfill’ target
As the key promotional initiative, the taskforce proposes to adopt a ‘half waste to landfill’ voluntary target for all members of the construction value chain. The concept has been hugely successful in the United Kingdom and has created a sense of positive peer pressure and corporate social responsibility.

The voluntary target allows designers, builders, material suppliers and recyclers to submit statements on how they will contribute to the target. These statements are published and serve as their pledge to other signatories that they will do their bit. Measurement of waste is undertaken at the landfill and is now also required by the Waste Minimisation Act.

The taskforce believes that a voluntary industry-wide target will be more effective as a waste reduction tool than a compulsory analysis and reporting system, as in California, for example. Compulsory reporting frameworks miss several important phases in the waste reduction chain – particularly the design phase.

Cheap fuels drive wasteful habits
Given the effort going towards the reduction of construction waste, it’s important to look at exactly what we are trying to reduce or eliminate. Some things are obvious, such as landfill gas and leachate and large tracts of unsightly contaminated land.

It is these obvious sensory factors that are the key drivers for waste minimisation targets at present.

The new Lion Nathan Brewery used around 5,000 tonnes of recycled waste glass aggregate as sand blinding, pipe bedding and, most significantly, a concrete aggregate.

Using glass as a construction aggregate contributes to reduced exploitation of natural sand quarries.
But there may be a far more important driver for construction waste reduction. The common denominator that underpins all forms of waste is energy. That our wasteful habits have coincided perfectly with the discovery of cheap, abundant, dense energy in the form of coal and oil is no fluke.

The availability of low-cost fossil fuels to mine, refine, fabricate, transport, construct and demolish our extensive built environment has afforded us the luxury of waste as an end-of-life scenario. The energy ‘embodied’ in building materials as a result of this long process is enormous. The only reason we can discard glass, concrete, gypsum, metals, timber and the like is because energy in this generation has been so cheap. It is unlikely that we could afford to build using current materials and techniques in the future – a future that makes only one promise: there will be a shortage of energy resources.

**Wasted $$ = wasted energy**

Some argue that the key issue with construction waste is the waste of money. Economists have shown the link between the growth of wealth and the availability of cheap, abundant energy. Oil is ridiculously cheap when you consider its relative productive capacity.

But the cost of many construction materials is largely a function of the energy embodied in that material. Take aluminium or iron. Both are abundant minerals, so why the high price? It’s not the bauxite you pay for when you buy aluminium – it’s the 800 MW of electricity required by the Tiwai Point aluminium smelter to produce it. Likewise with steel – the lion’s share of the cost is for the coal and coke that operates the extraction machinery and the diesel to transport the ore.

Wasted money is therefore wasted energy, particularly with construction materials.

**A question of scarce resources**

Resource scarcity is another reason cited for preserving construction metals. At current rates of consumption, global reserves of copper may last about 35 years. So landfilling a $20 cordless drill from Bunnings is a waste of copper, right? Yes – but more than that, it’s a waste of energy.

The Bingham Canyon copper mine in Utah (at 4 km across and 1.2 km deep) is one of the largest man-made holes in the ground. The copper ore concentration is a fraction of a percent – therefore the energy required to extract the copper is enormous. Few believe we will ever physically consume all of the copper available. We will likely run out of the energy required to extract it in trace concentrations long before that happens.

**Use life cycle analysis carefully**

If construction waste is primarily about wasted energy, it influences our approach to waste reduction. Should we focus on high-volume, low-energy construction waste products such as excavated soil or on diverting high ‘embodied energy’ products?

Life cycle analysis might allow us to quantify these relative effects. A blunt instrument, such as a specified percentage recycled by weight target, will help in a voluntary context, but a more sophisticated assessment is required before any such target could become compulsory. ‘Recycling’ some materials may produce perverse outcomes if the key variable we seek to minimise is life cycle energy.

**Optimum recovery, not just reducing tonnes**

The way we define a problem ultimately shapes our solution. We need to identify exactly what we are trying to preserve and then look at the optimum recovery process.

The great thing about the ‘half waste to landfill’ target is that it is industry-wide. Thus, motivated experts in their respective fields can target reductions for their own waste profile. This provides a knock-on benefit all the way down the value chain.

I look forward to a positive response from the construction industry when the half waste to landfill target goes live in 2010. There has already been a strong response from organisations wanting to sign up and get started.

For those wishing to dig a little deeper, consider the life cycle energy balance for your product or service, including the disposal/reuse phase. This may yield a considerably different result from simply aiming to reduce total tonnes to landfill.

**For more information, see the REBRI website www.rebri.org.nz.**