CONSTRUCTION AND DEMOLITION WASTE – WHAT CAN WE DO ABOUT IT?

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Introduction

Construction and demolition (C&D) waste is a major waste stream going to landfills and cleanfills estimated to be around 17% of all landfill waste nationally. This 1995 estimate is considered conservative and does not include C&D waste going to cleanfills.

In the past a number of New Zealand case studies have been conducted looking at segregating waste on construction sites to investigate opportunities to reuse or recycle the waste. However case studies alone are not enough to create significant momentum to reduce this waste stream, a more holistic approach to tackle the C&D waste stream is needed.

The C&D Waste Reduction Project started this approach by involving key stakeholders in the waste stream and investigating opportunities to reduce the quantity of material going to landfill and cleanfill. The project was also developed to assist industry, councils and the community to meet the New Zealand Waste Strategy target:

“By December 2008 there will have been a reduction of C&D waste to landfills of 50% of December 2005 levels measured by weight”

The C&D Waste Reduction Project was initiated and developed by North Shore City Council and involved the support of the Ministry for the Environment and a consortium of councils and industry groups. The project began in December 2003 and was completed in July 2005 and targeted the following stakeholder groups:

- Architects/designers
- Engineers
- Developers/builders
- Sub-contractors
- Product suppliers
- Demolition firms
- Home renovators
- C&D recycling operators
- Local and regional government

The deliverables of the project included:
1. An assessment of existing markets for recycled and reusable materials from C&D waste and the development of regional market development strategies for Auckland, Waikato and Canterbury;
2. A review of current legislative tools available to local and regional government to regulate C&D waste and guidance notes on regulating waste management under the Local Government Act (1974) and (2002);
3. Best practice guidelines for C&D recycling and reuse operators;
4. A waste tracking system for the chain of custody and processing of C&D materials within the resource recovery industry;
5. Best practice guidelines for five sectors: design and planning, construction, home renovation, building products and demolition and
6. A website (www.rebri.org.nz) as a C&D waste reduction information portal for industry, local government and the community.
An overview of the deliverables from the C&D Waste Reduction Project an update on the activities underway to reduce the C&D waste stream follows.

**Market Development Strategies for Construction and Demolition Waste**

The 2004 market development strategy report focused on six key C&D wastes: concrete, wood, plasterboard, salvage items from demolition, metal and expanded polystyrene. The report investigated actions and priorities to overcome the current barriers and to assist market opportunities.

**Concrete**

The report found there were opportunities to increase demand for crushed concrete aggregate by publicising the current guidelines and specifications for using this product for base course. Promotion of the product through government and industry procurement policies would also assist demand for the product.

Figures 1 and 2 demonstrate how concrete aggregate can easily be reused on-site where rubble from concrete blocks were used as base fill in a North Shore City Council construction assistance project.

**Wood**

The demand for reuse and recycling of wood could be improved by developing guidelines and providing information for how to use second hand and recycled wood products. Specifications should be developed for wood products to meet feedstock requirements for boilers and separation at source to improve the quality of wood supply and separate treated from untreated wood.

**Plasterboard**

There are a number of potential opportunities for using plasterboard waste in agricultural, composting and landscaping markets and as a recycled component back into plasterboard products. Source separation, research and business development assistance were flagged as priorities to develop this waste market.
Salvage Items

Salvage items are materials removed during demolition such as architectural features, fixtures, joinery and other building parts and can generally be reused in their original form.

To further develop the market for salvage items and second hand building materials recommendations included guidelines and training on deconstruction to improve the quality of salvaged materials. There is a need to promote second hand materials to designers and deliver market information to clients and designers along with guidelines for reusing the materials.

Metal

The metal recycling industry is well established and the market is being driven by good financials returns for the material. However there is a real opportunity to improve the diversion of metals from construction and demolition sites through promoting and educating about metal recycling and separating metals on site. There is a need to improve the metal removal services to construction sites to divert this material for recycling as a number of sites do not have large quantities of metals on site for recycling so operators can be reluctant to offer a service to individual sites. However a round of pick-ups could make this service viable.

Expanded Polystyrene

There are already some initiatives underway to collect construction expanded polystyrene waste for recycling. One such initiative was trialled on a North Shore City Council project where the council worked with the supply chain to take responsibility for the waste stream. The polystyrene installer bagged up the waste on site (Figure 3). When the supplier of the polystyrene delivered the next consignment of polystyrene they took back the waste polystyrene to their depot (Figure 4) and the manufacturer then took the waste polystyrene back for recycling.

The market for this product would be assisted by supporting existing initiatives and identifying the barriers to overcome.

Other Market Development Opportunities

Further development of the market for the products discussed above would be assisted by the following: increasing the cost of disposal, certification and specification of materials for recycling and reuse, providing infrastructure to divert these materials, information distribution and training. Government and industry procurement policies can have a significant impact on
further developing markets by requiring projects to use certain recycled materials in construction as well as requiring waste management plans to reduce C&D waste going to landfill and cleanfill.

Regulating C&D Waste

An inventory of regulatory tools available to Councils to reduce C&D waste going to landfill and cleanfill was conducted. The statutes reviewed were:

- Building Act (1991);
- Building Bill (2003);
- Resource Management Act (1991);
- Local Government Act (1974) and Local Government Act (2002);
- Energy Efficiency and Conservation Act (2000) and
- Health Act (1956).

The review recommended that bylaws were the most effective regulatory tool to be used by Councils as such guidance notes on regulating waste management under the Local Government Act (1974) and (2002) were produced. These reports can be viewed on the www.rebri.org.nz publications section.

Since the inventory of regulatory tools was conducted the Building Act (2004) was passed. Sustainable development is included as a principle in The Act. The New Zealand Building Code is scheduled to be reviewed by 2007, so presumably there is the potential to include proactive waste management requirements and allowance for using recovered materials in this Code. There is the opportunity for all those in central and local government, industry and the community who want to reduce the C&D waste stream to have an input into this review.

REBRI Guidelines

A major element of the project was to develop guidelines that give guidance to sectors involved in C&D and resource recovery industry on how to reduce C&D waste going to landfill or cleanfill. These guidelines are named REBRI which is a brand name that has been used since the 1990’s and is the name of a website operated by the Building Research Association of New Zealand. It stands for Resource Efficiency in the Building and Related Industries and the project steering group decided to use this brand name for the guidelines produced by the project and to use the existing REBRI website as the information portal for the material produced from the project.

The REBRI Guidelines were developed to take a holistic approach to reduce the C&D waste stream going to landfill and cleanfill therefore they include guidelines for the resource recovery industry and all the key stakeholders involved in C&D.

It is important to remember that architects and designers have a large influence on the waste stream during the construction of a building as well as influencing the waste stream during its future renovation and deconstruction. For example an architect/designer can choose appropriate materials that are long lasting, reusable and recyclable. They can design buildings that minimise waste during construction by using standardised material lengths to reduce off cut waste. Future waste streams can also be reduced by designing buildings that allow for future easy low waste renovation and are designed for deconstruction so materials can easily
be recovered for reuse or recycling. Though architects and designers can greatly influence the waste stream they are also driven by their clients' demands.

Building architects and designers and clients have a significant role to play in the reduction of the C&D waste stream as do all stakeholders. The REBRI Guidelines provide assistance to all the key stakeholders on how they can reduce this waste stream.

The REBRI Guidelines are downloadable and are at www.rebri.org.nz. Following is the full list of the guidelines available.

### REBRI Easy Guide Series
- REBRI Easy Guide for Concrete
- REBRI Easy Guide for Metal
- REBRI Easy Guide for Plasterboard
- REBRI Easy Guide for Wood
- REBRI Easy Guide for Design and Planning
- REBRI Easy Guide for Construction
- REBRI Easy Guide for Demolition
- REBRI Easy Guide for Building Products
- REBRI Easy Guide for Home Renovation

### REBRI Guidelines and Associated REBRI Documentation
- REBRI Guide for Design and Planning
- REBRI Guide for Construction
- REBRI Guide for Demolition
- REBRI Guide for Building Products
- REBRI Guide for Home Renovation
- REBRI Contract Specifications for Waste Management – Construction
- REBRI Contract Specifications for Waste Management – Demolition
- REBRI Construction Waste Plan
- REBRI Demolition Waste Plan
- REBRI Project Waste Management Record
- REBRI C&D Waste Transfer Form
- REBRI Induction – Waste Reduction

### REBRI Resource Recovery Guideline Series
- REBRI Resource Recovery Guidelines – ALL WASTE TYPES: Collection and Transportation
- REBRI Resource Recovery Guidelines – ALL WASTE TYPES: Storing and Sorting
- REBRI Resource Recovery Guidelines – PLASTERBOARD: On Site Processing
- REBRI Resource Recovery Guidelines – PLASTERBOARD: Off Site Processing
- REBRI Resource Recovery Guidelines – PLASTERBOARD: Collection and Transportation
- REBRI Resource Recovery Guidelines – METAL: Collection and Transportation
- REBRI Resource Recovery Guidelines – CONCRETE: Collection and Transportation
- REBRI Resource Recovery Guidelines – CONCRETE: Processing
- REBRI Resource Recovery Guidelines – WOOD: Collection and Transportation
- REBRI Resource Recovery Guidelines – WOOD: Processing
- REBRI Resource Recovery Guidelines – WOOD: Sorting and Storage
Opportunities exist to utilise these guidelines to reduce the C&D waste stream through tenders and contracts for construction and demolition projects.

The REBRI Guidelines and REBRI Documentation can be referred to in tenders and contracts for construction and demolition projects. MasterSpec is a standard tender/contractual specification document that is used with construction or demolition projects. Conditions can be added to this or other tender and contractual documents to ensure the contracted party submits a waste plan, records waste management during the project and tracks the waste leaving the project site to ensure it goes to the agreed disposal point. North Shore City Council developed wording for use in its MasterSpec tender document relating to one of its building projects. Below is a copy of the wording used in the document.

1311  WASTE MANAGEMENT

1.  GENERAL

Documents

1.1  DOCUMENTS REFERRED TO

Documents referred to in this section are:
REBRI Guide - construction
REBRI Guide Contract Specifications for Waste Management - construction

Documents listed above and cited in the clauses that follow are part of this specification. However, this specification takes precedence in the event of it being at variance with the cited document.

Requirements

1.2  Adhere to the requirements in the REBRI Guide Contract Specifications for Waste Management - construction

Completion

1.3  CLEANING

All cleaning materials used on the project to be biodegradable and non-toxic


The REBRI C&D Waste Transfer Form was developed to track the chain of custody and processing of C&D materials from projects to ensure contractors can provide documented evidence of the disposal point of the C&D materials. This evidence is required so the C&D project client can be assured the final disposal point is what was agreed to in the contract waste management plan. For example to ensure treated wood hasn’t been collected and then used as fire wood and those materials that can be recycled or reused are not being disposed of to landfill or cleanfill.

The REBRI Guidelines and associated REBRI Documentation will continue to be tested in the field with a number of identified projects. Feedback from these REBRI projects will be used to further develop the guidelines and documentation.
Where to Next?

North Shore City Council, Christchurch City Council, the Ministry for the Environment and a number of other councils have expressed an interest in using the guidelines on construction and/or demolition projects. The REBRI project will co-ordinate the feedback from the projects using these guidelines by a standardised reporting structure that will be used by trained consultants commissioned to work on agreed REBRI projects, however the REBRI Guidelines are there to be used by anyone involved in the C&D industry.

A number of initiatives are being investigated to continue the momentum to reduce C&D waste going to landfill and cleanfill. They include:

- Ministry for Environment working with industry training organisations to include the REBRI Guideline material in their industry training;
- Ministry for Environment is setting up a C&D Waste Reduction National Planning Group to keep the momentum going on reducing the C&D waste stream. The Group will be made up of industry, local government and Government representatives and
- The Building Code is scheduled to be reviewed by 2007. There is the potential to include proactive waste management requirements and allowance for using recovered materials in the Building Code.

Conclusion

C&D waste represents a significant proportion of the New Zealand waste stream and would have increased in recent years with the rapid expansion in residential and commercial development.

Past approaches to reduce this waste have tended to focus on segregating waste on construction sites and looking for opportunities to recycle and reuse these materials. A more holistic approach to the challenge of reducing C&D waste going to landfill and cleanfill is required and will need to involve industry, Central and Local Government, educational bodies and the community.

The C&D Waste Reduction Project has started this holistic approach and the new initiatives being planned to keep the momentum going should make a significant contribution to reducing C&D waste going to landfill and cleanfill in the future.

The tools and resources developed from this project are there to be used by anyone involved in the C&D sector and need to be used to be of value.
Acknowledgements

Project Sponsors
- Ministry for Environment Sustainable Management Fund, North Shore City Council, Christchurch City Council, Hamilton City Council, Auckland City Council, Manukau City Council, Rodney District Council, Waitakere City Council, Environment Waikato, BRANZ, RONZ, Winstone Wallboards Ltd.

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- Hamilton City Council – Sven Hanne
- Ministry for the Environment – Chris Purchas
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- All the industry stakeholders who gave of their time to assist with the project.

References
