Waste diversion during deconstruction

This is the first in a series of articles following the building of a reasonably priced urban house that is more sustainable than most typically built today. We start with deconstruction.

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Extensively renovating a home or building a new house presents great opportunities for optimising resource efficiency, achieving a healthy and comfortable building. The next few issues of *Build* will trace the experiences of a new build project in an urban setting, starting with the deconstruction of the existing house.

Starting from scratch

The existing dwelling was a single storey, 95 m^2 Art Deco house close to Hamilton central. It had a plaster exterior, all rimu timber framing, flooring and windows, and corrugated steel roofing. The original intention was to extensively renovate the house to make it resource efficient, comfortable and healthy. However, considerable destructive inspection – the type that can only be made after purchase – revealed that it would be more practical to start from scratch. The main reasons for this included:

- significant environmental compromises would have had to be made, especially in the area of thermal design (good passive design being the fundamental design guide)
- the size of the renovation would have been extensive and would increase progressively with destructive investigation
- financial costs, which were likely to be significantly greater from renovating than starting from scratch, while not providing anywhere near the amenity.

The immediate goal for the owners then became how the existing house could be salvaged in the demolition process to minimise the amount to be landfilled. The answer was simple – deconstruct, rather than demolish.

Original Art Deco house.

Reusing and recycling

The owners began by breaking down the components of the house and listing possible ways to divert them from the landfill – preferably by reusing or recycling.

The comprehensive REBRI (Resource Efficiency in the Building and Related Industries) guidelines were consulted for practical waste diversion. These guidelines can be downloaded from www.rebri.org.nz.

Ian Mayes, the local Eco Design Advisor (see www.ecodesignadvisor.org.nz), was able to advise alternatives to disposal on the more challenging materials and components (such as window glass and frames). The builders contracted to build the new house were keen on resource efficient construction and were consulted about possible markets for materials and best strategies for smart material management.

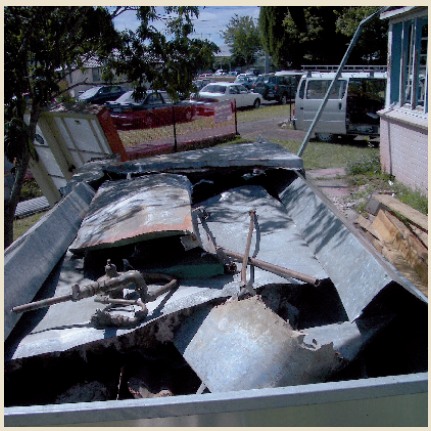
All the site workers were informed of the overall goal and agreed to work with this in mind. Neighbours and friends were also informed and given the opportunity to salvage discrete items. Finally, the Yellow Pages were used to determine material disposal options.

What was salvaged

The bulk of the deconstruction happened over a 5-day period – slightly longer than a similarly-sized 'standard' demolition project. However, the gains, in terms of diverted and salvaged materials, were considerable. The destination of the majority of the building materials can be seen in Table 1.

Volumetrically, by far the two largest materials to be sent to landfill were the fibrous plasterboard and wire-reinforced stucco work. Since these were co-mingled wastes (as they incorporated several materials), they made landfill diversion impractical. An attempt was made to clear the stucco using the bucket for the digger, but this proved impossible.

The recyclability of some materials, like the flooring joists and studwork, proved



Trailer load for the metal recyclers.

Firewood stack.

Tongue and groove flooring salvage.

Table 1: Destination of deconstructed materials.

Material	Destination
Windows and frames	Waste recyclers for reuse/recycling
Window hardware	To be onsold
External doors and frames	Friends' renovated houses and sleepouts
Internal doors	Reuse by friend or kept for future use or selling
Kitchen cupboards	Friend's garage as tool storage
Kitchen sink	Friend's sleepout
Stucco (fibre reinforced), carpet underlay, vinyl, roofing underlay and laundry stand	All to landfill
Carpet	10% to neighbour, rest stored on site to be used as garden underlay and newly polished concrete floor protection
Nails	At least half collected in punnets and sold to metal recycler, and the rest remained in the firewood
Laundry tub	Tub reused (for garden washing)
Spouting, downpipes, corrugated roofing steel, pans and flashings, conduit for wiring, copper piping, taps and other hardware, and steel bath	Metal recycler
TV aerial and coaxial cabling	To neighbour
Curtains, rails and timber blinds	To neighbour and some still to be sold
Concrete driveway and path, cracked ceramic basins and brick work	All to concrete recycler
Toilet pan and flush unit	Reused on site for builders
Rimu timber floorboards	About 65% salvaged, denailed and ready to use in new house
Timber framing (good condition)	About 75% salvaged, denailed and ready to use for future woodwork projects
Timber framing (poor condition)	99% salvaged, cut ready for firewood

difficult in practice. The joists were very dry and therefore split easily. The majority of the studs had rebates out of them, due to the timber cross bracing elements, which were fitted diagonally. This resulted in less reuseable wood (mainly for furniture making later on) and more fuelwood (approximately 4 m^3) being generated than was initially hoped.

On the positive side, there were a few things that weren't expected to be reused, but which were. These included the reuse of the television aerial, curtains and tracks, and toilet pan/cistern. The TV aerial (complete with its coaxial cable) was taken away by a happy neighbour and has already been installed. Neighbours also took curtains and tracks. The toilet and cistern were constructed into the on-site outhouse, which was entirely made of salvaged materials (apart from the nails holding it together and the water feed line).

Deconstruct versus demolish

So, what are the pros and cons of deconstructing versus demolishing? The more important issues for this site are shown in Table 2. →

The key to a successful deconstruction in this instance, could be put down to three things:

- Good planning at the outset, to find appropriate markets, especially if on-site storage space is tight.
- Choosing a suitable deconstruction team, who can provide workable solutions to the challenges that inevitably arise and are willing to go the extra mile.
- Ensuring that enough time is set aside, as more care is required to salvage some of the more delicate items (such as the windows and doors).

Thanks to Karl Kampenhout Builders for carrying out the bulk of the salvage operation and project management for this exercise.

The next Build *article in this series will look at planning the new building.*

Table 2: Pros and cons of deconstruction.

Pros	Cons
Satisfaction of seeing what can be practically done in a reasonable timeframe	More time consuming – in this case, by about 1 extra day
Reduced landfill and associated environmental costs	More pre-planning, thought and general involvement in the process by everyone
Financial benefit (from scrap metal recyclers and considerable personal supply of furniture wood)	More on-site storage space needed
Implementation of REBRI guidelines	

Dry rot in the house.

Salvaging the windows.