

CHRISTCHURCH DEMOLITIONS - PERSPECTIVE FROM A DEBRIS & WASTE MANAGER

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1. Introduction

The earthquake of 22 February 2011 caused widespread damage, especially in the central city and eastern suburbs. Damage was exacerbated by buildings and infrastructure already weakened during the 4 September 2010 earthquake and its subsequent aftershocks. A state of national emergency was declared on 23 February 2011. (Carter, 2011).

Immediately after the proclamation of the emergency, decisions were made that would assist the community facing this emergency. As the emergency came to an end, Canterbury moved into a period of recovery, changing the basis for decision making. This paper explores the decision making process used and lessons learnt in regards to earthquake debris management during the emergency and recovery phases and how the change in focus has affected those initial decisions.

2. From Disaster to Recovery

2.1 The February 2011 Christchurch Earthquake

An initial estimate of the anticipated tonnages was undertaken by the Civil Defence Management Group (CDMG). This initial estimate showed that there were 773 red placards in the Four Avenues, and approximately 485 required immediate demolitions, with another 150 buildings in the suburban shopping areas (business zones). The buildings ranged from residential through to large multi-storey buildings with an estimate of between 1 and 1.5 million tonnes of building demolition debris. Kate Valley Landfill did not have the capacity to handle the anticipated tonnages.

2.2 Establishment of the Waste and Debris Management Team

The CDMG established a dedicated Waste and Debris Management Team and provided the team the necessary support. The core team structure comprised of two councils (local and regional) a combination of policy based and operational role backgrounds and strong

technical support. In Christchurch the CDMG utilised a PhD student specialising in Disaster Waste Management. The CDMG realised that it was key to have relationship focussed people who could communicate effectively and allow information to transfer naturally. Contacts and active relationships with all agencies, councils and industry, across all levels in organisations, were established. Industry connections were important as consent holders had access to a large network of resources and capabilities; most importantly they had practical people to get things done.

The Waste and Debris team made sure that the right people were in the right roles, so strategic thinking was combined with practical application. In Christchurch there was a core Waste and Debris team of five, who then worked with key contacts in the respective councils, RMA compliance areas, and waste technical and operational areas.

2.3 Waste and Debris Management Objective and Guiding principles

The Waste and Debris team determined that an efficient and controlled process for the debris removal was required, and used the following principles:

- Sensitivity in handling material associated with known fatalities.
- Minimise potential generation of legacy issues from waste removal and disposal.
- Maintain a continuously safe operating environment.
- Safety and security for the community during recovery.
- Manage and minimise all recovery costs.

It was decided, due to the need for urgency in the emergency that a *'fast track'* programme was required to clear the city and a *'drop and haul'* methodology was enforced. All the material was to be taken to a centralised processing facility for resource recovery.

2.4 Burwood Resource Recovery Park

An assessment was made of potential locations within the Christchurch region to manage the anticipated debris tonnages. The site had to be easily accessible, and have sufficient area to cope with the temporary storage of the anticipated tonnages prior to the recovery operation starting and could not be located above a protected aquifer.

The old Burwood closed landfill and its surrounding pine forest met these requirements. A decision was made to establish the Burwood Resource Recovery Park (BRRP), as a joint venture operation between the private sector and Christchurch City Council (CCC). CDMG invited Transpacific Industries Group (NZ) Ltd (TPI) to joint venture with EcoCentral Ltd (part of Christchurch City Holdings Ltd and owned by CCC), and Frews Contracting Ltd (a local contracting business) to process demolition material at BRRP. The tender stated:

- The Burwood closed landfill was to be leased for 5 years.
- Estimated to be 15,0000 tonnes per day with one truck arriving every 30 seconds.
- The site to be operational for acceptance of material by 7 March 2011

2.5 End of Civil Defence and establishment of CERA

The Canterbury Recovery Authority (CERA) was established by special legislation and came into force on 18 April 2011 (Canterbury Earthquake Recovery Act, 2011) (CER Act). The Act provided significant new powers to CERA to lead the recovery of Christchurch, with the State of Emergency ending on 30 April 2011 (Carter, Hon J, 2011).

The major change between the two lead organisations was the focus. Civil Defence focused on emergency management and CERA focuses on the rebuild and long term recovery. This change was illustrated when the demolition methodology changed from the initial *'drop and haul'* to become a *'quick pick and go'*. The *'quick pick and go'* methodology allowed some on site separation of materials if it was possible to extract *'clean'* debris directly from the building without slowing the demolition process; and separated quantities could fill a truck to capacity.

2.6 Lyttelton Port Reclamation

The Lyttelton Port sustained considerable damage during the February earthquake as, port wharves, breakwaters, quays and reclaimed land moved significantly. The Port company approached the Government to use its powers under the CER Act to allow the reclamation of 10 hectares of harbour. The Government agreed and instructed that the necessary consents be granted on a non-notified basis. It was estimated that the reclamation would be able to use approximately 1 million tonnes of clean fill (Brownlee, et al., 2011).

2.7 Early days at CERA

With CERA taking control in May 2011 a review was undertaken as to the best contractual methodology for undertaking the demolitions. The completion of this review process saw a change in the contracting philosophy for the demolitions. Previously all the Civil Defence and early CERA projects had essentially been ‘measure and value’ contracts. After the review the majority of contracts became ‘lump sum’ contracts. Lump sum contracts allowed a move away from ‘quick pick and go’ to ‘salvage and full separation on site’.

2.8 New processing sites

While the change in demolition methodology provided for less costly demolitions, it meant that CERA was not able to require demolition material to be taken to BRRP. This led gradually to numerous processing sites, and significant on site salvage operations. The proliferation of processing sites, and the disposal of clean fill to the Port of Lyttelton destroyed BRRP’s financial model, which was based on ‘drop and haul’. BRRP saw the composition and value of the recoverable material decrease and the initial \$90/tonne tipping fee was no longer viable. The new financial risk exceeded the level that both EcoCentral and Frews were comfortable with and both parties withdrew. For the project to continue, TPI decided the gate charge needed to increase to \$120/tonne (which was still lower than public transfer station charge of \$187/tonne) and a new joint venture partner was required. Discussions were held between a number of parties, including CERA and as a result Transwaste Canterbury Ltd took over BRRP. Transwaste is a joint venture company in which the six local authority shareholders hold 50% of the shares with the other 50% of shares held by TPI.

3. The Recovery Phase

3.1 What happens after an emergency?

During a State of Emergency the emergency provisions of the Resource Management Act apply (Resource Management Act, 1991) (RM Act). Once an emergency is lifted these provisions no longer apply. Neither Environment Canterbury’s nor the Territorial Authorities’ Plans had been written to accommodate the recovery. This lack of appropriate regulatory rules creates a problem, as CERA operates under ‘business as usual’ rules in a situation that is not ‘business as usual’. While the CER Act provides CERA with significant power and influence, it does not have regulatory powers as provided under the RM Act. This situation

requires CERA to work closely with the relevant regulatory authority to determine appropriate solutions to problems. Only in a limited number of instances have the Minister’s special powers to instruct the Councils been used.

3.2 Multiple processing sites

The Order in Council of 8 March 2011 allowed the ‘temporary’ storage of demolition waste as a permitted activity (Order in Council, 2011). The Order however did not allow the processing of the material on that site. This situation left a policy vacuum which was exploited by various demolition contractors. CERA worked with Environment Canterbury (ECan), Christchurch City Council (CCC), Selwyn District Council (SDC) and Waimakariri District Council (WDC) to establish a regulatory framework to control these sites.

CERA requires Contractors to prepare a Waste Management Plan for demolitions that CERA has jurisdiction over. In this Plan the demolition contractor specifies where it plans to take their debris. ECan checks the Plan to ensure that the proposed sites have the necessary consents. While this check does provide some visibility it struggles in several areas as outlined in the table below.

Area	Reason	Outcome
Financial viability	The RM Act, under which the processing facilities are consented, does not check the financial viability of the business model of the applicant.	Currently in Christchurch there is already one legacy site where the operator has gone into liquidation. At the time of going into liquidation the site was in full compliance with all its consents and was an approved facility according to ECan.
Final disposal of the waste	Consents to sort waste do not have any conditions in relation to where the final waste stream is deposited.	ECan is investigating a site where contaminated material was taken from an approved processing site and used as fill.
Underlying zoning	Regional, District, and City plans have not been written with the expectation that a major disaster will	One operator established a processing facility on railway land. CCC had no ability to regulate any of the activities on the site.

	occur and the multiple processing sites will be established.	
CERA control	CERA does not control all the activity in Christchurch.	If a contractor is in breach of their consents and has not been engaged by CERA for that project, then there is little that CERA is able to do to manage the problem.

3.3 Managing Asbestos

The general public is concerned about the health risk posed by asbestos fibres in the air, especially related to demolition activities and the potential increased risk to their personal health (malignant mesothelioma or lung diseases). The removal of asbestos from a building is regulated under the Health and Safety in Employment (Asbestos) Regulations 1998. These regulations are enforced by the Department of Labour (DoL). In the early days after the February earthquake the DoL provided advice on the safe demolition of asbestos contaminated buildings (Department of Labour). Earthquake related risks from unmanaged asbestos exposure include; dust generated from demolitions being blown into public areas, trucks dropping asbestos in route to their place of disposal and the illegal disposal of asbestos. These result in long term risks to the community.

When CERA identifies that a building may contain asbestos, this information is provided to the property owners. If on entering a building the demolition contractors are not sure if the material they are handling contains asbestos, a sample is taken and sent to a laboratory for analysis. Despite public concerns air quality monitoring by the DoL has not indicated that there has been any increase in the background levels of asbestos in the atmosphere since the demolitions started. This indicates that the general public are not at any more risk of developing asbestos related lung diseases than they were prior to the earthquake.

3.4 Household hazardous waste

The Residential Red Zone (RRZ) was created after the 13 June 2011 earthquakes, and over 7,800 houses need to be safely removed. This is unprecedented in New Zealand. A specific risk CERA identified was ensuring the safe removal and disposal of residual house hold

hazardous wastes. CERA sought advice from ECan on the best strategy for its safe removal. This resulted in ECan, CCC, and WDC applying for and receiving \$509,000 to ensure that all this material is collected and disposed of safely (Smith, Hon N, 2012).

3.5 Onsite concrete crushing

When CERA took over the management of the demolitions waste concrete was being sent to the Port to be used as clean fill. CERA also had a policy that all basements had to be filled so the site was left in a level and safe state. Clean aggregates were then imported into the city to fill these holes. Determining that this was an inefficient use of resources CERA worked with contractors and ECan to establish rules to enable concrete crushing to occur within the CBD Red Zone via a Non Enforcement Decision. The rules have since been changed and ECan has assisted the contractors to gain the necessary Resource Consents to allow them to operate Region wide. Crushing is still able to proceed in the CBD Red Zone under a Non Enforcement decision (Environment Canterbury, 2012). No compliance problems have been experienced with the onsite crushing of concrete.

3.6 Deposition of inert materials

Under normal circumstances the huge quantities of material required to fill all the holes on the sites would involve site specific Resource Consents. CERA determined that the application for these consents ran counter to the aim of an efficient recovery, so approached ECan for a solution. A Non Enforcement Decision was granted, and was updated as more information became available (Environment Canterbury, 2012).

3.7 Number of buildings to be demolished

The initial estimate was that around 1,000 buildings required demolition. However after more aftershocks and addition of the residential red zone, the statistics for August 2012 are shown in the table below.

CBD & Suburbs	Completed	To be Demolished	To be Partial Demolished	No Action	Total
CERA	991	119	67	122	1299
Civil Defence	307	0	0	0	307
Total					1606

The residential red zone requires the removal of over 7,800 houses. Not included in these figures are buildings and houses demolished where CERA has no oversight.

4. Conclusion

After an emergency a Civil Defence Management team undertakes an assessment and determines an appropriate course of action. At the end of the emergency, especially in the case of Canterbury, the community moves into a recovery period which requires a new focus. This focus includes the importance of a competitive marketplace and the requirements of the regulatory documents.

It has been CERA's role to lead the recovery of Canterbury. Sometimes the regulatory documents have not assisted the recovery process. While CERA does have the power to require a change to regulatory planning documents (via a Ministerial directive), most of the required policy changes have been implemented following negotiation and facilitation.

As was discovered in Canterbury decisions made during the emergency, while correct at the time, can have unintended consequences when a community moves into the recovery phase, requiring changes which in turn may affect other decisions. This was demonstrated with the change from 'drop and haul' though 'quick pick and go' to '*salvage and full separation on site*', as the Canterbury moved from emergency to recovery. These changes affected the financial viability of BRRP, a fundamental component of the waste and debris plan amongst other things.

Undoubtedly there will be other disasters of various natures in New Zealand, but there will not necessarily be an equivalent of CERA to lead the recovery process. Prior to a disaster Councils need to establish a process to manage their community through the recovery phase.

5. People who have helped

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