I certify that except where due acknowledgment has been made, the work is that of the author alone; the work has not been submitted previously, in whole or in part, to qualify for any other academic award; the content of the project is the result of work which has been carried out since the official commencement date of the approved research program; any editorial work, paid or unpaid, carried out by a third party has been acknowledged.

Vendy Oliver

26 August 2008
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Out of hundreds of mail I sent, a mysterious reply came from an Anthropologist name Poncut, whom until today I have not met. My journey was made possible with his welcoming generosity to allow me to stay at his parent’s house in Banda Aceh. Heartfelt thanks to Edi Syahputra to be a sincere guide in Aceh’s challenging road. I sincerely thank Alfi Rahman, Cut Januarita, and Bunda Suhada (Poncut’s mother) for being an excellent hosts and helper in my startups in Aceh. I could not imagine the difficulty of getting through basic activity without them. I am impressed and learn much from their humble and kind nature.

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I wish to offer a sincere gratitude for people who makes this project documentation come true. Adinda Uneputty and Emelyn Usanto for their graphic design and layout of this document, I thank them for being patiently let me changes the text over and again for a long stretch of time and many times on a pressured deadline. Real thanks to Sarah Iacono to magically transform my text into beautiful sentences. Many points that I would like to communicate has been brought into focus and clarity, without her there were too many fragmented pieces that may just brought reading into a confusion. Dr. Soumitri Varadarajan for his suggestion to take on a journey into a new ground, the disaster zone, and I did. It was invaluable to me that he deftly and thoughtfully guided many pieces of stories that I had from the disaster zone from something that confuse me to something that makes sense and become a profound source of realization for me. Finally thanks to my mother and father for their devotion and love, who allow me to deviate from a stable and safe choices in a career and explore what I felt more natural to do.
My project

The project began in March 2005 and was completed by February 2007. It emerged as a response to the tragedy caused by the tsunami that occurred on 26 December 2005, also known as the Boxing Day Tsunami. The disaster affected more than 10 countries from South East Asia to as far as Africa, destroying the livelihood of millions. It is now regarded at this point as the largest natural disaster in recent history (USGS 2007).

I was very intrigued by the notions designers have of their role in a disaster. I believed that designers can create a positive outcome for those who have been displaced from their homes by preparing residents with better products and services. Such products may include tents, rescue boats and fire extinguishers. Although this area of work has already been explored, many argue that there is little information to provide appropriate assistance (Telford 2006). It is difficult to understand how products and services can be designed without truly comprehending the context of their use. Such thoughts led me to wonder if a designer could travel to a disaster zone and be able to contribute more effectively to the re-construction process. I wondered if I were there (on-site), would I, with an education in design be able to make a difference? My question is the result of searching for alternative directions for design to take, also for me personally to steer away from consumer design. Seeking new functions for design, I needed a new context. So drawing on the basic needs of humankind, I looked towards the affects of the 2005 tsunami to investigate whether design can assist at the most necessary level. My project has also endeavored to respond to a personal curiosity, that is the identity of design and the depths of its substance in a testing circumstance. The project in Aceh has been as much a personal journey as an academic project from the within the stream of Industrial Design.

The project

The project consists of practical work and a project documentation. When the project began I had little knowledge of the tsunami that swept over South East Asia nor was the social framework of design in this area. I decided that in order to improve my knowledge in these areas I would have to change my life, which is my vision and my engagement with the world. So I began the usual background research through the internet, libraries and seminars. I focused on social movement; left wing, liberation, environmental action and social justice issue. I was able to find enough information on the tsunami but had not much success in regards to design in a disaster. The lack of knowledge in this area pressed my project to release its boundaries. I began speaking with aid agencies in Melbourne but received no useful feedback. I also tried volunteering but was unsuccessful. Later on I developed a friendship with an Acehnese student studying in Jogjakarta. We conversed through e-mail many times and he offered to let me stay with his family in Banda Aceh. So filled with hope and fear of the unexpected, I left Melbourne to begin my fieldwork in Banda Aceh. As soon as I arrived I began speaking with more aid agencies in an attempt to help them and support their cause. Frustrated with the lack of responses, I was desperate to work on any project. Fortunately, semi-stranded in Aceh, I was offered to help in a building project. The project required the construction of a school with funds being donated by the Society of West Borneo, which is my home town in Indonesia. I accepted the offer because it seemed to be the only viable option and allowed me to do some field work.
Still new to my surroundings, I became an Assistant Project Manager for the construction of two primary schools, one kindergarten and eight houses, all in two separate locations. During this time I utilized all methods of documentation available to me. I observed, wrote in a journal, took photos, recorded videos and voices. There was numerous times throughout the project that I felt despair, unsure of where the project would lead me. My job in building construction was very demanding; it consumed a large extent of my time, including weekends. Throughout my time in Aceh I interacted with people from all walks of life; survivors, government officials, international agencies, traditional/village administration, military and even a minor encounter with the separatist movement or GAM (Gerakan Aceh Merdeka). In 2006 the building project was completed. I was still determined to do my own project so I persisted with aid agencies. The second time around the agencies gave very helpful feedback, perhaps the situation had stabilized since the GAM has signed peace agreement with the Republic of Indonesia. When visiting various agencies I documented their projects. I also did a lot of independent exploration and observation on Aceh and its growing developments. I remained in close contact with Aceh for another year.

The ADR (appropriate durable record)

After two years in Aceh, I returned to Melbourne to produce an Appropriate Durable Record (ADR) as a component of my Masters. The ADR package consists of a Project Document (Exegesis), a Visual Needs Catalogue, Video Journey and an Exhibition. The Project Document is the central component of the ADR, which contains the entire Masters journey and the realization of the project including a personal reflection. The project document discusses the tsunami, the problems caused, the requirements of survivors, the affect of the disaster on the Acehnese people and how design can contribute to the city and to life, after nature’s destruction. The many subjects I have learnt from my fieldwork in Aceh are also discussed. Some of these areas include the intervention process and its implications as well as the uniqueness of the city and its affect on my outcomes. In the chapter D4D (Design for Disaster), the brief of my Masters is outlined as well an abstract in relation to the designer and how they can contribute to an area affected by disaster. During my time in Banda Aceh I documented many of the activities I was involved in. I compiled a Visual Needs Catalogue, which is a photo book that is segregated into various areas which design can engage in a disaster. It functions as a reference for further learning and can be discussed outside the context of Aceh. During my time in Banda Aceh I was constantly recording information, I used a mini DV camera to record my encounters in Aceh and describe everyday life in a disaster zone. From the tapes I recorded while in Aceh, I have composed a DVD that tells the story of my personal journey in Banda Aceh.
List of Abbreviations

**BRR** - Badan Rekonstruksi dan Rehabilitasi (Reconstruction and Rehabilitation Agency)

**EU** - European Union

**GAM** - Gerakan Aceh Merdeka (Free Aceh Movement)

**ICRC** - International Committee of the Red Cross

**IDP** - Internally Displaced Person (survivor of a disaster)

**IFRC** - International Federation of the Red Cross

**IOM/OIM** - International Organization of Migration

**NGO** - Non-Governmental Organization

**PAM** - Perusahaan Air Minum (National Water Company)
Indonesian public company which supply water

**PLN** - Perusahaan Listrik Negara (National Electrical Company)
Indonesian public company which supply electricity

**RI** - Republic of Indonesia

**Syariah** - Muslim Law

**TNI** - Tentara Nasional Indonesia (National Army)

**Turn Key System** - Build with own expense first, to be reimbursed later by donor when building is completed

**UNDP** - United Nations Development Programme

**UNHCR** - United Nations High Commissioner for Refugees

**WFP** - World Food Programme
I look at design
my I learn
way I interact
way I look at does
while it sf"fure
In many ways this project emulates the disaster context although it does not achieve what I endeavoured to find. I attempted many things that weren’t successful, however in doing so found something completely unexpected. I have searched for insight into working in a disaster area, suggested ideas, described challenges, issues to be reviewed and suggested topics for further discussion.

This project was a personal journey in search of the role of design in a natural disaster. It was undertaken in the spirit of an academic adventure, investigating the affect of design in a disaster area. I am suggesting this document to be viewed as a signpost to disaster work and the initiation of an inquiry. Maintain flexibility is a must, as an employee of SPHERE organization commented, ‘Every time we go into a disaster area, we keep re-inventing the wheel.’ The harsh circumstances that influence these responses are always surprising, and this has been true of my journey.

My Master project consists of:

1. The Exegesis - The Project Document

2. DVR Components
   a. The Visual Needs Catalogue
   b. The Building Project
   c. The Video Journey
   d. The Exhibition

The Project Document is an account of my journey, the processes I undertook and my findings. It is essentially the core of my project. The DVR components detail the subsequent response to my findings.
The Problem

Although design has had, ideas about what it can do to be prepared with better products for the next disaster, can design/er go in after a disaster and contribute? This was the question, which set me off wanting to go to Aceh and to live and work there and ponder about the role of designer in disaster.

March 2005, the world continues to mourn the tragedy of the Asian Tsunami that claimed so many lives at the end of 2004. The torrent of solidarity rushes from all over the world (Cosgrave 2005). In Australia, the whole nation opened its heart and contributed wherever possible to the disaster, and I started my inquiry.

I was very intrigued to understand what kind of work was carried-out in the areas devastated by the tsunami. I was intrigued by design that allows social responsibility to take precedence, by providing attention to issues such as poverty and war. However, I found little information on the function of design in the case of a disaster. Although design has been implemented in areas prone to natural disaster to better prepare residents, can a designer arrive after the tragedy and effectively contribute? This was the question that inspired me to go to Aceh, to live, work and reflect on the role of the designer in a place of adversity.

The network for working abroad in a place of conflict and disaster has a background of international relations and international development, which is a component of social sciences. To understand how design can function in a social context, I intensively exposed myself to material relating to action, creating change, using alternative methods and researching social injustice and marginalised issues. At one point during my exploration my ideas and values became entwined, making previous distinctions faint. However I realised that I had delved into a network that existed alongside dominant establishments. My notions of design prior to this exposure and the aftermath of the tsunami were in relation to what design can achieve for the consumer and manufacturer; for the purpose of commerce, leisure and scientific development. This revelation widened my awareness of issues in the world that require attention amongst the ever growing matter of consumer demand. Upon researching design in disaster areas, I found much information about disaster itself and a very limited information as to how a designer operates and instigates aid in a crisis.

To further my knowledge I began contacting aid organisations, newspapers and schools. I did not have any contact with designers and organisations associated with aiding natural disasters so I attended seminars about international development. The profession of industrial design has not been identified with a specific skill that can readily fit into the taskforce of a development program. I entertained the idea of volunteering but discovered that it was run on intake sessions and I was unable to work the vacant positions, such as an accountant or a civil engineer. At the time a sense of urgency was building inside of me, I wanted to go to Aceh because I felt I could do little more in Melbourne. So, eager to help in any way, I departed Melbourne for my journey to Aceh as a travelling civilian.
On the Tsunami

Sunday morning, the day after Christmas 2004, at two minutes to eight o’clock an earthquake measuring 9 on the Richter scale erupts under the sea off the West Coast of Sumatra Island, Indonesia. The quake triggered an enormous wave, commonly known as a tsunami (Inoue 2005). It rushed from the middle of the Andaman Sea with tremendous force to the coast of nine Asian countries and five other countries as far as Africa. The horrifying waves caused a lot of death and destruction. On that very day almost 230,000 people were killed and some 1.7 million people were displaced while their environment and the livelihood of their nations were devastated (Cosgrave 2005)
On the Tsunami

Basic geology informs us that the earth is made up of floating plates of solid mass that are constantly moving and adjusting themselves. It can simply be described by visualizing pieces of styrofoam floating closely over water. The styrofoam is equivalent to the earth plates and the water is representative of the molten liquid that is deep underneath the surface of the Earth. Every so often the plates move and adjust themselves, creating friction between plates; this is what causes an earthquake (Geoscience Australia 2007).

Many earthquakes are mild and cannot be felt, they can occur without causing a tsunami. When an earthquake takes place under water and is larger than 7.5 on the Richter scale, it hurls the water with great force towards the coasts and crashes on the beaches and then continues streaming inland (Bolt 1978). The name tsunami was given by the Japanese which translates to ‘tsu = harbour’ and ‘nami = wave’. So far, Japan has experienced 195 tsunamis.
Andaman – Sumatra Earthquake 26 December 2004

As it displaced water from the ocean, the earthquake shook the livelihood above it. The earthquake of the South East Asian tsunami released energy equal to slightly over 25,000 nuclear bombs.

Extremely large water recession on the beachfront is a sign that the tsunami will return with a similar or greater extremity. In Kalutara Beach, Sri Lanka the water withdrew an unusual 400 meters from the beach only to return to the shore as an enormous wave (Digital Globe 2004). The Kalutara Beach wave was amongst the highest. It was recorded that it rose up to 30 meters before it broke and rushed further inland. On this day the bright afternoon sky suddenly turned dark. Set off by the earthquake at its epicentre, near Indonesia, the ensuing tsunami travelled as close as 15 minutes to countries neighbouring the Indian Ocean. These areas included India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka, and Bangladesh. They also travelled up to a distance of 7 hours towards Kenya, Seychelles, Somalia, South Africa, Tanzania, and Yemen. Being the closest to the epicentre, the city of Aceh receive the hardest hit, taking some 170,000 lives of 230,000 total.

South East Asian Tsunami following Andaman - Sumatra Earthquake
Aceh being the nearest (250 km) from the epicentre was severely damaged. The enormous scale earthquake caused houses and buildings to collapse with further damage brought by the surge of water sweeping debris. The tsunami destroyed the main infrastructure of Aceh, obliterating roads, bridges, drainage systems and electrical and water facilities. Furthermore communication and transportation were cut-off and the agriculture and fisheries were also severely damaged. More than a hundred thousand people were killed by the tsunami and 2 million people were left in desperate need. And without anticipation, only three months after the tsunami, on 28 March 2005, another lethal earthquake broke in Nias, the West Coast of Aceh. The quake measured 8.7 in magnitude. No tsunami was reported, however the earthquake destroyed 300 homes with 1300 casualties in Nias and Simelue Island (JAMA 2006). In Such a short period Indonesia has suffered two catastrophic disasters.

Devastation in Aceh and Nias

Aceh being the nearest (250 km) from the epicentre was severely damaged. The enormous scale earthquake caused houses and buildings to collapse with further damage brought by the surge of water sweeping debris. The tsunami destroyed the main infrastructure of Aceh; obliterating roads, bridges, drainage systems and electrical and water facilities. Furthermore communication and transportation were cut-off and the agriculture and fisheries were also severely damaged. More than a hundred thousand people were killed by the tsunami and 2 million people were left in desperate need. And without anticipation, only three months after the tsunami, on 28 March 2005, another lethal earthquake broke in Nias, the West Coast of Aceh. The quake measured 8.7 in magnitude. No tsunami was reported, however the earthquake destroyed 300 homes with 1300 casualties in Nias and Simelue Island (JAMA 2006). In Such a short period Indonesia has suffered two catastrophic disasters.

On The Tsunami

'It was a double storey market. ..people were selling fish and tending their stall during the earthquake came and everybody run downstairs, not long after that the building collapsed to the ground and then the tsunami came followed with a very loud noise. '

Syarifah Mastura
A survivor of tsunami disaster from Uleulhe

<table>
<thead>
<tr>
<th></th>
<th>Aceh</th>
<th>Nias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fatalities</td>
<td>129,775</td>
<td>961</td>
</tr>
<tr>
<td>Missing people</td>
<td>36,786</td>
<td>18</td>
</tr>
<tr>
<td>Internally displaced people</td>
<td>192,055</td>
<td>42,200</td>
</tr>
<tr>
<td>Houses needed</td>
<td>86,000</td>
<td>13,500</td>
</tr>
<tr>
<td>110,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schools damaged or destroyed</td>
<td>2,087</td>
<td>--</td>
</tr>
<tr>
<td>Major health facilities damaged/destroyed</td>
<td>106</td>
<td>16</td>
</tr>
<tr>
<td>Small water sources damaged/destroyed</td>
<td>10,124</td>
<td>--</td>
</tr>
<tr>
<td>Coastal fishing boats lost</td>
<td>4,717</td>
<td></td>
</tr>
<tr>
<td>Hectares of fish ponds destroyed</td>
<td>20,000</td>
<td></td>
</tr>
<tr>
<td>Farmers displaced</td>
<td>60,000</td>
<td></td>
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UNMS and BPH
In July 2005 I arrived in Aceh. Seven months after the disaster; the damage caused was no less surprising. The landscape was barren and flat as far as the eye could see. Fine debris was scattered among the grass that had started to grow above the land that once supported a community. Now, beyond the emptiness, the land spoke of a horrendous tragedy that had hurt so many.

Looking at the Port of Uleulhe, the landscape was bare and the strong wind further reminded me that little was left by the unforgiving wave. The damaged concrete foundations, bricks, flooring and houses suggested that the area was once well populated. Occasionally, atop the remains of house foundations tents were built. Often objects and structures were displaced in obscure areas; boats had landed on roads and above houses. A ship that was previously used as an electric generator in the area of Punge, had last been reported in the ocean, but was brought inland by the tsunami.
Lhok Nga, located near the beach was a popular tourist destination for local and interstate visitors. Now very few houses remain, with the exception of some luxurious homes. The aftermath of the tsunami affected all levels of the economy. The stretch of dry coral reefs along the beach demonstrated how severely the beach had been affected by the tsunami. The water mark was quite high and there was evidence of partial and whole land mass subsidence. Parts of the roads had been cracked and lifted, exposing stone underneath. As well as destruction to the buildings and roads, drainage systems, bridges and levees were ruined.

Although the landscape had been heavily disrupted I was able to travel on a motorbike, though a car would have been difficult. It was extremely confounding to witness these levels of destruction. The shorelines had been pushed many kilometres inland. In this area there had once been an abundance of trees, houses, fishing activities, homes, hotels and beachside houses. The remains of this beautiful place were sparse and I only came to know of its splendour through others.
'The earthquake was so strong.... we cannot stand up. Many has to lay down on the street, helpless and surrender our fate to whatever was going to happen.'

Bunda Suhada
A survivor of tsunami disaster from Lamlagang
Type of damages

The considerable combination of water and earthquake damage was best understood when divided into categories since the combined force of destruction has made the entire region unintelligible. Collapsed parts of buildings, displaced objects, corpses, vehicles, were all jumbled together in the aftermath of the disaster. The areas listed here are based on the damage assessment made by the World Bank, which detailed a comprehensive compilation of affected sectors and the sub-sector (World Bank 2007). Another humanitarian practitioner suggested similarity of experiences in the field (Allen 2003). I chose to combine both of these categories with my field interaction as a macro-view for the design intervention. My objective of this compilation was to define the affected areas, in life, after the tsunami for designer to engage with the topic of disaster.
1. Infrastructure

The most significant physical damage was to the infrastructure of Aceh. These damages disrupted the vital function of the city, region, and the villages. It includes the severance in all levels which disrupt availability, distribution, and usage of product, services, and urgent needs.

**Transportation** includes the facilities and amenities (roads, bridges, land transport, ports, and airports)

**Communication** includes fixed line telephones, cellular, and postal services

**Energy** in form of electrical power and petroleum fuel

**Water and sanitation** includes water supply, sanitation and solid waste management

**Water control** including flood control (embankment, irrigation and coastal protection)

These item hosts many more vital element of product and services that needed repair or complete reconstruction. Infrastructure which most heavily affected was roads, water infrastructure, communication lines, and energy distribution. Since infrastructure is a complex matter and usually consisted of a large network, it affects the service to the public and likely to be long term in effect. This kind of damages needs intervention by the government. In the field of infrastructure, designer could function on a system level in planning and assisting infrastructural product development, or work on individual items of needs, i.e. village electricity.
2. Social

The tsunami has caused great harm to the access of human network and social activities, includes the building that host these activities. This impairment includes the damage to physical and non-physical facilities.

**Housing** includes land ownership (title), homes and their content i.e. furniture

**Education** includes teachers, training, skills, schools, books and stationary

**Health** includes hospitals, polyclinics, doctors, nurses and equipment

**Culture and religion** includes mosques in Aceh and churches in Nias

Social impairment consist of loses of personal belonging and vital engagement to normal live. Social sector that were affected heavily were housing and building such as school building, hospitals, and includes the loss of supporting personnel in each area, i.e. doctor, nurses, and teacher. Help in social sector has been performed with an intervention from outside, such as volunteering aid organizations to assist immediate and short term need such as tents, medicine, and books, while rigorously planning for long term reconstruction. This reconstruction needed to involve the community since social sector are about fulfilling services for the people. ‘Community’ is discussed in here as people both live in the city and the village. Designer could contribute in the identification of need, consultation during planning, and facilitating the realization of projects with a community.
3. Productive Sector

One of the largest impacts of the tsunami was the fall of the economy which manifested from the impairment of the industry and employment of Aceh and Nias. The field of productive sector has been affected on income earning opportunities, credit facilities, labour supply and demand, and market forces (Allen 2003).

**Enterprises** consist of manufacturers, public markets, agro-based industries and commerce

**Agriculture** consists of infrastructure, land, livestock, and equipment

**Fisheries** consist of fishing harbours, brackish water culture, boats, equipment, and production

Intervention needed to reconstruct productivity is the involvement in restoration of product and services at the community level and state level. Designer could help in the facilitating the restoration of previous skill or may contribute with the transfer of appropriate new skill and technology if the community is ready, i.e developing processing tools for harvesting. Designer may also work on strategy such as policy on a planning level.
4. Cross sectoral

This is a category which was connected as an area that comprise of systems and assets which could be tangible or intangible matter. They often function more as a collective resources.

**Environment** includes the coral reefs, mangroves, sea grass, forests, and loss of land use

**Government and administration** includes building, equipment, and personnel of public administration, justice, parliament, and police

**Banking and finance** includes infrastructure (building), loan and deposit

In here, intervention needed is the support of knowledge and management skill in the environmental resources, human resources, and financial resources in the administrative level and the community level. Design could contribute holistic knowledge in resources and integrated management skill, at the same time learning local practices. This could be applied both in the community level and government.

**On the Tsunami**
Aid, intervention, information

One of the greatest disasters of the recent human history has opened the floodgate of generosity and compassion to Aceh. Aid manifested as objects and food, flows in as much as those donation in monetary. The 30 years oppressed region of Aceh that culminates as the disaster suddenly receives a great deal of money which allow projects to be started, community to be rebuild, governance to be reconstruct, and freedom to be restored. The attention in Aceh was given in full and the region is awake from its dormant state of limitation with a total international commitment of $13.6 billion (Stamp 2005).

With the amount of aid surge, aid organization was busy setting up projects all across Aceh. Responsibility grew as the aid organization receives money much more than it used to handle. Organization which used to work on law and justice mission for example suddenly had a surplus in the field of law and justice itself. It had to find ways to translate the aid monies into something useful for the victim of the Tsunami. Many organizations expand their mission to more areas, such as health, livelihood, and most common were housing and shelter.
Projects were established all across Aceh in all the places possible by international organization partnering with local organization. With 400 organizations with plenty of donation money wanting to reconstruct Aceh, the entire province was a crowded house filled with projects. If you could make figure of 400 organizations establishing 2 projects each, that is only 800 projects and many organizations that I visited had four of five areas of contribution, and each area has its own kind of projects.

There was no space for design intervention by itself with that much of projects, especially when housing and shelter, livelihood such as agriculture and fishery, and infrastructure such as road and bridges construction was put as the utmost priority in the reconstruction. Furthermore with the entire financial system, the aid monies has a plan of how it could be spent and has to be spent in a certain amount of timeframe, most of them has two years. In this case, there was no development and idea generation needed. It has more procurement and logistic to solve the problem and answer the needs. There was no space for design.
In the beginning, the aid for Aceh was for an immediate emergency response. This was an extremely urgent task that brought goods and services associated with the rescue of the victims. International intervention started from here. Delivering aid was quite a logistical challenge because the tsunami had lifted roads and airstrips causing many areas to become isolated (Qadir 2005). The affected area was enormous. In addition to logistical problems, many years of conflict within Aceh has caused the population to spread out making it difficult to find survivors. The emergency rescue was laborious and time-consuming because of the scale of destruction.

The first task at hand was saving lives and preventing the outbreak of diseases. Emergency rescues searched for victims and lead people to safety, ensuring they were warm, given food and provided with shelter. Interventions in the case of a disaster are co-ordinated with a responsive mechanism known as Rescue Recovery Reconstruction Rehabilitation (RRRR or 4R). RRRR is a method of responding to the aftermath of a crisis. Each of the phrases describes the type of action and its priority. There are some variations of 4R. Above is an excerpt from the Red Cross activity catalogue.
Sphere Chapter

Although direct action on ground level is effective, there is a method of responding in a disaster situation compiled as an agreement of standard protocol called the Sphere Chapter. The Sphere Chapter has identified the common need of the affected and provides practical applications, whilst maintaining concern for safety and saving lives. Many aid organizations have operated and used the Sphere Chapter as their standard guidance for action in the case of disaster.

The Sphere Chapter has provided a minimum standard for good practices; a reference guide that can be materialized into action in the event of a disaster. An example of Sphere’s knowledge base is it would be able to tell us how many toilets need to be built to facilitate 200 people or how much water is required for a given amount of IDP (Sphere 2004).

As a designer, there is an opportunity to materialize many of Sphere’s concepts by combining them with fieldwork. A set of design requirements could be formed in conjunction with the principles of Sphere to provide a wider range of products and services such as those concerning religious needs, customs, cultural preferences or political limitations. Design for disaster could be the design of products and services required by Sphere standards. For this reason the question we need to ask is, is the purpose of design to fulfill the needs of the user? If so, how should the design be?

Specific Work in Disaster

The second earthquake on the island of Nias occurred only a few months after the Boxing Day Tsunami. Due to the short time between the two tragedies, the recovery programme for Aceh and Nias were organised under the same task force. Below is one of the tables demonstrating the process of reconstructing the areas in 2005 (World Bank 2005).

<table>
<thead>
<tr>
<th>Estimated total need for long-term recovery</th>
<th>Acch</th>
<th>Nias</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total funds pledged for recovery</td>
<td>-</td>
<td>US$5.8 billion</td>
</tr>
<tr>
<td>New homes built as of November</td>
<td>13,225</td>
<td>200</td>
</tr>
<tr>
<td>New homes under construction</td>
<td>16,205</td>
<td>--</td>
</tr>
<tr>
<td>Number of schools that have been rebuilt</td>
<td>331</td>
<td>4</td>
</tr>
<tr>
<td>School enrollment 7-12 yrs</td>
<td>95%</td>
<td>89%</td>
</tr>
<tr>
<td>School enrollment 13-15 yrs</td>
<td>87%</td>
<td>71%</td>
</tr>
<tr>
<td>Major health facilities restored</td>
<td>37</td>
<td>1</td>
</tr>
<tr>
<td>Boats replaced or being built</td>
<td>3,122</td>
<td></td>
</tr>
<tr>
<td>Hectares of fish ponds repaired, back in use</td>
<td>5,000</td>
<td></td>
</tr>
<tr>
<td>Farmers assisted to return</td>
<td>40,000</td>
<td></td>
</tr>
</tbody>
</table>

*The Reconstruction and Rehabilitation Agency (BRR)*
Negotiating the Politics

Located in South East Asia, Indonesia neighbours onto Malaysia, Philippines, Thailand, and Papua New Guinea. Aceh is located at the western tip of Sumatra Island, Indonesia. Bordering the Andaman Sea and Indian Ocean, one of Aceh’s satellite islands is where the first kilometre of Republic of Indonesia begin. The closest economically developed city to Aceh is Medan.

The majority of residents in Aceh are Acehnese with a minority of Chinese and Javanese inhabitants. Bahasa Indonesia is the national language; however Acehnese is most commonly spoken as the first language, with few variations of local dialects. Most Chinese living in Aceh speak Hakka, a Chinese dialect that originated from Southern China. In contrast, Chinese living in Medan primarily speak Hokkian. The city ACEH is colloquially used as an abbreviation of Arabic Chinese European Hindi. In its past Aceh was a central area for trading, which has influenced the diversity of ethnicity in Aceh. The devastated region of Lamno has been known to inhabit Acehnese with blue eyes, fair complexion and light coloured hair.
Aceh is a very distinct province that takes great pride in religion and historical revolution (Reid 2004). On a national map Aceh is also known as Serambi Mekkah or ‘The Courtyard of Mecca’. The religion of Islam has flourished in Aceh with many practising quite seriously, some praying five times a day. Every Friday, without exception, every stores of Aceh must close for two hours to respect those praying at mass. For education, it is common that children be sent away to Islamic boarding schools. In these areas, alcohol and gambling are prohibited. To live in Aceh, it is pertinent that all adhere to and respect the culture and religion of the city. For Acehnese, the Islamic tradition is very important and is practiced in every facet of life, from clothing to finance.

The Acehnese have a strong sense of spirit against oppression. Their strength has been validated by their fierce history of fighting against Dutch colonization and the forming of the GAM (Gerakan Aceh Merdeka/Free Aceh Movement) against the centralised government Republic of Indonesia.

For 30 years the separatist movement was fought with the Indonesian government over the ownership of Aceh. The long-winded dispute has been a conflict paid in blood and fear. Unfortunately the opposition has overwhelming power on the stability and security of Aceh as well as the accessibility of the city, destruction of infrastructure, delivery of health services, education and economy. Not long after the tsunami of December 2004, a peace pact was finally accepted by both parties and has successfully been maintained to this day.

Aceh is not a poor country. The economy is quite robust due to the large supply of natural resources such as oil and gas. Almost half of Aceh’s employment is involved in agriculture, particularly fisheries. The affect of the tsunami in rural areas of Aceh has created great strain on their natural resources.
During my fieldwork, there was the contrast that I could not comprehend, which was seeing the attention of the world pour in to Aceh and the almost immobilized pace of reconstruction. The first year of the reconstruction (2005) the donated funds used was only 10% of the total sum and the remaining figure was rolled over to the year after (in 2006) which again only less spend less than 15% of the total budget of 2006. The pace was too slow compare to the aid given. Despite the attention, eagerness, ability and equipment that I saw, it puzzled me what made the reconstruction did not progress as it should be.

It seems Aceh, there were the clash between many groups of power that were affecting the reconstruction of Aceh. On one side there were the aid organization with the monetary power, on the other side there were also the existing corrupt government that makes the administration complicated, and the Free Aceh Movement which partially owned Aceh that makes the entire reconstruction process highly charged with politics. And it left the IDP or the tsunami victim trapped in the middle of the heat remained to live in the tents and barrack for nearly two years or more.

My interaction with various groups found evidences which made out some of the problems of reconstruction in Aceh. It was political infliction which sprung out from many sides of intervention. One of them was the clash between the Muslim fundamentalist in Aceh with the altruistic missionary aid groups. Aceh was well known as a ‘special’ region in Indonesia that was dedicated for Muslim believers to live their live accordingly, even the law used was Syaria law in addition to Indonesian law. Whoever enter Aceh has to respect this or they were not welcome, or prosecuted. Many charitable aid organizations were quite often sprung out from Christian spirit of giving, which explain many aid organizations were Christian based. A few of the organizations were silently trying to convert the vulnerable survivor of the disaster to Christianity. Along with food, clothes, and medicines, they were given the bible. Some of the donated houses were even build the shape resemble a this religious architecture. And some organization take this chance to build churches in Aceh as one of their donation to this devastated Muslim region. This made the local very furious and protested.

The reconstruction of Aceh could be seen as an international intervention which was too crowded in such a fragile territory with enormous amount of aid money involved. The development was appeared to be rather chaotic and disorganized with that much of political tension. One good side about it was not a violent situations, it was merely about political and economic gain. And the local Acehnese was simply trapped in the middle of the tension with living in the tents that started to leak, lost of family members, and restlessness of no jobs. What I did recognized in that situation was there were many opportunities for grass root and small scale action because the local felt neglected and could not do anything to better the politic and relief situation. However, these opportunities were not easy to be departed of the ground and launched as a community project because the local has came to be dependant on the donation and Cash for Work scheme, which further made worst from a build up of mistrust of the organizations who early on had promised and did not deliver.
Preparation (Jan – Jun ’05)
The idea of going to work in a disaster area started on January of 2005. It was later approved to be supported by RMIT on March. In Melbourne, I began to prepare myself with the subject conditioning and background research, while building network and searching for opportunity to work with aid organization. I have one semester of Research Method which give me the idea of how this project could be explored. This was crucial part as I did not know anything about design in a social context.

Trip and study ( Jul – Aug ’05)
On June, the trip and study began. I went back to my hometown in Borneo (West Kalimantan) in Indonesia to look into travelling to Aceh soon. Going home to prepare the necessary documentation and health check. On July, I felt confident and I left Borneo to Aceh. And began my field research, and to find collaborative projects, internship, and volunteering with the aid organization in Aceh. It did not produce the intended result and to do what I wanted. From this point I had to change my strategy and take whatever comes along. Fortunately an offer came up.

Building Project (Aug ’05 – Jan ’06)
From my hometown, people were donating for Aceh reconstruction too and they were seeking to build school and housing for the displaced. While I have been busy seeking for participation without any definite answer, they offered me to be the West Borneo representative and help out on the construction. I went aboard on this opportunity and take on a mixed role of Site Manager/Assistant Project Manager/ and Procurement and Logistician. This role made me see the overall process of the construction at the same time interacting closely with the field. From the scheduled 4 months, the project faced difficult circumstances and it was completed in 7 months. Even with a large responsibility on the building project I still did not feel that I was doing my design project or related to it. To try to answer this I remain in Aceh after we completed the building project and try to seek my own project.
Part II (Mar ’06 – Feb ’07)

I proclaimed this ‘part II’ as a restart since I have completed one project and I try to start with a new frame of mind. I look into went in to various organization to look into their projects at the same time looking to develop my own projects. There were many site visits and a few discussion with the organization official, but again there were no solid direction of doing my own project. I went out to do independent researches in various fields and find urban issues arise after the tsunami. At this stage the research also lead me to interact closely with the local Acehnese and the IDP, especially fishermen. Time was running out, if I were to take on board and work with the community, it was possible but it may took a long stretch of time. So I decide to return to Melbourne.

Report and reflection (Feb – Dec ’07)

On February 2007 I return to Melbourne with plenty of documents, information, and raw material. I have 12 tapes from my mini DV recording of my journey, 20gb of photograph and some writings from my journal. It was time to produce this material into tangible information, also to produce a reflection, and to extract the learning from the entire journey in Aceh. This document is one of the result of them.
My arrival in Aceh was 7 months after the disaster. The Rescue and Relief stages had passed, so all emergency response and immediate health matters had been attended to. The victims or Internally Displaced People (IDP) had been relocated to a safe environment and taken care of. It was the beginning of the Reconstruction phase. At this time the city was in desperate need of permanent shelter and means of economy (Steinberg 2007). I arrived at a point when talk of the town was on shelter, land rights, cash allowance, jobs and income which were of the most importance. Co-ordination between organizations was a subject of debate, military dominance was still heavy and the political power was still divided. There were feuds all around, with many forms of power seeking control. These areas of conflict were consumed between the Local Government, the National Government, United Nations, Foreign Donor/Organization, the Military, the Police, the Customary/Traditional administration, Local hooligans, and the IDP.

Reaching out to the aid organisation

My arrival in Aceh was 7 months after the disaster. The Rescue and Relief stages had passed, so all emergency response and immediate health matters had been attended to. The victims or Internally Displaced People (IDP) had been relocated to a safe environment and taken care of. It was the beginning of the Reconstruction phase. At this time the city was in desperate need of permanent shelter and means of economy (Steinberg 2007). I arrived at a point when talk of the town was on shelter, land rights, cash allowance, jobs and income which were of the most importance. Co-ordination between organizations was a subject of debate, military dominance was still heavy and the political power was still divided. There were feuds all around, with many forms of power seeking control. These areas of conflict were consumed between the Local Government, the National Government, United Nations, Foreign Donor/Organization, the Military, the Police, the Customary/Traditional administration, Local hooligans, and the IDP.
Located near each other, some organizations were convenient to reach. Although the tsunami appeared to have destroyed a large portion of Aceh, fortunately the urban areas were only partially affected. Many of the houses that had survived were rented as office space. I chose to align myself with NGO of their public service nature (Nafziger 2007), especially foreign NGO, hoping to learn professional engagement with disaster arena. The organization offices were very busy with people moving about quickly, talking on the phone and writing. For the most part I had no contacts, only participating organizations in the 400 list in my dossier. When approaching associations I always asked for the Director of the Head of Mission, when this failed I would work my way down the ladder to the Field Manager or whoever was coordinating field activity. Several organizations were undergoing changes in their leaders or directors at the time of my arrival. On a few occasions I met with the new person in charge. I approached the NGO with the mindset that I could really help them, that I could be beneficial to their work. I kindly asked if I could work for them, but three weeks had passed without any agreement or feedback from my proposal. During this period my confidence was decreasing, I was improving my skills in public relations and staying motivated. Even though I had had little response from aid organizations I was content to be in the area and absorb the work of others. My week ran tight with office visits and I began to feel that I would need to move on.

I did not wish to burden my host family and I considered moving so that I could get access to specific field information. So I returned to the NGO requesting work with a simple exchange of accommodation and internet access for my service. I was so anxious to get straight into work that I didn’t realise that I may have demanded too much too soon. I speculated on the organizations understanding of a designer, maybe they did not see my qualifications as an answer to the urgency of work required; since design does not have a singular affinity to a specific skill or ability such as accounting, plumbing, doctor or managing waste. Further on I decided to venture in a specific area to learn how design can support the process of reconstruction. There were many sectors to choose from; I selected one that I thought had the potential for design intervention. Some of these sectors included shelter, livelihood, water and sanitation, logistic, medical and health, and communication. There were many other areas that handled specific care such as orphan care, disability, poverty, civil society, good governance, culture and language. Aceh was emerging as a development centre for every aspect of life. The new Aceh was intended to be developed inside out. There was an enthusiasm for an improved infrastructure and a betterment of the governance, human resources, and environmental assets. Aceh was going to become a model city.
I was acutely aware that everything in Aceh was going to be completely different to my usual surroundings. To absorb as much information as I could, I began researching initiatives that have shown positive results in regards to the restoration of life in displaced areas. I also investigated projects that have contributed towards regaining function within a city. After the disaster Aceh has become a new environment with alternative methods of operation. To gain an understanding of the system I looked in the workings of aid organisations intending to introduce design as a support in the RRRR (4R) effort. When I arrived in Aceh reconstruction of permanent housing was underway. There were cries of discontent from the IDP who were still living in tents and barracks, 7 months after the fact that huge donation was
injected into the reconstruction. The economy in Aceh was very abnormal due to the constant demand for more supplies. The city looked like an enormous construction site as it slowly began re-building itself. It was very difficult for the aid organisations to explain to the IDP that their houses would not be ready for another two years because comprehensive planning was required.

When I arrived I was determined to support the reconstruction process by establishing a project with an aid organisation. I hoped to collaborate or participate in their projects. However after three weeks of door to door contact with organisations I had not received any positive response. So tired of living in hope, I decided to conduct my own project and began fieldwork using my own methods. I settled on the idea of constructing shelters considering it was their foremost issue in the city. At this time I unexpectedly received and offer to help in the building of schools and houses. I gladly accepted my first offer because I knew it would allow me to do fieldwork. Without realising it, building re-construction later became the source that revealed one of the many roles of the designer in a disaster.

My early difficulties of establishing connections with aid organisations, ironically gave me a greater diversity of interaction. By default, I went out and opened my dialog with anybody who would listen. The contexts of my discussions were varied on many levels; these occurred from street level to state offices. These discussions remind me that the tsunami affected Aceh people of all walks of life and affected basic needs in life.
Through my journey in Melbourne and Aceh I have undergone a complete transformation. Each of my findings throughout the project has built on the previous and has created a great area of reference. Initially I struggled to understand the significance of design in an atypical environment, because I was still viewing industrial design from a traditional perspective. The conventional realm of industrial design would not survive in Aceh, the local market requires essentials for everyday life and they are not often stylized like the consumer products of the western world. What can design achieve in an environment such as this? The question kept circulating in my mind. I was living in hope of finding the answer. Superficially, it seemed that design was not considered necessary in Aceh. However I kept reminding myself that design is driven by a need or a desire and there are many needs in the case of a disaster. In reality, there are many ways in which design can engage in relief efforts; from the provision of water to applying the appropriate roof material. By the end of my project, I realized that I had addressed the needs of the locals on many levels. I engaged myself at the urban level, administrative, rural, political and even national security. However, there was a particular need that could not be denied, that is housing. Housing was the focal point that directed the entire Reconstruction phase. Fieldwork yields a unique experience that requires the support of many trades and has the ability to be enhanced by design. Among the requirements for electricity, fuel, ice and employment, there was also a more peculiar social need for life partners and marriage. The project has opened my eyes to the tragedy of disasters and demonstrated the positive result design can have on such a horrible situation. Not only does design have the capability to improve the delivery of products and services, but it can offer choices and opportunities as well as improving the quality of life. I have learnt that the context for design is as wide and varied as one’s willingness to be involved. The confines of our paradigms dictate what design is and what it can be. This, I did not know before I started my journey.
The challenges of working in Aceh have defined some of the directions I have taken and decisions I have made. One of the greatest challenges for me was adapting to new living conditions. In post-tsunami Aceh, electricity was not an abundant commodity. Electricity was often low in voltage and there were many shutdowns. I found myself resorting to manual approaches for everyday tasks, or sometimes not doing them at all. Reading, writing, watching TV and having a light inside the house all depended on the state of the electricity. Water pumps are necessary in households for bathing, washing, cleaning and cooking. Often I used the water from wells for these activities. Fridges were scarce and those that were working were not used because the voltage could ruin electrical equipment. So meals quickly became take-away for me. To reach outside the confines of the city, communication through internet and land line phones was also difficult. The tsunami washed away phone lines and made internet unavailable in homes so I predominately used a mobile phone for contacting people. The communication issues were quickly supported by initiatives from the local government to divert home phone numbers to CDMA, so that the IDP could keep their phone numbers and remain in contact with loved ones. Although it sounds convenient, phone coverage is largely dependant on the aerial coverage which becomes poorer the further out of the city you are. Because of mobile communication, contacting people quickly becomes an expensive task. Whilst I was living in my host’s home, accessing email was difficult. After some time in Aceh I found an internet café, but once I began working in construction I had little time to email. At this time I began the lengthy activity of banking. In Aceh it can take at least an hour to withdraw money over the counter or a 15 minute queue
at the ATM machine. With the scarcity of fuel, every three days it would take me at least an hour and half to queue for petrol. Although many of the activities and transactions I did were familiar to me, they all took a considerably greater amount of time to complete. On the positive side, the processes involved greater interaction with others.

There was an enormous amount of money involved in the reconstruction of Aceh. Aid organization received much larger donation than other disaster and quickly became responsible to use it. Many organizations even adopt new areas of involvement since there were larger demand from donor. However large, because of the budget, nobody was willing to support my project concepts. The construction process was automated; hardware was purchased and delivered with no indication of product development. With such a large sum of donations, the Aceh reconstruction process became merely a transaction, a conduit of the product & system delivery mechanism.

Despite my intentions to help, support and better the living conditions in Aceh, my identity caused much suspicion. I am Indonesian and of Chinese decent. I was repeatedly warned by concerned family and friends that my colour could become a problem in Aceh. I was also reminded of the many Chinese who fled Aceh out of fear during the times of conflict. I was slightly hesitant about entering Aceh, but I maintained a level mind. As it turned out the majority of Acehnese I encountered were very friendly and helpful. Being Chinese has not disadvantaged my project by any means, but I’m not sure how others felt about my presence. Yes, at times there was conflict on the field, but there was also a great sense of acceptance when I remained clear of my
purpose. I was able to speak Bahasa Indonesia to the locals, however it is preferable to speak Acehnese. Being an individual in Aceh instigated many problems for me. I had a lack of access to information and office facilities. The ‘Cash for Work’ program that was initiated to help the tsunami survivors actually gave the IDP little encouragement to help them rebuild their lives (Collins 2006). Learning from the Chernobyl disaster, this moral challenge is often faced by donor whom became over nurturing by giving too much or too soon (Lahidji 2004) (Lenain 2004). This made it difficult for me to inspire, promote possibilities and exchange constructive ideas on the topic of self-help. It was difficult to promote self-initiation because people often became upset that there was no cash flow to support their efforts to rebuild their life. The thought of waiting for an organisation or government to offer support did not help stimulate individual activity. Having the title of a ‘Designer’ also left people confused of my position. Designers are often assimilated with fashion, style and decoration. Many were unsure of what a designer produced and this often ended most questions. Popular understandings of a designer are irrelevant in an undeveloped area, so the term ‘a designer’ I exchanged for ‘a student’ or ‘a researcher’. 
## Budget Summary

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<th>Item</th>
<th>Frequency</th>
<th>Costs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
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<td>International flight Melbourne - Aceh</td>
<td>2.5</td>
<td>A$ 1230</td>
<td>A$ 3125</td>
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<tr>
<td>Domestic flight Aceh – Borneo or Jakarta</td>
<td>9</td>
<td>A$ 200</td>
<td>A$ 1800</td>
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<td>Motorbike purchase (company)</td>
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<td>Guides and process</td>
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<td><strong>Grand total</strong></td>
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<td><strong>A$ 16775</strong></td>
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This research was partially independent and sponsored. RMIT waived my school fee fully and I depart to Aceh with my own expense. In the beginning, I tried to seek sponsorship from organization but it did not work out. While I was in Aceh, I live in an Acehnese house for two weeks, living two weeks in a family which has not much to give is a big deal. To return the favour, I tried to bought food for the family sometimes, they did not allow me to participate too much on financial side, they refuse and it was not polite to do so. One of the host’s friend become my guide and we travel on his motorbike, feeling that it was part of my journey, I tried to help out on petrol and food as I could in return of the favour.

During the school building project I switch to different set of lifestyle. Renting a room in Aceh’s china town, and the construction company also rent a car for the operation and purchase an operational motorbike for the site. The motorbike was used by the crews to buy food and groceries travel to downtown. I used to the car to travel to both areas split by an hour away travel. I was grateful for this as the road was very dusty and the weather was hot and humid. I was baked a few times riding motorbike and my skin went 4-5 tones darker. I very tanned while I was in Aceh. Often the sun felt painful on the skin.

Gasoline for the car was filled every 2-3 days spending a full tank of 45 litres. Early stage of the school building project, petrol was cheap, about half the price of Melbourne, because of scarcity the government increase the price by 100%. It was then became very expensive for us. We began driving without air conditioning in the car and frequenting both of the construction site to only once a day.

I worked 6-7 days in exchange for food, accommodation, and tons of experience. It actually became stressful for me after a while living in a disaster zone, constantly working and there is very little things to do apart from that. I asked to have a short break of 1-2 weeks after 3 months to go back to my hometown to stretch my leg a little and revive my spirit. It was also an opportunity for me to report the school construction project to the donator and revise construction cost since prices kept increase.

I travel back to Melbourne in May 2006 for the first time, it was nearly one year since I left. I did a GRC on June 2006 and share my findings in Aceh. I travel back to Indonesia to take the project further this to continue the ‘Part II’ restart initiative since I was informed that the West Borneo construction company was bidding to build 400 homes for the IDP. I was in and out of Aceh to help out the administration process for the 400 - 1000 house building project. This bid was charged with organizational politics and internal games. It did not work out at the end.

I packed up from Aceh, help the company to sell the motorbike, wrap up my documentation, and I return to West Borneo to write a report of my field work. Looking back at the cost, I had full support from the construction company from the necessities to conveniences. I had tremendous support from the host family for being kind and trusting to me. And RMIT for the fee waiver.
In the beginning, it was hard to simply just pick something and declare this was what I wanted to do. I did not know what I could do, let alone know what I wanted to do. There were a wide multitude of areas to start from.

Need identification and problem perception was created by making a ‘visual needs catalogue’ as the way to understand the context. During field work in Aceh, I constantly recorded what I saw in photographs everyday as a journal and organize them chronologically. I also wrote a field report when I felt the field visit has something significant such as current issues, stories, achievements, or complaints. Later on the photograph was catalogue and group into separate categories, and within each category there are many small stories, needs, or possible specific projects. The segregation of the categories was born from the ‘sector’ or ‘area of focus’ in which aid organizations participate on throughout the 4R process. I noticed these areas were the main focus, since it was replicated by most organizations in Banda Aceh. I do not know if these areas were created from identification or request from the IDP, but I chose them because I saw some technical or cultural aspect that I see design were able to help. In total, there were 16 categories that I identified, and in my consideration not all of them needed help or intervention. This were the six categories of need in a disaster area a ranked from the most crucial to important: Transport and Logistics, Water and Sanitation, Energy, Shelter, Livelihood, and Waste.
The area of logistics and transport deals with all activity in relation to the transfer of people, goods and services. Aid and emergency relies on effective communication (Tanguy 1999). It is the business of moving something from one place to another, covering the whole process; contracts (deals/agreements), procurement (obtain/purchase) and maintenance. In the logistics of a disaster the destination and consignment must be discussed before selecting a mode of transport. Transportation is contingent on the condition of the terrain and the facilities available. Delivery is usually available through air, sea or land depending on the scale of the goods. Other than emergency cases, day to day transport is involved with the delivery of food, medical equipment, volunteers and personnel. The area of logistics and transport is perhaps the most important concern that makes the Rescue, Relief, Reconstruction, Rehabilitation effort possible (Kovacs 2007).
December 28 of 2004 was a day of gratitude and relief for many Acehnese. On this day many aid organizations and self-initiated groups landed in the disaster area. Packages such as the Family Kit™ (Red Cross) were quickly distributed to victims. The packages consisted of soap, a stove, toothbrushes and clothes to accommodate for five people. Aid workers also delivered tents and supplied water and food. Two days after the disaster had struck, the world had reached Aceh. The matter of transportation and logistical operations were the most crucial element of relief work at that point in time because it connects aid workers and services to the IDP. The skill of landing in a devastated area was once only mastered by the armies.

However, today there are also organizations and private companies that specialize in the consignment of aid goods. The tasks performed by the field of logistics and transportation operate progressively according to needs in disaster work through the RRRR stages. In the beginning, during the Recovery stage, logistics are employed to transport injured victims, doctors, deceased bodies and deliver supplies such as food. Further on, transportation is more concerned with staff mobilization, distribution of food supplies and also the delivery of construction material in a system of warehousing control. For these tasks to operate smoothly there is a considerable amount of management and administration work.
During the emergency phase in Aceh, Australian Police were helping handle and manage the deceased, which went on well into the Relief stage (2R). Identifying the deceased was a difficult and traumatic experience. The exposure to the tsunami made it very hard to identify bodies. The police had to work rapidly because the flesh of the bodies was deteriorating. Because the process was laborious and complicated, bodies were piling up waiting to be identified. The initiative of the Chief Officer in Australia was to send a freezer ship to Aceh to preserve the bodies while identification took place.

Land transport was most commonly used for local distribution of aid material and aid workers. During the emergency phase air pilots located IDP in isolated regions while distributing emergency material. There were too many people in urgent need of attention. Speed was not the only matter, later in the Reconstruction phase air transport were landing in nearby Medan and were then transported by road to Aceh.
Sea transport was handled by the British and Irish Red Cross. I spoke with the British Red Cross manager who told me many stories about their work. I soon realised that logistics was much more than aeroplanes, trucks and ships. When he arrived in Aceh, consignment was retained by the military and he was held in lock-up. The port collaborated with the forces and asked for Rp.2000/ trucks. They tried to seek fault and demand consideration for the release of the shipment. Red Cross did not accept and produced the necessary papers and insisted that it was aid material being transported. After a few days they were released. His story taught me that not everybody valued charity and aid the way I thought.

I spoke with another Red Cross unit, inquiring about problems they were facing. The people who worked in land transportation mentioned that their truck had a low tray which did not allow them to carry many goods and shook the load when driving. The stability of the truck was made worse by the uneven terrain that was damaged by the tsunami. The main problem concerning logistics according to Fauzi, a logistical manager of RC, is the aid distribution to the IDP. It is important that everybody receives and equal amount of supplies. In order to be fair, aid distribution must be performed in front of the IDP and their name must be on a list. The relief in Aceh largely depended on which organisations managed the IDP and determined what type of program they will run to distribute goods. For Red Cross, they assessed beneficiaries, picked up the goods from a warehouse and then distributed them at the barracks by name.

In Pulo Aceh, an island off the coast of Aceh the NGO’s equipment is the only means of transportation between the island and Banda Aceh. Even before the tsunami hit the island, Pulo Aceh had very little supplies. The services on the island were so poor that if a tyre punctured it could not be repaired on the island. Basic supplies such as salt had to be brought from Banda Aceh. After the tsunami washed over the island, the reconstruction of houses in Pulo Aceh was a difficult job due to the lack of supplies. Materials such as sand, bricks, cement, timber and steel had to be transported by boat. Unfortunately halfway through the building process, some of the employees abandoned the project because the materials were too expensive.
Across Banda Aceh, the Aceh Island, there are many things can be ventured. It has plenty of problems, and partially isolated because of the dependency upon supply from Banda Aceh.

Supplying aid and support to Pulo Aceh was a strenuous process because of their dependency on Banda Aceh to provide the materials required. Traveling between villages was difficult because of the steep and rough terrain. There is a considerable need to advance local transportation. I assumed that the rickshaws would satisfy their travel needs because they are so versatile, however the commonly used three-wheel rickshaws could not handle the hilly landscape. The locals would benefit from improved land and water transport on the island to help medical aid. There is only one medical facility on the entire island and the ambulance is held on a boat. When I last visited there was only one ambulance. Aid organizations were researching improved services and facilities so that patients could be readily moved from villages within the island. The matter of logistics and transport is a grand avenue that is quite intricate. Through my research and experience I have discovered that there are many more problems on the field than are written on paper. There is the possibility for development in each of the problems I have witnessed. Some of the more serious issues include the time required for material delivery in the emergency phase, improved storage of the deceased and more efficient process of identification as well as enhancing transport systems.
The cornerstone of delivering aid, giving help, and provide assistance depends on the knowledge and the swiftness of the logistics.
The airport was flooded after the tsunami, now clear and busy transporting international and national worker to Aceh.

Freight of various packages contain medical equipment, food supplies, and cooking equipment.

Engineers, doctors, medical equipment, vehicle, water and food arrive this way early in the disaster period, this is the most important gateway for interstate and foreign aid to come in.
Truck and utility type vehicles in particular are the most active in day to day activity in the disaster area to support the delivery of aid material, construction material, and the increased trading.
Overloading was a common sight in Indonesia, more so in Aceh due to the increase of trades, weak transport regulation, and ignorance of safety.

Negligence in the rush of reconstruction often forgot the human factor.
Almost everything was imported to Aceh, from large scale heavy machineries to arbitrary conveniences.
opposite
An LCT (Landing Craft, Tank) delivering across waters of Aceh. 600,000 metric tones of non-food items was transported for free for 12 months for aid organization.
photograph Big Cat - www.chatterpillar.net

top row
Self-contained modular offices made of a truck container. It has electricity, phone, internet, air-conditioner, tables and shelves.

center row
Broken street sweeper from Turkish Municipality; A Unicef's donated bobcat excavator; Dump truck from NYC park authority.

bottom row
Timber cut to sizes in a saw mill; A large World Food Programme tent for storage; A prefabricated house donated by China (PRC).
on this page and opposite
Various becak (rickshaw) of Banda Aceh style.
Logistical Operation
Basic logistics
Consignment, Contract, Documentation, Warehousing, and Transportation
Water and Sanitation

In the early stages of assisting the tsunami victims there was an abundance of help and support. Medical services included immediate attention in conjunction with medicines, surgery, injections and possibly transportation to more equipped facilities. There were many survivors who were treated for swallowing water (Redwood-Campbell 2006). Medical support was among the best throughout the Aceh relief project. Volunteers provided free services. An important focus in the health field is that of sanitation and the provision of clean water. The NGO had various methods of responding to these issues. Water was either processed on site or brought over from a processing site. The water that was processed on site used numerous filters and technology such as the reverse osmosis system to prepare raw water for drinking. The mosques in Aceh were among the only standing structures after the tsunami. For this reason the water purifying systems were installed in the mosques. Most of the water infrastructure (piping) in the mosques still remains, which allows the water to be processed on site. The water infrastructure was installed in the mosques in Aceh because Muslim religious activities involve a lot of cleaning with water. Before praying Acehnese Muslims wash their feet, hands and face. Most pray five times a day. Mosques also serve as a place for social interaction within the public. It was very comfortable for the locals to combine the mosque with the required water facilities. The clean water is supplied by trucks that refill tanks once every few days. There are few types of tanks fibre, inflatable vinyl or steel corrugated drums.

The individual tanks can hold anywhere between 1000 to 5000 litres. The public water tanks commonly have 6 taps that allow people to collect water in an ordinary jerry can, foldable jerry can (from the NGO) or jerry can with tap (also from the NGO).
Need Identification and Problem Perception
Depending on the area, ground water was excellent, salty or in-between. Due to the large inflow of sea water, mud and effluent, restoration of the water supply was necessary. The damages made by the tsunami varied with distance. Some harm included increased salinity of the soil and water as well as the destruction of water distribution apparatus. The well in Kajhu Village for example can be restored, but it needs to be bored much deeper; anywhere between 30 -150 meters. In comparison, a normal well in a non-affected area could be hand shoveled 3-5 meters deep to provide clean water.

Aceh has few sources that supply water; the municipal, ground water and rain. There were many households that had limited means of water supply. The majority of Acehnese rely on ground water from the local well because it is believed to be the most economical form of harvesting water.
(Plummer 2008). The current condition of water is saline because of the extent of travel made by the tsunami wave. (Clasen 2005) While in Aceh I visited a barracks that are now had no choice but to buy their water. An aid organization built a sea water processing centre but the plumbing to distribute the water was not thought through. So unfortunately water is not supplied to the barracks. The substandard distribution of water is similar to that of electricity in Aceh.

A particular issue I discovered is the accessibility of water to the elderly. When walking through the barracks I spoke with a woman who had rheumatoid arthritis. Her mobility was very poor so her neighbour carried water from the tank so she could pray everyday. Most people had no choice but to accept the slightly bearable conditions they were living under while waiting up to two years for permanent housing (Suahasil 2007). Improved strategies could be developed to ease everyday tasks.

For the community temporarily living in barracks, water is particularly important to cultural rituals. In Acehnese culture it is imperative to have access to water throughout the day. Additionally, water is required for drinking, bathing, washing, and cleaning. Bathing in Asia is significantly different practice to that of the western world. The use of water reservoir and pail is one of the most common methods. Water is scooped from the reservoir and poured over body, arguably consume less water than showering and less electricity as required for a conventional shower.

Gampong Jawa has had numerous houses built post-tsunami. In early 2007, many house constructions had been completed. I spoke with a woman who was living in Gampong Jawa and pregnant at the time. She told me that even though the majority of houses were built, there was no available water distribution so she still had to pay for water. She has a square tank that holds approximately 1000

Need Identification and Problem Perception
litres and was donated by the French Red Cross. She shares the tank with her neighbour and it usually lasts them three days use. The water is used for cooking and drinking as well as construction. The lady was renting her house and although she had a toilet there was no septic tank so she had to walk to the sea to use the toilet. To wash her clothes and dishes she used water from the well. She expressed her disappointment that the water was salty and yellowish in colour and stained her clothes after washing.

**Strategy on water**

I have heard that the distribution of water from aid organizations (by means of trucks) has been reduced. The distribution is expected to terminate sooner rather than later. It would be extremely beneficial to help the newly settled residents generate an independent source of water and make it easy to obtain. Two possible sources of water may include ground water and rain water reserves. Generally water is not scarce in Aceh, but quality can differ from place to place. Water from wells can vary, some produce a very good quality of water which is clear and does not have an odor. Other areas have a high level of salinity and retain some soil and a slight odor in the water. Basic filtration systems could solve this problem.
After the disaster, water was contaminated, supply was broken, and the inflow of sea water makes ground water saline.
Filtered - safe drinking water was provided in public places such as mosque. The water was either processed on site or delivered by truck.
top row
Water collection point with ordinary twist-faucet.

bottom row
Water collection point with an injection-like faucet.
Inflatable storage and rigid water storage in domestic and public places.
on this page and opposite
Various water well, tanks, pockets, drums, and tub.
Potable water after the tsunami was abundant, but you have to pick it up yourself.

Asan
Tsunami survivor
When you drill to the depth of 150m, the water will shoot out, and you don’t need a pump.

Usman
Geuchik Kajhu Village
on this page

Majority Acehnese harvest their own water from the well, use pumps, and take water using pail. Concrete rings were pre-made for well construction and septic tank.
Processing and Storing
top row
Water desalination processing center donated by Kingdom of Kuwait.

middle row
An Indonesian NGO made these reverse osmosis technology to process raw water to be potable.

bottom row
Gravity water tank in a government office; A kettle to boil and store water; Gallons of commercial drinking water
My concern is that often a well is build next to a septic tank which is not sealed and does not have waste water treatment.

Anna K. Stechert and Steph Hornett
MCK is the term used to describe Mandi, Cuci, Kakus, a facility for Bathing, Washing, and Toilet. These three activity often performed at the same place.
This toilets were meant to be a temporary toilets. Some were built with proper plumbing, others were simply built by the river or sea.
Most of the houses were swept flat to the ground, what was left are often the floors and the toilet only.

Squat toilet are the most commonly used in this part of the world.
Five times a day prayer makes it necessary for water to be available

Wudhu = Islamic ritual of cleaning parts of body before prayer
A communal place for wudhu which was the only structure left from a mosque.

Resident of barrack taking wudhu.
Disposal of personal waste was done through the use of septic tank. Commonly in Indonesia, there weren’t any facility from the council or government to handle this matter.
on this page
Various septic tank construction. The orange tank was actually a water tank used as a septic tank, buried on the ground with sand, as the building was only a temporary structure.

opposite
Fibre glass septic tank made by Dian Desa, a Javanese NGO
Drainage and Water Disposal
Having a drainage was quite a luxury, in most cases water were disposed to the ground.

Drainage is a necessity, some work their way around it. The poorer you are the worse it get, and health become at risk.

opposite
Trolley used as a temporary wash basin on the construction site.

on this page
Drainage is a necessity, some work their way around it. The poorer you are the worse it get, and health become at risk.
Drying clothes under the sun. It dries fast as the weather is very hot.

Majority of Acehnese washed their clothes with hand. Some families uses washing machines, but sometimes there were no electricity.
When I arrived in Aceh 6 months after the tsunami, I realised the extraordinary impact energy has on our lives. Energy sums up the vital requirements of powering everyday activity. Many aspects of life operate on the constant supply of electricity, fuel and gas. The power generated is invisible, we only know when things function or they don’t.
A sudden loss of electricity can devastate daily actions, not limited to the household but to a myriad of activities such as those in the workforce, hospitals and social sectors. In modern-day life electricity underlies many regular activities and furthers our dependence on it.

On the basic end of the scale, without electricity we could be left in a room of darkness. Without the supply of electricity many household appliances are obsolete. The use of a TV, fridge or computer would become a challenge. In daily life, the absence of electricity could compromise our ability to see and read past dusk. The prolonged absence of electricity on a widespread level could disrupt communication (Global Education 2006) and jeopardize safety. The wave of the tsunami swept the South East coast at a reported speed of 80 km/h giving it an extraordinary destruction force. The wave lifted permanent structures, pulled trees from their roots, ruined houses and displaced extremely heavy objects. During this time it was not surprising that electric poles were also ripped from the ground.

Electricity
The provision of electricity in Aceh like most cities in Indonesia relies on the centralized distribution of electricity from the government power plant, PLN (national electric company). Indonesia is known for its use of coal and diesel to generate electricity. Although the power plant in Aceh survived the tsunami, their service was heavily disrupted by the dislocated poles and disconnected electricity. In some areas the poles remained but the power lines were snapped off, thus disrupting the electricity to homes.

The absence of electricity in Acehnese households affected many activities. Seeing and reading became challenges and food storage was futile. Cooking was done manually; an electric rice cooker was replaced with a steamer heated by kerosene or a wood fire. Since most Acehnese purchase food daily, the fridge was not of grave concern. Leftover food was usually kept in a ventilated cupboard.

Although this may seem daunting, the IDP that lived in the barracks did not experience these limitations. The barracks are essentially a compound for living that has been built to provide the basic necessities. The location of the barracks was specifically chosen to allow adequate access to utilities such as power lines proximity.

Without electricity, water had to be retrieved from the well because the water pumps could not operate. Ordinarily the water pump would withdraw water from the well and deliver it to the household
reservoir to be used for bathing, cleaning dishes, washing clothes, drinking and cooking. A year after the tsunami, the area that I was staying in experienced a black out up to twice a week, each a few hours long but could sometimes go through the whole night. The difficulties that affected me were the lack of lighting, not being able to charge my mobile phone and turn on a fan when it was hot.

Aside from the frequent blackouts, the electricity was usually supplied at a low voltage. For example, an electrical current that is supposed to run at 220 volt would be delivered at 180 volt. Presumably this happens when the total usage of electricity exceeds its capacity. Demand for electricity within a neighborhood can differ depending on the level of reconstruction. A particular line of electrical distribution has to cater for additional households because the previous line is not available anymore. Low voltage is recognized when lights suddenly become dim. Sometimes the light is so dim that the two pieces of wire within the globe are glowing very faintly. In these conditions the damages to electrical devices are apparent. Fans suddenly begin to rev slower and then speed up when the current becomes stronger. The host family I lived with repaired their fridge 8 times before giving up. When I went to visit the IDP in the barracks, I noticed one of the families in Kajhu had installed a voltage regulator for their fridge. At times, electrical devices would not work at all, in which case it was best to turn them off.

Generators and batteries were the most commonly used back-ups when black-outs occurred. In some areas it was the only available source. In places where electricity could not be reached by cable, the residents relied on a generator. The consumption differed depending on the capacity of the generator. The locals in Lhoong said that their generator consumes 20 litres of gasoline in 12 hours. During the Reconstruction phase in 2005, there was a 200% nationwide increase in fuel cost. This situation had detrimental impacts on financial and environmental issues because it cost
three times as much as regular electricity that is distributed from the government. For low and middle range incomes, this was an unaffordable cost for daily living. As a result, the livelihood in Lhoong, a sub-district in Aceh, had diminished. A group of fisherman in Lhoong had been paying up to twice the city price for ice blocks since the fuel increase. The city of Aceh is one hour away so the transportation of ice blocks required a considerable amount of petrol. The power lines in this village were destroyed by the tsunami and there weren’t enough facilities to store the fish. So fish were sold quickly, cooked or preserved in salt. For lighting, they siphoned electricity from a food stall owner from the hours of 6.30 until midnight.

The remoteness of villages heavily affected their source of power. Pulo Aceh, a two hour boat ride from the city was only connected to electricity through a generator that was switched on in the afternoon so the village could share the power. During day time, the generator was turned on when necessary, such as when an NGO officer visited. The electricity was used to access an office computer, TV and a fan. To keep them informed with current news a truck battery was used to power the communication radio. There was no landline phone on the island and only specific spots received mobile phone coverage.
The need for electricity is paramount in order to maintain a standard of living. In the case of post-disaster construction new means of supplying the public an industry must be deliberated. The use of a multiple source energy generator may be the solution. This would integrate the available electricity with daily activities (Teske 2007). By alternating resources, they may begin to support each other. I will discuss the possibilities for Aceh that can be incorporated into the reconstruction processes for energy infrastructure in a disaster area.

Solar energy

Solar powered energy could be very advantageous in Aceh because of the very strong sun they experience throughout the day. The sun rises around 5 am and sets at approximately 6.30 pm, with slight variations throughout the year. The sun can be very intense and damaging since there are few buildings and trees to shade the locals. The sunrays are usually unobstructed especially in the middle of the day. As a non-scientific comparison, the average strength of the sun is comparable to the hottest day of summer in Melbourne. In setup, solar powered hardware is quite large, heavy and space consuming. However in the long term they have the capacity to provide free electricity. I calculated the electrical requirements for a village I was working at; I concluded that it was still uneconomical to generate electricity by solar power for an existing industry, however it could sufficiently provide enough electricity for household use.
In Kajhu, the village where I was working, the strong gusts of wind have been a constant challenge when working on the field. It would shape your hair to one side if you stayed in the same spot all day. When we built the worker’s barrack; a wooden plywood structure with a corrugated zinc roof, it often scared the workers at night because the wind blew so strongly. The wind continuously shook the barracks, creating a lot of noise. Many of us thought that one day the wind would carry our barracks away. Consequently, we hammered more nails and attached more plywood for reinforcement, hoping the structure would hold. Unfortunately only two months later it was September, the beginning of the monsoon season. One particular day at 2 o’clock it was mildly showering so everybody stood inside the barrack on their coffee break. Suddenly the strong wind passed through our site, pulling the nails out of the roof and taking half the roof away. On a snap, all of the men rushed out of the barracks and one of the construction workers Sanihi, ran in the wrong direction and was chased by the flying corrugated roof. Fortunately the roof landed ahead of him otherwise it could have been fatal.

In addition to the strong winds, the tsunami cleared a vast stretch of land resulting in a free flowing stream of area without any barriers. The wind can be strongly felt in the Kajhu area, which is a district that previously had 13,000 people but now has less than 2000 residents. The blowing wind in Kajhu could make you very tired after a day’s work.

Another venture of energy diversification is the use of wind power. In a disaster, particularly the reconstruction phase, there is a need for energy supply to support the building construction related activities such as sand mining, supplying water, operating saw mill machinery and casting bricks. The area consumed by wind energy can extend to sectors such as health, sanitation and livelihood. Wind is an abundant and destructive force in Aceh, converting it to energy could be a positive response.
Gas

During the reconstruction phase, there was a nationwide scarcity of all kinds of liquid fuel; diesel, gasoline, and kerosene. It is hard to accept that Indonesia, an exporter of oil, could experience a problem such as this. There was a ration of fuel for each province, city, district and petrol station. However, for future use an alternative fuel may be necessary.

North Aceh is known for its supply of gas and was unaffected by the tsunami (Athukorala 2005). LPG was running as usual. Gas in Aceh is an untapped resource that has the potential to be utilised as an alternative to liquid fuel.

Examples of gas alternatives are apparent in the western world and could be implemented in Aceh. It would prove vitally beneficial if public transport in Aceh was run on gas. The scarcity of kerosene has affected the income of fishermen in Aceh. Most boats are powered by a mixture of kerosene or diesel fuel. Unfortunately during the fuel crisis fishermen simply stayed home. I have speculated whether gas could be implemented in boats similar to its automotive use. LPG for a boat could potentially operate on interchangeable tanks that could be stored when offshore.

In Aceh household use of gas was only utilised by medium income earners. There are many residents simply relying on kerosene stoves and the very low income earners use wood fires. Similar stoves are also used by food vendors and mobile food vendors. If gas is made available to families and small industries, the dependency on liquid fuel will decrease. There is room for development in the vicinity of gas facilities and improving the availability for low income earners.
There is the potential for gas to be made available to industries, great and small. For instance, brick making consumes vast quantities of timber, particularly terracotta bricks. The fire used to solidify the bricks can run between four days to a week of 24 hour use. In the redevelopment of Aceh gas could be used to power the kiln and at the same time it would produce a better flame resulting in an improvement in the quality of the bricks.
Strategy for Energy Reconstruction

The need to run a vehicle, electricity to turn on lights or to go out to sea at dark is part of moving on with life. The scarcity of fuel ended when the government raised the price of fuel. The price of goods and services hiked respectively. The queues for petrol, kerosene and diesel subsided but this did not mean the energy consumption decreased. Reconstruction continues in Aceh and life will eventually return to normal. The energy levels in Aceh continually rise as more people are slowly moving into permanent houses. Aceh is starting to come alive again. It was very slow in the beginning but confidence has settled as political stability has endured (Gaillarda 2007).

The dependency on a centralized supply of electricity has a disadvantage particularly in the event of a tsunami. The central electrical
generator was untouched by the wave and it functions alone. However it lacks the ability to supply many households and the industry of Aceh. The supply of energy should be separated into smaller generators to say the least. One should aim for an independent energy supply to maximize every available source as well as running independently in the event of the destruction of a neighboring supply system.

The greater the distribution of the system, the better each will run (Teske 2007). This is likely to put responsibility and consciousness into the usage of energy. Smaller systems will rely on the responsibility of the user to maintain a constant usage. Each system should be able to sustain itself; it should not rely on another system to support it. A smaller system that is distributed widely would need to have an integrated energy supply, by using available energy sources. The utilization of fossil fuel should not be eliminated, however it is wise to optimize available sources.

I am proposing an integrated system which will require at least one component of a natural energy source such as solar power, wind or water in conjunction with a fossil fuel generator such as coal or diesel. What if every 20 households were part of a small-independent and integrated energy system? It may increase the responsibility of the users or could be designed to operate with minimal attention.

The distribution of electricity in Aceh has had many problems in the past and greater issues since the tsunami disaster. There are dormant forces that have an enormous potential when utilized properly. Although it is wise to aim for an independent source of electricity, Aceh may not be prepared for this as yet. It is a difficult task, but the technology is available to answer our needs.

On a lighter note: I have been pondering about society’s dependency on electricity, after I met a lady that has lived without electricity for 24 years, by choice. Initially electricity was not available, so she learnt to live without it. Consequently it has been quite a blessing for her. During the day sunlight is relied upon for most activities, so lighting has not been a problem. In the night they have dinner by the fire. Life for them is actually quite rewarding as it is, without the entertainment of a TV or Computer. They learn to tell stories, share thoughts and communicate well. They value human relationships and cherish nature. They have pets that follow them around in daily life; a pony, horse, couple of ducks, dogs, and a goat which provides entertainment and drama for them. After all, they said the absence of electricity has given them a rich and happy life.
Sudden blackout, low voltage, and scheduled shutdowns were part of life after the Tsunami.
Installation of lighting were done simply. The survivor do the best with the resources that they have. In some areas, there were no power lines and it cost too much to run electricity with generator, so they use oil lamp.
How the local manage electrical distribution
above

Distribution of electricity often made with minimum resources, often it appeared careless and neglecting safety although some appear quite smart. Since electricity fluctuates a lot, for those that can afford it, stabilizer was used to prevent wild fluctuation of currents.
We just leave our jerry can here, along with the other. Maybe there will be supply of kerosene tomorrow.

Machmud

Acehnese waiting in oil depot
Kerosene stove is commonly used compared to gas stove. During the nationwide scarcity period, it was difficult to obtain kerosene fuel. Domestic cooking was disrupted, so does food vendor and hawker.
Cooking in Aceh is usually done by female, especially at home. Male also cook, especially when it is a large scale cooking, and involve butchering.
opposite
Aceh favourite dish, *Kare Kambing*, made of goat and plenty of local spices.

on this page
Various local cooking method, some use woodfire used not as a fancy way but it was the only thing available, large scale cooking tend to be done by men, food vendor’s stove made of old drum and fry flat on top, banana fritter vendor with big flame.
Apart from petrol station, there are small stalls on the roadside that sell fuel as retail. Prices is slightly higher but it is convenient and faster.
Availability of petroleum fuel variety such as gasoline, diesel, and kerosene affects the fluency of transportation, industry, and livelihood. Vehicle could not run, workshop could not operate machinery, fishermen could not start their boat.
Shelter, Housing, and Dwellings

The matter above the head

Shelters were built as emergency refuges as soon as the victims were able to be reached, rescued, and assisted. In the early stages of the disaster, shelters were built from donated tents or self-initiated makeshift structures. The tents were supplied by the UN and other aid organizations. The makeshift shelters were made from materials that remained after the tsunami. The IDP often helped each other build their makeshift. Human creativity can be seen at its best when producing makeshift items.
Tents were often organized in a compound for further care. Occasionally, in a vastly empty area you could see an individual tent spread across the barren landscape. Many IDP set their tents up on the foundations of their destroyed homes. This was done for emotionally reasons as well as to protect the ownership of their land. Land rights were a sensitive matter since most documents were swept away by the tsunami or the owner was missing. To signify ownership the Acehnese survivors marked the remains of their property with their name.
Nearly two years after the tsunami, Aceh was finally cleared of tents. Aceh’s recovery rate after the tsunami was very slow with more than 200,000 homes lost and more than half a million displaced. The immediate requirements were shelters, barracks and tents for the survivors. Barracks are essentially a shared living compound complete with shared amenities. Usually a main building is divided into many smaller rooms that house one family in each room. Unfortunately locals had to live in tents and barracks for more than a year while awaiting permanent residence. The reconstruction phase confronts many challenges including inter-agency coordination, planning and mapping, land rights, obtaining material, skilled worker shortage, appropriate construction methods, control and access to areas, transportation, and many other basic issues. These issues I found were often complex and interrelated.
Development and hollow victory

After the one year memorial of the tsunami, the current acting governor declared that residents would be moved out of tents into more dignified standards of living. After all, the tents were meant to be a short term solution to the living conditions. A new housing plan was proposed, which is known as the Transitional Living Structure (TLS). TLS in short is a plywood-clad shelter built on a lightweight steel structure. It has a very fast construction rate; six men could build one TLS in a day. These type of housing is different from an emergency shelter. Transitional-type housing is more durable and allow livelihood to be carried out while their permanent house is built (Lagorio 1990).

The aim of the housing and shelter reconstruction is to provide a permanent residence for the IDP. A house that is sturdy and safe to withstand the weather, that is suitable to the Acehnese culture and their way of life and structurally sound in the event of earthquake, but in the reality it tooks too long to built while locals were left confused with no house and no jobs for a long period of time. In February 2007, two years after tsunami, I revisited
the fisherman community in Uleulhe. The area had changed quite
dramatically within a year. The previously empty field was filled with
new houses and the barracks I had once visited still remained. A lot
of the barracks were empty, which was a positive sign that survivors
had moved into permanent residences. I spoke with a lady who was
still living in the barracks even though her house had been built. She
explained that she would rather stay in the barracks because her
new home did not have electricity or water and she ‘can not stand
the dark’. Clearly erecting a house is not the complete solution to the
local’s needs (Age 2005).

The donations gathered for tsunami relief in South East Asia were
everous and were continually increasing (Brown 2006). The
government, NGO and the private sectors participated in this
action and the volunteer organizations took part in
the construction phase finally making permanent
housing of the utmost priority. The battle
between the economy and construction continues,
some NGO representatives have evaluated their
scheme by switching to a turn key system for faster
results and less problems. With so many problems arising,
should new minds be invited to deliberate? Should fewer
organizations of power be making important decisions?
What if jobs given to the IDP rather than aid organizations?
New ideas and challenges

In building construction not only new ideas, concepts and plans need to be discussed. Techniques and methods of construction required in the concept stage have to be understood and executed locally. For instance a new building has an added feature of being able to withstand earthquakes and tsunamis; the building must be able to be built by a local contractor. In some cases pre-fabricated houses may be a commendable solution. In Kajhu Village we built a school using local construction methods. Next to our site an Australian company was constructing a building tightly fitted houses that comply with disaster resistance Australian standards. The progress of the building was very slow because the project went through 3 contractors before it was finally decided to change the design. Local contractors are not equipped for the advancement of Australian building methods. This is not to comment that either method is superior, but improvements need to be thoroughly thought out before being executed.

Building requires specific types of materials and processing methods. Materials used in construction may included timber, steel, concrete, sand, soil, water, stones, bricks, ceramic, cabling, lighting and paint. Building also entails the use of electricity, gasoline, diesel and concrete mixers. Are there other techniques that require low technology and can easily be taught?

Sustainability is one of the philosophies that are seeking an application in disaster areas. Sustainability is a viable practice for an area stricken by natural disasters. An aid organization that was building a few thousand houses previously bought bricks because they produced a faster result. Further into the construction process they began training local IDP to make bricks themselves. Initially they only produced 10% of what they could obtain and naturally the construction process was much slower. However, they gave the locals skill empowerment by using available financial aid and training them in a new area. Very few companies are still applying sustainability principles because it is time consuming and generally not cost effective in the short term. Or was it simply because not much organization want to use community approach in the reconstruction?
Building is an activity that involves many skilled workers and requires numerous quantities of materials. In Indonesia, a standard building is built using bricks and concrete. In their construction culture, a specific material, process and types of tools are required. For instance it is accepted knowledge that bricks and concrete are used to make durable, strong structures. Locals have agreed on this standard and their description of a good, solid house is in conjunction with these materials. In the reconstruction stage there is room to reshape the generalisations that hold strong among the local residents. Other materials that visually appear less stable are similarly durable and local residents can be educated of this i.e. pre-fabricated houses that have been donated by China which have not been widely accepted by the Acehnese people.

Local choice
Near Kajhu there is a village that is renowned for brick making. The production of mud bricks in this village sustains the local’s livelihood. The tsunami almost destroyed the entire village, leaving the survivors to live in barracks. Due to a large demand for construction materials, a local NGO representative sponsored the residents to rebuild their brick factory, complete with a kiln. The NGO representative sponsored Rp 70,000,000 for each operator which is the equivalent of AUS $10,000. There are many aspects of this story that can be learnt from. Instead of donating money to new residencies for the village, a large fund was invested into a business that will continually help the wealth of the village. The donation can be considered a smart investment that ensures the long-term success of the village. However there is an environmental implication of the brick making business. Mud bricks are traditionally wood fired and require four loads of 8m3 of wood fire to produce 10,000 – 20,000 bricks. To build a house approximately 6,000 bricks are needed, which totals a considerable amount of bricks when 200,000 houses are being built. Making such a large quantity of bricks requires a lot of timber, which in turn sacrifices many forests in Aceh.
Strategy for Housing Reconstruction

It came to my attention that there is a significant quantity and type of material needed to build a house. The excavation and transportation of materials use a lot of energy and time. To actually assemble a conventional house, tools and materials such as hammers, saws, nails, glue, ceramic cutters, trolleys, pails, screwdrivers, nylon strings, hoses and drills are necessary. What came to my mind is that the process could be more efficient. Either using an approach that proposes a completely new method of construction or improving current techniques could benefit the overall process of construction. To begin, small improvements in each process would support the overall result. For instance stronger moulds for casting foundations that are flexible so they can be re-used throughout the project.

It goes without saying that the philosophy of environmental sustainability should continue to evolve and advance many facets of life. Renewable agricultural materials such as hemp, weed, bamboo, straw and grass could be utilized more readily. Developing alternative energies for excavation, production, transport and construction may prove more economical in building construction. Also consider reducing the number of parts and gain material independence i.e. wall construction does not depend on the readiness of window frame or door frame (refer to The Building Project document – Site Story Should it be wood?).

Introducing sustainability into the local capacity can participate in long-lasting construction. A company called Emergency Architects, taught IDP how to build their own homes. It was a slow process but it meant that the local residents have the knowledge base to help others and re-build in the event of future disasters. Lafarge Cement + Atlas Logistics, were unhappy with the slow production of bricks once they began teaching locals how to produce their own. However given time, Lafarge Cement + Atlas Logistics recovered and production picked up speed. Indeed more instructive action such as this is need since there were undoubtedly many unemployed IDP.
We live in this barrack for more than 1 year, the remembrance of 1 year Tsunami was celebrated here. Organization keep coming back and did a survey, but we never get our house. Other villages has been developed.
I think they forget about us.

Wawan
Fisherman
Tents and Makeshift
on this page

Early on the tsunami, tent and makeshift shelter were scattered like flags. All kinds of shapes and colours were built across Aceh in areas fortunate enough able to be reached by aid organization.
Debris, found objects, parts of other buildings, anything that can be salvaged were used to build a shelter or extend their tents.
Barrack is a temporary living compound where the displaced live together. Usually a village or a sub-district share a barrack. Families were separated by units or rooms. There are standard facility such as electricity and water. Many aspects of their life were dependant of the NGO, such as food, health, and jobs.
TLS (Transitional Living Shelter) by Red Cross, a temporary shelter developed to move the displaced out of tents. After exhausting 1.5 years the 10,000 displaced still live in tents, many were leaking and started to fall apart. TLS were built as a temporary shelter for living up to 2 years while residents wait for their permanent (concrete) house.
on this page and opposite

Semi permanent house developed by IOM/OIM (International Organization of Migration), built by local contractors. These houses is built quite like a Meccano kit. Parts were pre-made and transported to the location, and assembled on site. Parts were mostly made out of concrete and fastened with nuts and bolts hold by brackets, the wall was made using gypsum board, and the door made of plywood.
Prioritizing the minority of Chinese descent in Aceh, the Taiwanese Buddhist NGO purchase an entirely new land and built thousands of new home for the displaced.
Bearing light weight only, facade’s columns were made of concrete-filled PVC pipe. Building 5000 houses, it has its own integrated manufacturing unit that produces parts like window frame, paving block, gypsum ornament, and PVC columns onsite. They even raised their own vegetation. Tsu-Zhi Village is build like a real estate dwellings.
Acehnese that has a land were taught to be a contractor; chose the design and manage their subsidized construction cost, material, and labor.
A partnership with local organization, Uplink - JUB (Jaringan Udeep Beusaree) initiated a self managed construction. Imported, shipped, and delivered to the site, the wall was composed of a material similar to those of wooden flooring. Adopting local architecture using stilts, this house is a permanent house that were built on site.
Aid housing suggested by BRR (Badan Rekonstruksi dan Rehabilitasi, or the National Agency of Rehabilitation and built by local and national contractors.
on this page

Various aid housing by different organization, among them Acehnese political party - PKS, Badan Rekostruksi Rehabilitasi, Turkish NGO, CARE, Uplink - JUB, and German GITEC
Cement, sand, gravel, and stone are natural resources that need an excavation and transportation. Terra cotta brick produced by combining clay and sand, and fired in the kiln traditionally for at least four days and nights. Good timber needs a strong tree, often time an old tree. It needs to be cut to sizes and transported. Steel is not local. It involved mining and smelting, and it is heavy to transport.
After installing tiles for 2 days (12 hours each day), you felt so sore that you just don't want to wake up...
But you have to.

Yus
Worker from West Borneo
Among the myriad of things needed to build a house, these are some of it. Buckets of paint; Window frame and door; Paving block; Fence, Concrete block for drainage; Power point; Wash basin; and Well.
Livelihood

The level of salinity and mud deposit has negatively affected the yield and soil condition in the agriculture area. Surface conditions after the tsunami left the coast damaged as well as displaced boats and fishing amenities.
Problems after disaster

Income generation
Disasters like a tsunami destroy most of the infrastructure including the mechanism of economy (World Bank 2007). Many people, industries and jobs were taken away with the tsunami. Some survivors became depressed and introverted whilst others sought relief and revived their spirits. The journey of moving on often reaches a standstill where one asks themselves, what now? Many seek a new activity in their life, for most income is the main priority. Locals hope to restore their ability to earn money by taking available jobs and most are glad for the distraction. ‘It is boring being a refugee,’ commented an IDP who recently became a food stall owner. Most Achenese are eager to resume daily life, some do this by raising chickens, selling coconuts, becoming middlemen for timber and construction materials, opening coffee shops or even driving cars for the NGO. There were also some who had unfortunately fallen on their hopes that the government would give them cash allowances. The program ‘Cash For Work’ (Collins 2006) shifts the traditional morals of participation; helping each other and willingness out of social consciousness. There is a decline of traditional cultural practice called kerja bakti which is about working towards common goals although volunteers are not paid. I heard many of the displaced utter ‘what they can do’. There is a definite desire among the community to do something, of what they are not sure., but they wanted to

Industry
Semen Andalas, is a well known cement factory in Aceh. It was partially affected by the tsunami but has become fully operational thanks to the support of Lafarge, a French NGO. Aside from cement, Aceh is known for their production of paper and gas, which are among the highest produce in Indonesia (Rochaini 2004). Before the tsunami, the soil in Aceh was very fertile and produced
many crops. Illicit trades of marijuana exist between Aceh and the rest of the nation. Under Indonesian jurisdiction marijuana is highly illegal. The cousin plant of marijuana, abaca (hemp) could grow quite fertile in Aceh and could possibly be an alternative to produce a wide range of alternative materials such as medicines, paper and clothing.

**Food security**

While in Banda Aceh, I came across the village chief of one district in Pulo Aceh. We were both on a boat heading towards the island. I noticed he had a few bags of groceries, of which I could see chillies and dried fish. He told me that he had to buy his groceries from Band Aceh in fact all basic supplies came from the city. I realised that life in Pulo Aceh is far from secure and heavily dependent on produce from the mainland. Pulo Aceh’s growing dependency on Banda Aceh has resulted in many people leaving the island. In conversation I commented that surely they do grow some produce for themselves, since I saw people drying nutmeg on my first visit. Tojir, an environmentalist, replied “It’s not enough for everyday consumption, and there is no continuation in supply.” Tojir said that chillies are as culturally important as salt, but residents of Pulo Aceh cannot get chillies everyday, usually every few weeks. Aside from the livelihood of the residents of Pulo Aceh, they face greater problems because the island cannot
New possibilities

Home Industry
Many locals have become restless and need an activity or program to help them generate an income as well as to make them feel useful. Home industry was one of the attempts made by the NGO to help boost the lives of the Acehnese. In Ulelhe domestic industries have begun to flourish with skills such as traditional cake making, sewing and fish production like Presto (pressure cooked fish). During my stay in Aceh I visited the Aceh Reconstruction Fair. I saw many opportunities for the domestic industry to be amplified. The technology involved in the domestic industry would be appropriate for a developing country.

Tourism and niche products
Fortunately the tourism industry has recently taken off, with hotels and air flights fully booked. In addition the hospitality industry has started to rebuild itself. Souvenir stores have attracted many tourists who wish to take apart of Aceh home with them. Traditional Acehnese stitching is very elaborate and is supported by tourists. There are many more products that can be produced from the traditional Acehnese heritage. Although Acehnese are not intrinsically strong in craft when compared to the Balinese, they still have a great sense of pride in their culture and produces.

Agricultural, farming, and fishery technology
There is great potential in the field of fisheries and estate crops. In Pulo Aceh, I saw a row of octopi being dried similarly to how clothes are dried. The locals eat fish, octopi and other sea produce either fresh or salted and dried. Developing a drying system for the seafood could help the locals produce greater quantities. During my observations I started to see the possibilities in the area of agricultural produce. Whether during the planting, harvesting or processing stages, design development and sustainability could be implemented.
Coconut produce
Tojir suggested that ‘nata de coco’ could be produced from Pulo Aceh. This means many parts of the coconut plant can be used; the shell, root, trunk, leaves and oil such as Virgin Coconut Oil (VCO, a therapeutic supplement). Luckily there is a wide market for coconut so work in this area is underway. Various technologies could be applied to the development of coconut extracts.

Woman’s activities
There are many women who find themselves bored, with little to do. When I visited Pulo Aceh the majority of women were sitting around, looking unamused. The need to occupy some women opens up many possibilities in the way of constructive activities and skills that can be taught.
Craft and hand made objects
Acehnese crafter are usually makers of utilitarian objects such as vessel, baskets, and fishing tools. They were not many, even before the disaster. These skill is getting rare and diminishing, similar in some other parts of Indonesia, as modern imports is cheaper and more attractive, traditional objects were left behind in their sales. The other side of this phenomenon is that the survival of craft is left only for a dependant necessity needs such as fishing lead that fisherman depends on. Some of this skill is translated into fashion or artistic tapestry such as dresses, burqa, and cleric hats.

Small and medium enterprise
There are cabinet makers, timber dresser for construction needs, tailoring service, welding, hand car wash, and water filtering service.
Hospitality
These are mostly coffee shop and food stalls which many IDPs turn to as a business after the disaster.

Micro enterprises
These are micro trade of services and goods. They are usually offer singular services or products, with the exception of the mini convenience store. These are supposed to be mobile, but many has found permanence and stayed in one spot. Among those are gasoline stall, tire punctures service, mini convenience store, and shoe and sandal repair, there are even SMS stall by the use of someone’s mobile phone while wait to receive a reply.
Majority of Acehnese make a living from sea commodity. They are passionate about it. The tsunami destroys their boats, engines, nets, and ice factory.
Local produce of fishery: fish, oyster and octopus. Some price doubled since the increase of petrol and the apparently changing sea condition and yield.
Salination and mud deposit from the wave affected the soil condition and the yield severely.
above
Timber dressing workshop for door and window frame, put together by skill matching of the displaced and three months team work training. Subsidized by Church World Services.
Welding; Sewing; *Doorsmeer* (Dutch for car wash) were the Small-Medium Enterprises initiated by Forum Bangun Aceh (FBA) which gives micro credit to small to medium sized merchants and service oriented business.

Presto fish (a pressure-cook fish) on a vacuum pack; Tuna jerky and tuna floss. Product diversification initiative to empower women in this seafood-rich region; vacuum packaging was new to the region.
Fuel kiosk sells gasoline, diesel, kerosene on the roadside, usually catering motorbike, rickshaw, and nearby household stove.

**opposite page**

_tukang jam_ = watch repair

_kedei rokok_ = cigarette kiosk, a convenience stall which sell drinks, cigarettes, candies, occasionally newspaper.

_tukang sol sepatu_ = shoe repairer, also repair sandals occasionally bags and suitcases
Originally mobile, food vendor often find permanent place or a partnership with coffee shop which sell drinks only.
top row
Sugar cane vendor often setup in the morning and sell until afternoon before *Maghrib* (an afternoon prayer after sunset), one in particular is setup at the back of his ute; and Fresh coconut juice stall.

bottom row
Fried crab noodle is one of the local favourite; Filtered water shop is quite common business in Aceh, where some still doubt the quality of the water processed by the NGO for drinking; Coffee is the local favourite; dark and sweet coffee is served here. It is common for business is discussed in a coffee shop, or simply passing time.
above

A mobile mixed servicer. The owner repair sewing machine, and seems to have service to engrave name onto spoon and plates
top row
Jamu (a tonic herbal drink) on a bike; Unidentified hawker on becak; Fish monger on a motorbike, the seller will clean the fish for you.

center row
Unidentified utility becak; Jamu seller on the bike (back view); Bakery hawker on foot.

bottom row
Fish monger; Tire repairer for two wheeler and three wheele; Bakery hawker.
opposite page
Wood charcoal

on this page
All products made from coconut tree. Broom, brush, vessel and cup, and mat
Utilitarian Crafter
on this page and opposite

Although craft is not Acehnese forte, among few were the Acehnese craftswomen who make utilitarian objects such as cooking pot, container, and fishing lead. This skill is quickly diminishing by both modernization and also lost of the skilled practitioner during the tsunami.
A row of personalized donation box on the site where a floating electric generator landed on top of houses. Apart from that, this area was swept quite severely by the tsunami. This generator is now a monument frequently visited by local and tourist.

Beggars is rare in Aceh, often it is only because of disability, which are very disadvantaged and marginalized.
Waste and Dust

My early recognition of post-tsunami Indonesia was the amount of waste generated. What was once the personal belongings of the Acehnese have now become waste. In many of the areas I visited the land was barren and empty with only debris of mortar and bricks left by the wave. Survivors tried to salvage bricks and sell them for a small fraction of their original price. Occasionally I saw people hammering the left over pieces of concrete trying to recover reinforcement steel, so that is could be sold at the recycling depot. After the tsunami, Aceh became a massive wasteland. In addition to the debris, the destruction left a significant amount of fine dust particles (Byleveld 2005).

Problems of waste and what has been done with it

There would not be any immediate impacts of the waste if it were removed before it decomposed, however the quantity of waste is equal to 20 years of Aceh’s production. To quantify the waste, the debris was equal to three football fields long, three football fields wide and three stories high (UNDP 2005). With such an enormous amount of waste there was not enough space for landfill to contain it all (UNEP 2005). The waves of the tsunami displaced objects of all sizes; houses, boats, ships and cars just to name a few. Removal of the displaced objects faced many challenges. On the road to Lhok Nga, there was a ship and a tanker with a gap between them just big enough to fit a car through. Both vehicles were steel vessels and extremely heavy. In some instances gigantic objects such as these were left as a monument to remember the tragedy that took place.
Some displaced objects were extremely large. Removing the damaged vessels became a unique task for Titan Marine Salvage, who specialise in shifting such objects. The photo above shows the sheer size of the vessels that were blocking a main road. Underneath the heavy vessels, an inflatable pocket was placed and filled with air to lift them away from the road. The inflatable pocket could then be dragged with the object above it.

Possibilities
During a field visit to Ulelhe, the port of Banda Aceh had been closed. I heard some clanking noises behind me and turned around to see an excavator on the shore scooping up the bank and unloading it into nearby dump trucks. It was described to me that the machine was retrieving the tsunami waste that had been left there temporarily while the city was being cleaned up. Early initiatives to recycle waste were started by the UNDP. Concrete rubble and bricks were used to fill holes in the roads. Materials were sorted, timber was reused for housing and cabinet making and plastic, wire and steel were sold to Medan.

On the main road of Banda Aceh, I saw a group of people that were causing the traffic to slow down. I could see a small group of people scattered on the island in the middle of the road. I soon realised that the group was a troop of men that were performing a sequence of jobs on the road. The first three men were the ‘dry sweepers’, who swept and shovelled the pile of dust into a trolley. Following them, two men marched behind with a hose to the road and brushed while a man with a shovel worked in between the two groups. If there was stubborn dirt or hardened debris on the tarmac, the man with the shovel scrapped it off. Slowly following behind the men was a water truck, supplying water for the street cleaners.

Which strategy
Waste is a raw material. Skill and income generation initiatives can be applied to waste. The early initiatives were to clear up and get rid of the waste so there would not be any health risks. The problem was handled so that the waste was effectively removed and provided employment for a period of time. However, Aceh’s economy has been declining. A recycling facility in Aceh could be advantageous to the city as appose to selling the reclaimed material elsewhere. In one particular recycling depot where the segregation of waste occurs, 10 tons of metals are salvaged at an approximate profit of A$1700 every three days. The recycled materials have been used in the reconstruction, but not yet in the development of the community. So far recycled timbers have been reused by trimming the damaged parts and cutting to size to make cabinets and furniture for schools. The operation ran similar to that of a factory, except it was performed with the help of members of community.

Dust strategy
The street cleaning in Aceh was by far the most thorough I saw in all of Indonesia. The Turkish
The Project/ the process

Retrieving early Tsunami waste from the sea

A pile of tree trunks from early tsunami

Segregated timber recovered from the disaster, ready to be re-processed
Segregation in Department of Parks and Sanitation

Left:
Corrugated zinc

Right: Reinforcement steel rod from housing
flag on the water trucks indicated that the program was developed by the Turkish Municipality. The most inspiring scene in Aceh was watching all the rickshaws on the road. In terms of transport, rickshaws are the most abundant because of their cost and the flexibility of their form. Because construction will continue for many years to come, dust in the air will persist despite the efforts of the municipality to sweep and clean the roads daily. The Acehnese rickshaw is inspired by a motorbike or bicycle and for that reason they are very efficient in fuel consumption.
At the segregation depot – weighing collection.”

Crushed concrete used to fill holes on the road.”
Need Identification and Problem Perception

Top left: Scavenging material at the landfill center
Top center: Damaged vehicle left on the roadside
Bottom left: Making school furniture from recovered timber
Bottom center: Ready to use fence made from recycled timber

Top: Composting from market food waste – YUDA organization
Bottom: Speeding the composting by covering the processed waste
Problems with dust
The street of Aceh were quite challenging for motorbike since the air was laden with dust. The road was also being rebuilt. Most of the new road stays as gravel for some period of time. The pace of reconstruction has demand even more delivery of building materials all across the city and suburbs. Trucks became a common sight on the road. These trucks mobilize vast quantity of bricks, concrete blocks, sands, cement, soil, stones, rocks. This condition was especially felt when the wind blows or when a vehicle passes by. The dust has also become a new challenge in living after the tsunami. A few reason of the increase of this air pollution came from the mud brought along by the wave, dries off and became fine particle which flew with the air. Furthermore, Aceh was surrounded by construction activity. and timber everyday. This constant mobilization of building materials combined with debris might have distributed fine particle and debris that cause visual disturbance for the motorist and respiratory problems for people that live around. Houses that were doubtful were knocked down. Bricks, concrete blocks, sands, cement, soil, stones, and timber are a common sight on the road. Living in Aceh is like living inside a massive construction site. The dust from the construction material has contributed more to the overall air quality.

Additional disturbance for other motorist was caused by ignorance. Dump trucks and common tucks was a common sight in the map of Aceh reconstruction. This vehicle often carried building material with only a superficial cover on its top. Often times building material fly off from the back of the truck. I had travelled behind a convoy of three dump trucks carrying gravel. The gravel was spitting out unexpectedly and it shattered the windshield our vehicle.
What has been done with street dust

Helmet with front face cover increase in sales. The dust could be unbearable for a regular motor user. It was not only affecting the motorist, for the merchants as well. Products they sell easily get dusty, even in a day. and for those who own shop right in front of busy street, they like to wet the road a little by splashing water frequently on the street in front of their shop

On the main road of Banda Aceh, I saw a group of people on the roadside causing the traffic to slow down. Faintly at first, I saw a small group of people scattered on the road divider. This troop of men appear to perform a sequence of jobs on the roads, the first three men were the ‘dry sweepers’, they sweep and shovel the pile of dust to a trolley. Following them, two men march behind with hose to the street and brush while a man with the shovel toggle in between these two groups, if there was stubborn dirt or hardened stuff on the tarmac, he scrapped it off. Marching behind slowly was a water truck, which supplied water for these street cleaners.

By far, the street cleaning was the most thorough street cleaning effort that I had seen in Indonesia. I spotted Turkish flag on the water trucks, so I know it is a program developed by Turkish Municipality. My inspired moment came from watching the culture of Aceh that uses a lot of rickshaw. The road of Aceh was rendered by rickshaw, a transport which was abundant and available at the most flexible form. Since the reconstruction will continue for a few years, dusty air will persist despite the municipal effort to sweep and clean the road daily. The combination of the rickshaw and street cleaner was possible to clean more roads and improve space management in traffic. The Acehnese rickshaw itself derived from a motorbike or bicycle which makes it very efficient in fuel consumption compare to a four wheeler. However, the development of the road sweeping transport was not as necessary as to further take action in investigation in ways of reducing dust as a health hazard.
The debris produced from the earthquake and the tsunami was equal to 20 years of waste.

UNDP reports
A massive comparison to the road, a tugboat and a barge stranded in the middle of the road on the way to Lhok Nga.

A floating electric generator; A whole house with the foundation; A barge with a new kiosk built underneath.
opposite page
Salvaged from the debris, these reinforcement steel is collected to be sold to smelting factory in a nearby city, Medan.

top row
At the segregation depot nearby the city. Pile of computer parts; A pool full of mineral water bottle; Two worker weighting packaged plastic cups and bottle

center row
A pile of truck tanker at the landfill center in Keudah; Scavenger in Uleulhe saving up his found steel rod; A few pile of timber and logs dig from the water. These were disposed to the sea during early clearing of city area.

bottom row
Smaller chunk of debris is used to layer road surface temporarily; A pile of reinforced steel only kept by the Department of Parks and Sanitation; A large pile of timber reclimed from disaster waste. It has been sorted according to size.
opposite page
Water container was distributed during the emergency response, it is now a herb planter.

top row
Reclaimed timber turn into table and chairs for school built by aid organization; Another product from scrap wood are fences for new plants.

center row
Local organization YDUA, beneficiary of Austcare recycle market waste from mainly vegetable into organic fertilizer.

bottom row
Rice sack used for packaging clay bricks to be carried over to Pulo Aceh by boat; Rubbles from building were plentiful though still in the very small amount being re-used, among them is as a road filler, mixing aggregate for road constuction, and to mark one’s territory.
There isn’t any major problems in domestic waste, what may be appropriate is a knowledge on the possible use of waste.
Water and sanitation (Watsan) was one of the key areas to receive much attention in Aceh post-tsunami. This type of bin can be carried away by a truck.

Segregation did not work as organic and non-organic bins receive indiscriminate waste.

Sugarcane waste, after juicing, this fibrous material will go to disposal.

Various local bins. The most preferred is the straw basket which came from fruit delivery. Another popular bin is made from half of a steel drum since waste can be incinerated on spot.
Indonesia in general did not have a proper waste management, and awareness of proper disposal was not part of daily concern yet. Moreover in Aceh which area has debris scattered across town.
Causes
Debris, dry mud, construction material particles created dust that were easily blown by the wind, especially now without much barrier, the wind is also much stronger.
We swept the floor twice a day, and it was still dusty.

Asan
Tsunami survivor

There are street sweepers during the day cleaning the city street, it helps, but barely enough. The streets heading to tsunami-affected areas were usually much worse. Having a high volume of construction trucks, the road was often a dusty ride, affecting motorist and shop owners’ merchandise. One cafe owner splashed buckets of water to the road to reduce dust in front of his store.
In the night, a troop of street cleaner swept, brushed, and sprayed the main road of Banda Aceh, manually.

Emulating the all in one street sweeping machine commonly used in western countries, a water truck with three to four personnel performing an integrated task in street cleaning.
The world outpour of donation for the Acehnese stirred the course of development to be much larger than intended since the scale of the destruction awakens world’s attention. I found high ideals were once existed which stumble upon politics and later fall short and found no other way but to express itself just as a standard or even poor humanitarian effort (in comparison between enormous attention - worldwide donation with the result achieved). Actually in Aceh, there was no short of goodwill, in fact it might have been the clash between good intention that wanted to improve everything versus the old-opportunist which operate from a mindset of commission, corruption, and under table deals. I was not sure that the aid organization aware of this or simply had no choice but to comply, since it was the only way to get across the aid-money, material, product, and services for the survivor. Since half the aid were better than none.

The Role of Aid Organization

Aid organizations were the extension hand of the world donation to the Banda Aceh. Mostly were genuine humanitarian efforts that landed on the disaster site and started to carry on their specific role, such as emergency food, health, shelter, kids, etc. Later on more aid organizations began entered Aceh and the earlier one also shifted to a more specific mission such as civil rights, orphan care, or logistics for example. It was soon realized that there were only so much aid and donation that can be spent on these specific areas while there were much more aid money available, additionally the money has to be spent since the donator often demand results and often request accountability of their donation.

So, aid organizations expanded their aid mission based on what was needed and the current problems that they found. For example of this practice, I found aid organization that specialized on civil rights and psycho-social health started to open up projects in housing and water sanitation too.

However added responsibility appeared to be noble, the downfall was although many of these organizations tried their best and put their mission ahead based on their ideals they often not experienced in these additional areas or projects out of their usual scope. It was often encounter unexpected problems that were difficult for them to handle. I agree that aid organization can be ‘open’ without any specialized areas and operate based on needs and field demand, the difficulty was that such complex situation (post conflict – post disaster) did required different approach altogether and past experience does not necessarily provide the best solution, but innovation on the ground and utilizing what was available might give rise to faster recovery. Such example was shown by Emergency Architects from Australia which went to the tsunami zone and trained the IDP to build their own home, resulting locals able to build their own and even take up a new profession as a builder for others. Aid is power, and the authority of aid still caught heavily in politics. Who should spent the money and how it should be spent still carry out by the ‘giver’ or the board elected by the giver. Dissemination of skill which geared towards community benefit may have constructed the key success of EA, but the dissolution of authority to decide could also made the aid mission more genuine; in which is harder to do because it is also ‘less to do’ from the giver side, allowing beneficiaries (the community) to do what they want to do. If it is donated, Naomi Klein said, “It’s their money anyway.”. The dissolution and dissemination of skill and decision could be applied not only on the village level, but also to municipal and state level, i.e. to reconstruct better governance. It depends on them; after the aim of Aid is: an assistance, help, or support for the less able.
Aceh case of development was stuck on intricate bureaucracy, too much focused on housing, and in my opinion there were too many hands involved. Understandably, housing became most needed as it is something solid to hold on to by the IDP after every each of their belonging were swept away, often not even a pictures of their family members or certificate of land rights were possessed. At the same time the process of building one house is relatively easy as old Acehnese often did so by building a structure next, behind, and around the main house (parents’ house) on the same acre of land; building for many people is difficult and requires mammoth-like effort. Material for one house is reasonable, one could calculate this and fit into a few trucks and that is all. It became much more complicated when 500 houses is needed, or 5000, Aceh was building over 200,000 houses. Where to obtain this much of material, the skilled person to build these houses, and when to start? That was the major if is not the largest obstacle of housing re-construction in Aceh.

To execute a plan to build houses as aid product for the IDP in fact were the start of the reconstruction problem. Locals were put to tents and barracks to wait. While survey and planning was carried out, there was not much for the locals to do. Jobs were scarce and economy was down. They were bored and desperate to rebuild their lives while others were contracted to rebuild their lives for them. What if they were taught to plan, to choose, and to build? I saw only few village committee were elected and involved in the planning process, and that was that’s all the jobs available. The rest of the active IDP was trying to find something to do such as taking a job as a rickshaw driver, middleman for construction material, opening food stall or coffee shop, and the inactive IDP was comfortably choosing unemployment since the aid food allowed them to survive and relied their livelihood from donation. This was the case of too much expert having jobs and making decision that should have been done by the Acehnese themselves. Aid could function better to build houses and other needs together with the local survivor.
Design in the disaster zone at its heart was an altruistic mission to help with the knowledge of design for the betterment of any aspect of life. In my case, I soon attempt to attach to an aid organization to have a better access of the field, data, officials, and communities. Design as an aid project met an obstacle than just to work on the problems created by the tsunami. It was the underlying politics that governs the recovery - reconstruction – rehabilitation process. My reality on the disaster zone was at that time it was hard to start a project with the aid organization but in the field there were many problems that waiting to be handled. All of the problems looked so overwhelming. The stretch of ruined land was massive and locals were restless made to wait for the plan to be carried out, for their boat to be built, for their houses to be reconstructed while in the mean time given food subsidy. There were very low will to start something since they were made to assume their capacity were futile and it should be left to the expert to decide (consider 400 organizations fly in to help them out and months of subsidy). Many reach out their hand to ask for donation as it was their nature. Acehnese was not like this before. This was made by the aid organization kindly provide everything for them such as food, training, healthcare, house, allowance, jobs, etc.

There was a need to do something at the same time too many people nationally and internationally make themselves available to do it. “It was suddenly sexy to go to Aceh” an aid worker says. The Acehnese at that time was not needed to rebuild their own region, many were considered lazy and un-responsible which simply caused by the politic of aid which move most of the responsibility away from them. In short, IDP in Aceh was marginalized from international aid movement. Such case did not happen in the case of a village in Indonesia where four engineers went to live with rural area (Magsaysay 1983). They found out the village had water difficulty, the local villagers spent hours per day gathering little water from distant source. They constructed a simple project using gravity to channel water from the source with bamboo. This was all done by four engineers (‘the expert’ whom were at that time university students in Gajah Mada University) and the whole village. It could be a mess if too much skilled person involved, and the community goal was imposed by development expert.
In the beginning, design/industrial design project in disaster was an attempt to help the community. Right now I know I have approached a wrong side of the scale in my Aceh’s project. At that time I know it was very hard to get people up (the IDP) to do something for themselves, yet at the same time I did not realize decision, jobs, money, planning, and design were not in the hand of the IDP. All I see was lots of aid organizations and thousands of projects sprang out across Aceh in which I wish to participate on. It was difficult for design to function as a project for community since the dominant problems were the politics of power and disaster at that time has been expressed as an economy of employment, material, product, and services transfer in the name of reconstructing Aceh. The role of design in a disaster needs research, sharing ideas/goals since inception, and the materialization of goals together with the beneficiaries (community). There were too much politics; too much money involved, too many party involved, too much bureaucracy for design to function properly. In this sense my project can be offered as a way to re-look at the function of aid/organizations in development. Design in Aceh was limited at the same time had to express in a new form. I took on whatever participation available and document almost everything, observing current practices, the failure – problems – success, and hearing and listening to the communities. Design in a context of Aceh’ disaster was part design journalism and part action research. That was the least that was possible to do, documenting for better action in the future. Design at that time was limited to a survey and problems finding to come up with a framework for other designer to work with aid in other disaster. One thing still left was how to carry forth humanitarian purpose of design to overcome disadvantageous political situation?
Re-constructing my action

This project undergo a few phase of transformation. I began my Masters in 2005. The first few months were utilized to develop my methodology, planning, research, public relations and searching for a fieldwork partner. I had a plan of how this project would be. I made a decision to travel to Aceh after volunteering in Melbourne proved unsuccessful. I decided to approach from a different place, into the disaster zone. I travel to Aceh and approach big organization for the reason of security and professionalism. It also did not work.

At that time, I drew a few conclusions that change the structure of my project. I could not work with the organization (NGO) because they had too much money. Territory has also been marked for specific NGO, and the Reconstruction map has been chartered for specific organization intervention to regulate 400 organizations working in the zone. There was no space for independent intervention, let alone research and development for design. At that point, there was no way of doing product design. All their hardware were coming from overseas; the machinery from China, America, Europe, and Japan. Materials were shipped from nearby country such as Australia, New Zealand, and other province of Indonesia. There were no product or technology development after disaster, but there were tremendous amount of imports and logistical operation in Aceh to answer to the need of 504,518 tsunami displaced in Aceh.

Since I was establishing contact with the aid organization, I did not have any far-reaching consultation with the community. But my interaction with the city and the local Acehnese give sense that the city was completely dependent on foreign aid, there was not much motivation to do without. Community perception was stumbled upon financial limitation. I was often asked for money when I go into the community. It makes me sunk deeper into the thought that it would take a tremendous amount of energy and financial means if I want to make my Aceh project as a community project.

Seeing the circumstances that did not turn out as I expected, it leave me with the choice of get involved with any project that comes along or go back to Melbourne and made my project theoretical or hypothetical. I preferred the first choice and I began to accept the disaster and the needs as it was.
Fortunately, an offer came along not from a foreign organization, but from a construction company for me to help out in a construction of schools and houses in Aceh. I was asked since they need a representative in Aceh. I get on board to the construction project. So, my project started to happen.

I accepted the project and I soon became completely involved. It was an arduous project that experienced ongoing challenges. Within seven months, we successfully completed two projects in separate locations. We built two primary schools, one kindergarten and eight on-site teachers’ housing that was completed in early 2006. Afterwards I continued to stay in Aceh after the building was handed over. I was hoping to engage in fieldwork once again and establish my own project. I did a lot of independent research by going straight to the field and engaging with the issues the community was facing. Aid organizations finally began to open their doors to me and I had an opportunity to develop my project. I found myself trying to restart the project by altering my approach in various areas right up until the end of my journey. I remained in close contact with Aceh for 2 years. I concluded my results in Aceh and decided to return to Melbourne to compile my learning into the document you are reading now.

My project in Aceh is comprised of a series of documents that I compiled from my travel journal, newspaper clipping, photograph, video recording, and audio recording. I have four documents that construct my project. A design methodology called Design for Disaster (D4D), a photo documentation that I compiled as a Visual Needs Catalogue, two schools and houses building project, and a video of my Aceh journey.
The Project Design

1. Design for Disaster (D4D)

Departing from the field of normal realm of Industrial Design to the field of disaster zone as a post graduate was courageous, different, and difficult. The step to make the project as ‘a project’ faced many challenges and many trials which failed. However, there were also successes after many attempts. From the disaster zone, there was also projects started by the aid organization which gave lesson of different approaches needed if similar situation occur.

I saw an opportunity for different design intervention in a future disaster. The lineage of designer mainly designing product and services for the disaster affected could be improved by a perspective and methodology offered by D4D. This was the gist of my journey in Aceh which could be used by designers which has initiated interest for working in/for a disaster, or other practitioners in the humanitarian field.
2. The Building Project

While I was seeking work with the NGO, a private company in West Borneo was chosen to represent the province’s charitable efforts in the reconstruction of Aceh. I am originally from West Borneo and I was asked if I wanted to help their project in the field of building construction. Their project was to build schools for the tsunami victims. Although it seemed peculiar to be involved in construction, I agreed. I hoped that the construction work would bring me closer to the field and at the same time allow me to gather experience to later conduct my own project.

The tsunami coupled with an earthquake in 2004 in South East Asia, has destroyed a large portion of the population. Habitation was damaged on all levels and infrastructure damaged to varying degrees. In two separate villages we built schools and housing for the teachers. In Kajhu, some 11,000 people were killed now only 2,000 people displaced. In this area we built a school (722m2) and a kindergarten and a few homes for the teachers. An hour outside of Banda Aceh, IDP were located in a region called Jantho. Jantho is a mountainous area where we also built a school (1200m2) and housing for the teachers.
3. Visual Needs Catalogue:

During my fieldwork in Aceh I took many photos to document my experiences and findings. Throughout the fieldwork I interacted with a variety of areas some of which I revisited many times. The Visual Needs Catalogue is a means of telling stories about the tsunami and its influence on Aceh. The visual document is intended to communicate a point of view as well as sharing my observations. I wanted my records to be as comprehensive as possible so I tried capturing as much as I could. The archive includes a few thousand photos. There were many significant objects, moments and events that influenced my journey through Aceh and can only be represented through photographs. I also intended this archive to be used for further studies, because my findings are the outer shell of a disaster that can be applied to other contexts. I segregated the photographs into categories that can be quickly found, many of the chapters show problems that were awaiting solutions. The objective of the archive is to be viewed as an entry point for designing in the context of a disaster. However it is your decision to make what you will of the document.
Being a single person in a new land, everything I saw I wanted to capture to show others. In the beginning I did not know what was happening around me but I knew that I had to record it and share it with others for further study. Recording and taking photographs became a juggling act and many times I would have a camera in both hands. I often wished I had a team with me so that recording could have been done more thoroughly. The 400 organisations in Aceh had created many projects, each offering different solutions. Unfortunately some projects caused more problems than they solved. Some successes were superficial or even hollow. It was very difficult to keep track of the many projects taking place. The Video project delivers a story about design intervention in a disaster area for the purpose of studying and comparing with the Visual Needs Catalogue. The Video talks about the journey, its experiences and design searching for meaning and realisation.
The Approach and Method of D4D

The growing global toll of disasters, according to data collected by Munich Re Group. Source: Munich Re Group (2005).

http://sciencepolicy.colorado.edu/admin/publication_files/resource-2449-2006.02.pdf
Disaster reality and D4D

Executing design in an area affected by disaster can be a very complicated and traumatic experience. It could be difficult and we may often have to rely on our ability to relate to the situation in order to achieve any single purpose. It is most likely that the situation will include death, pain and suffering as well as the post-tragedy distress of re-building the area. The problem is also now dealing with a situation of extreme loss and people facing a new life that is now non-functional.

Disaster in reality is not only what it seems, not only are we dealing with a harsh situation, and extreme losses that have occurred. There are also current actions which start to unfold which are not revealed to public often because it is unclear of what is happening beyond the mess of a disaster. However altruistic and contributing, a disaster is not always what it appears to be.

Post-disaster practice is often filled with dirty bureaucratic practices in application. The loss of ability in supporting basic living and the ensuing helplessness in economy and torn governance after a shock has made people lose control of their lives, therefore putting them in a position where they accept any proposition offered (Klein 2007) or worse, letting themselves be coerced into it. In this fragile period, injustices often happen before the survivors realize it. After the tsunami, In Sri Lanka, the beach heads which host a community of fisherman were now taken over for privatization and auctioned for resort hotels. In Aceh, the beach heads are now controlled by the military because there was a power vacuum after the catastrophe.

Disaster in many cases is good for the rich; it is in general good for business. Access to natural resources and reconstruction of national infrastructure is a sought after booty both by national governments and external donor countries, as in Timor’s oil and the Halliburton contracts in reconstruction in Iraq. Disaster and the process of reconstruction often do not favour the affected but instead generate a massive opportunity for the re-constructor (Klein 2007). The cost of intervention is often over priced and with questionable benefit for the poor. The donated state-of-the-art saltwater conversion plant in Aceh was not able to be operated because local government does not have the funds for the operational cost, consequently IDP cannot move out of the barracks to their new permanent home because there weren’t any water supply.
Disaster is often filled with corruption and financial feuds. Apart from the involuntary relocation, spread across Aceh is now thousands of aid houses, small in size and low in quality. Process to bid for infrastructure projects and housing was rendered with middlemen and often openly practices nepotism and collusion, which produced a nearly two year for thousands of IDP to stay in their weather battered tents. The cost for botched negotiation and ‘buying-in’ to the opportunity in re-construction of infrastructure and housing often cause delay, furthermore, the percentage of the contract value was given to the ‘seller’ (and middlemen) which in turn motivate the contractor to reduce the quality to match the price. At the end, the local to accept much less than what was intended. Much needed construction material; sand, rocks, timber, soil, are the produce of natural resources and quarry which is often controlled by the military which makes profit from illegal logging and the mining. Transportation services by sea faces challenges from the port authority which demand bribe for container filled with aid material. Truck carrying new timber must contribute some amount of money to the law enforcer post

These situations constitute the context of design in a disaster. The problems originated from the disaster and what was has been done which makes it worse although seemingly better the situation. Current strategy and many other attempts have served as a model of reconstruction that does not work. Disaster will not stop on the last hit and we cannot use current ways of handling disaster; it is costly, takes too long, susceptible to malpractices. Therefore there is an urgency to take a different look of design for a disaster. Design and designer are likely to encounter the above situation in a disaster apart from a product-service-system challenge. Design for Disaster (D4D) is an action to direct the reconstruction back to the survivor and to bring back justice.
Context of practice

In a disaster there are two methods for implementing change. The difference between the two processes of labour is the location. It depends on whether design is applied **outside the disaster zone** or **inside the disaster zone**. Working outside the zone is when design is performed away from the disaster field or much longer after a disaster occurred. Working inside the disaster zone means a designer goes into a disaster zone, establish projects, and the realization of the design right inside a disaster zone. The involvement is so much richer when working inside the zone, such as interacting with real situation while contributing to the betterment of others lives, at the same time enriching ones own knowledge in design and possibly other life skill.

Embedded practice

The practice of design depends on purpose; whether it is for profit or increase in knowledge. In this case, the embedded practice in a disaster zone is to learn from an environment that one does not know much about through real live situation. We have done it in hospital by looking and studying patients’ temporary living environment (Evans 2004). We have look at transportation in tram riding experience and found the current issue. We observe learning experience through handheld electronic source (Russell 2007). Having a designer in a disaster zone is the same thing, a context that is only heard about in news or books. It is the experience of going into the disaster zone, the hospital, the prison and the detention center, the telemarketing office, the farm, the remote villages, etc. which shaped the content of the embedded practice. A designer need to go and do it, to mingle with the environment and absorb the problems, and experience the bitter sweet experience that real situation has. That is a field engagement practice for designer, away from creating things and services from a distant source without ever experience the real situation. The lesson that we could learn from US invasion to Iraq is the embedded journalism which was used for propaganda. Although the war is cursed by many, the import from this is that embedded practice could be use for design to have a better understanding thus created better action and solution of a current problems, whether it would even be the military, or the sufferer of draught, or graffiti tagging as an expression of art for example. These lessons are too valuable to be just learned from books and media. We look for places that we can go, absorb the situation, bridge understanding between what is really the problems and the needs, and take action when possible.
When working in a disaster zone it may be fitting to plug-in to commonly used response practices, Rescue, Relief, Rehabilitate and Reconstruct (RRRR or 4R). The RRRR mechanism describes the actions needed and in their order of priority, such as the 1st R (Rescue) is performed as soon as a disaster occurs (see page 26 for action table). This 4R mechanism is used by the aid organizations to respond to the disaster zone. It is not the most ideal time for designer to get involved (I believe that design ought to be involved much longer and before disaster occurs), but working with the current intervention mechanism we could enter the disaster zone knowing that this system is at play, and constitutes the base that the aid organizations operate from.

The first phase Rescue is often called the ‘desperate dash’ because action must be taken immediately to save victims (IFRC 2006). This phase generally lasts less than a couple of days. Following Rescue, Relief begins by providing health care for the wounded as well as offering food, water, clothes and shelter. A few humanitarian practitioners are currently working on bringing different practices to the community by understanding the confusion faced by the survivor after the shock, therefore alleviating unsustainable short-term ‘desperate’ decision and taking steps in ensuring community rights and benefits and forestalling undesirable take-over by private agencies (Klein 2007) (Racoviceanu 2008). Relief is quite an extensive process and can range from weeks to months in duration. Whilst the victims are settled in temporary accommodation, the Rehabilitation process begins by erecting temporary shelters and barracks for the locals to live in until permanent residence is constructed. Unfortunately depending on the level of severity this stage can take months to years. The final stage of response is the Reconstruction phase, whereby permanent houses and buildings are constructed and the economy is slowly rebuilt. In any of the four stages designers can intervene and assist. Designer could go in and bring community in each step of the process and facilitate in the realization of their goal, not organization’s goal. Ideally, community is involved in the use of their aid money as soon as donation started to happen (Klein 2007), most of current practices in the disaster zone is a program/project formulated by the aid organization. There could be a significance change in each step if we really want to restore or improve the welfare of the affected.
Outside of the disaster zone, designer can only create a beautifully designed object as an exercise of ideas. Design outside a disaster zone has little significance to the disaster itself, and may be often inappropriate since it may not have any cultural significance or matches with the community goal although it may look to improve the welfare of others in a short term. Designer could do better outside the disaster zone by creating a conduit for a designer to go into the disaster zone and to work directly with the disaster itself before or after occurrence. Away from the zone, at best is for a designer to focus on local context or go into local area or regional where the risk of disaster is present, i.e. draught and bushfire in Victoria, and support local residence by implementing precautions in the event that tragedy reoccurs. Engage your local zone; there is tremendous learning from working on-site which can only happen when engaging directly inside the zone.

There are other methods for D4D outside the disaster zone; theoretical and hypothetical which currently practiced in the classroom and planning agencies. The theoretical process involves numerous concepts as to how to prevent or aid in a reoccurrence. This is a valuable exercise that promotes new ideation in a design practice. An example of this is a government design policy to promote sustainable design as a national priority; sustainable design being the theory and government policy being the design strategy. Design policies often strive for greater opportunity, improved management and enhanced economic growth.

However, traditionally D4D has revolved around hypothetical projects. Under this process designers focus on a known issue and make assumptions about the outcome of their intervention. Hypothetical projects often include product design tasks. In some cases aid agencies have approached design firms as clients requesting the production of objects similar to tents, water containers and stoves. On a larger scale, systems and services are also considered in relation to a product. A case in point is that of water storage provided by Oxfam, aspects included in the product are sanitation, delivery, physical proportions and transportation. Projects that emerge from a hypothetical model can provide ease for relief workers and support local residents. Utilizing current hypothetical strategy, it is pertinent to increase field interaction to improve local knowledge and learn from the local resident; otherwise it became only an exercise of intelligence which may not be needed.
Asian Tsunami of 2004 is perhaps the greatest display of participation from around the world. Some people gathered used prescription glasses to donate to the victims, others collected funds, some generously filled their cars with food and materials and drove to the affected areas and doctors flew from around the world to help save the lives of those who were harmed. There are so many problems that possibly arise out of a single event. The means of contribution are endless. What could a designer do?

There are two alternatives for a designer to provide help in tragedy stricken zones. It is possible in the beginning to travel with an aid agency and support their current projects; this can include delivering medical aid, erecting tents or training the survivor’s new skills. If unsatisfied with their projects we may propose projects which aid agencies may support, this way has proven difficult for me in the case of Aceh (read pg 97 Re-constructing my Action). In some cases, volunteering may be the easiest way to gain field work because no prior skills or requirements are needed. Volunteering in area that you have specific skills such as translating, can help develop interaction between field workers and aid agencies. There are volunteering guides of where to go and for a specialized cause in a humanitarian area (Hindle 2007).

The advantage of working in association with an aid organization is access to their field area and the people working within it. Working with an aid agency is a viable option if you are feeling anxious about working in a new, confronting environment. It is also helpful when facing daily tasks such as bathing, studying and sleeping. Another positive aspect of working in a large group is the time allowed to focus on a particular skill. If you are interested in volunteering be aware that they may have intake sessions to send people to the area. The waiting period can range from days to weeks to months. If you are a student considering volunteering, consider Youth Club as they are known for placing volunteers more readily than other organizations. For youth action, consider agencies such as Rotary or Lions Club, or even your local church organization. Design specific groups may include Light Up the World foundation.

A second method for working in a disaster area is developing your own aid agency. There is an emerging movement to bring designers to disaster zones to embark upon social projects such as poverty-stricken areas or transportation of water in an isolated region. Design has the strength and knowledge base to improve the function of objects and systems. Industrial designers have often been nicknamed “the jack of all trades”, their multidisciplinary skills allow them to cross into unknown territory. As an agency, designers can make their own inquiries, establish projects and search for funding. This allows designers to work closely with the community, to understand their needs rather than pursing individual interests. Being a design aid agency would allow you to work on a humanitarian task as any other aid agency would.
A designer travelling to a disaster zone not only needs to know how to execute a project, but to consider what kind of project should be initiated. It is important to know what to look for and how to develop a worthy project. Initially all boundaries must be liberated, a clear mind in regards to design and what it can be will help produce the project.

Many problems that occur post-tragedy can be addressed; often these troubles are less conventional than water and shelter. Whilst in Aceh I recalled one area where there were very few men. They had electricity, transportation and shelter but something intangible was missing; the special bond of marriage. On a personal level, the question you must ask yourself is, are you going to design what you think they need, or help them answer what they really need? It is imperative to listen to the community, engage them in conversations and empathise with their needs. Zygi Lubkowski, says “there is a place for sophisticated new design and technology - but only when and where local traditions and ways of building and living cannot be readily adapted to cope with future emergencies.”

Let’s look at the immediate action areas in a disaster before we plunge into the zone. There are six major areas that constitute most needs after a disaster in order to sustain live, and also likely in a prevention/preparation in an area prone to a disaster, such as at the fragile zone of Pacific Ring of Fire where 80% of the world’s earthquakes occurred (Wikipedia 2008). At this local and international fragile places designer can work on a disaster before it happens. Designer can work on preventative measure, which is to make able for a place or a person to respond to a disaster when it happens. It is more important for aid to be derived independently from a person, village, city, or country in case isolation does happen. Learning from Aceh, there is an ideal situation, which is to utilize local capacity and resources first before adding more. Any aid that will be brought in is best only temporary to avoid long term dependency. And the preferred aid to be brought in the disaster zone is best as an aid that will strengthen local capacity to respond to a situation, such as disaster awareness, design, education, and practical training

Pacific ring of Fire: New Zealand, Indonesia, Philippines, Japan, the Atlantic, Middle America continent and down to Peru is located
**Transportation / Logistic**

The key of aid is to get the product, services, and assistance as soon as possible whether internally or externally when independent effort was not available. When more outside help is required than own capacity, effective transportation and logistics is crucial to save or to prolong lives. Specific recommendation was to work with the local community to come up with a preferred method for evacuation, followed by the dispatch of basic supply such as emergency kit in case there are destruction of route such as roads, ports, airports, and possible means of communication to the outside. Whatever method is conceived, there are undeniable basic needs which has to be available during rescue such as food, shelter, clothes, and health preservation. Depending on the condition designer could also generate a project with the local community to make available simple transportation for rescue or to live after disaster.

**Water and sanitation**

Availability of clean water comes first. We could work on the method of generating water locally, or establish purification method from contaminated water. At this moment, water is seldom looked at and taken seriously when it is not an inherent problem of the area. However, it is wise to be able to produce, recycle and regenerate water with simple method. In case of disaster, this skill is at its most urgency since human could rarely survive without water. Since it is likely working in the zone will interact with culture, it is best know the use of water in their daily activity. Islamic for example requires water to wash parts of body before prayer. After the source of water is established, we need to understand local use of toilet, bath, and washing, for a suitable type of facility to be erected after a disaster.

**Energy**

Equally important to carry on living is energy such as electricity and fire. The most important about energy is how to use less of it and to produce it independently. During disaster supply of electricity can be cut off from the main source which makes energy dependency becomes a problem. Designer has worked on various technique of the use of alternative energy, this is useful to be combined with local capacity to generate a more localized source of energy to allow independent source such as battery, photovoltaic, bio-fuel, and others; to carry on the activity of cooking, washing, bath, and even to produce foods and services. Barefoot college gave a good example of how illiterate rural women could be taught to build solar panels (Barefoot College 2007) (Trutmann 2008). To answer immediate needs, local community in developing countries often has better knowledge to respond to energy provision. Houses are often equipped with kerosene stove and gas stove in case gas supply ran out, and many rural homes have their own diesel generator. It reminds us to always work with local knowledge and explore vernacular ingenuity.
Shelter

Tents have been used for emergency shelter for first response for those that are able to receive help from outside. This has only meant waiting and possible delay. Most house owner are not prepared and do not know if their house is going to collapse, swept away by water, or hurricane. This is perhaps the hardest to communicate with to anyone house owner if disaster has never happen to them. In this case, we could work with community on awareness and identification of vulnerability. Fire from domestic household is often a common cause of the loss of houses in developing countries. Although tents are commonly used, I often wonder if makeshift shelter that is built from salvaged material could be better and easily constructed by the survivor, since it is perhaps the most natural responds, just like we naturally seek shade and cover when it is too hot or rain. Another priority of D4D is to work on local skill using native material and rely on reasonable proximity rather than relying on outside help to construct, whether it is a construction of shelter or house. Dissatisfaction and unemployment in a disaster often breed out from the lack of responsibility or simply unable to do so, when one has to build their own shelter or house, much less is being said.

Livelihood

We ought to engage local context to use design in a livelihood context. Aid organization has clearly point out that food security is the most important for a community to survive, whether it is in war, disaster, or isolation. Agrarian society/culture look to restore their capacity to produce crops, fishing community will want to go back to the sea, and urban community would like to go back to their grocery shopping. The priority should be focused on local’s nature. Further on is to assist community to be self sufficient as soon as possible, even on the most basic produce. The advance stage is assist community’s ability to trade and to have a meaningful activity which we often called work. This doesn’t always mean the ability to have an income or money. It can be a synergistic means, such as a exchange of building construction skill with food. In terms of livelihood, assistance from developed country has to be scaled back to the most basic means; often it is best to start from very simple things as not to impose technology that is hard for the recipient to take care of.

Waste

Utilization of waste has not been a second nature for many people and community, unless they have no limited access to new material there are no other choice. In disaster, there were often abundance in ruined or spoiled goods, there were often debris. In other words, all of a sudden there’s an excess of waste material. The most immediate material yet to use is waste material. Design could increase the possibility of utilizing waste in a daily activity, such as cooking, sleeping, commuting, etc. We could also work with community on utilizing waste for building material since destruction often destroys homes. The area above is what usually needed in a disaster. These areas can be ventured much more specific into needs. This general knowledge is useful as a designer to know what to work for in a disaster for in the community, or the aid organization, or even the government/municipality.
Now that we are ready, there are some important steps that can be done daily when aiding in a disaster area. These practices must be implemented as a design method. Documentation is not the most critical part of the process, however it is very valuable. Images help to reconstruct a scenario, demonstrate what is happening in the field and capture crucial details.

Photographs can be used for early observation when in a disaster area or re-visited later to study the progressive changes. I have used photography as a journal and an archive because it allows me to rearrange the information into various orders, i.e. chronologically or categorically. Photographs can also be used as a powerful and sometimes emotive communication tool.

Making a journal is essential, when possible write in text or record voices if conversation-like note taking is preferred. I still find scraps of notes from my fieldwork that are continually providing me with insight. Journals are useful to document ideas, concepts and even for commenting. Personally, I find writing to be the most powerful form of documentation because there is a connection between the mind, eye and hand to the idea you are presenting. It is also the easiest form of documentation when electricity is not available.

Take videos along your journey, this is a valuable documentation tool that allows you to show your travel to others. Using your footage you can share, publicize and reflect on your experiences. I also found that it is good to have a variety of locations, situations and interviews.

Doing a live project is perhaps the best way to absorb information and learn as much as possible. Regardless of what you do, the greatest learning is done through experience. Whether you work in an RRRR response network, develop your own project, or collaborate with an agency, it is invaluable to do fieldwork.

The objective of D4D is to provide us with a knowledge base to employ design as an action tool and discover what we can create with it. Even if projects are unsuccessful, the knowledge gained is unparalleled by research found outside the disaster zone. The contrast between working inside and outside of a project is vast.
Now that you are equipped to commence fieldwork, there are some topics to consider. A designer/planner/humanitarian contemplating working in a tragedy zone can follow many directions.

Engaging the primary needs
The primary needs of victims must be attended immediately after the incident has occurred. The principle objective is to save as many lives as possible. Secondary to this are the basic biological needs such as clean air, food, drink, warmth, shelter and prevention of disease outbreak.

Engaging public services
Designers are encouraged to become involved in community projects. This field extends beyond the vicinity of household utilities and broadens to public systems such as waste management, transportation, communication and safety. In particular disaster areas require electricity, clean water and fuel for cooking.

Engaging the economy
On a practical level funding activities are greatly appreciated by the community and organisations. ‘Doing something’ is strongly associated as an act of renewal and a response to hope. On many occasions IDP receive wishes, complaints and participate in ‘cash schemes’. Given a limited amount of money to develop projects, designers can use existing materials to the best of their abilities to solve shortage issues as well as finding new and inventive applications for materials.

Engaging emotion
Designers can also help the local community in areas atypical of their profession. Given the stressful atmosphere, there is the possibility to entertain, become a lobbyist or even be involved in public relations. The conditions are often harsh and mundane, smiles and laughter may simply be the hope they need.

Whatever path you choose to take in a disaster area, congratulations and good luck.
Conclusion

On handling complexity

I did not realise at the time, but the core of my project has been contingent on my ability to try. I didn’t know if my plan would succeed nor what I would do if it didn’t. I didn’t have any support from an aid organization before I left Melbourne and I can now admit to myself that I have taken many risks with my project and have tried to make the best of all situations.

One of my plans was to reaching out to Aceh academic community such as the University of Syiah Kuala. Since there was no aid organization was seriously responding to me in their own reason, I also prepare a lecture in Indonesian hoping to reach out to local university students that were diligently protesting of corruption, the spread of western religion, and other civil action. The talk I prepared was a hope of diverting such energy to take action towards the betterment of their immediate environment since they (Acehnese) were already doing something. I notice local ability is quite relative; no one is really unable to do something. Often politics is the largest barrier to determine the drive of a community. In this case, design could work on vernacular identity and ideally grow into a design policy.

On my journey

Early of the master journey Soumitri Varadarajan commented that my journey was “...like going to the jungle”, and I went in with only a torch and spare batteries. Although the project was uncertain to me, I expected to bring something home to Melbourne, of what, I was not sure. The project was an adventure at its deepest level; excitement, despair, hope, happiness, fear, joy, compassion and uncertainty all directed my experiences. Every aspect of the project was completely new to me and as I progressed I surpassed my comfort zone as a student, as a designer, and as a human being. The many facets of the project made it complex and often difficult. The atmosphere included post-disaster and post-conflict issues as well as foreign and fundamentalist intervention. I felt privileged to learn in such a multifaceted environment and can now appreciate that I couldn’t have achieved such a multitude of growth in another environment. When Simon Curlis and I were at the stage of writing project proposals during the first semester of our Masters, Liam Fenessey was speaking as if we were “…going to change the world!” I did not believe him until I realized that I have become the change.

The significance

The significance of my project is evident on many levels. Through me, RMIT University has contributed to aid in the tsunami affected area of Banda Aceh. In the course of my work I have also found a means for designers to contribute to the lives of those struck by natural disaster and have radically expanded my paradigm of design and hopefully others. Whilst in Aceh I was often asked what organization I was representing, I commonly said RMIT University, since most looked puzzled when I simply explained that I was a designer. When interacting with Acehnese locals I was frequently asked for money, with a little guilt and a little pride I usually responded that my service is the only contribution of RMIT University. The physical aspect of my service was assistance in the construction of two primary schools, a kindergarten and eight houses, which were donated by the Society of West Borneo, Indonesia. The most significant phase of my Masters has been the field work completed in Aceh. The success and failures of my fieldwork proved as an invaluable learning exercise.
While doing fieldwork I documented many activities that may prove beneficial for designers wanting to work in a similar situation. I went to Aceh as a designer, whose role was blurry and unknown but my time there allowed me to understand the designer’s place in a disaster zone and the extent to which they can improve the lives of others. My journey has made me appreciate that as designers we must liberate our boundaries, re-construct our concepts and expand our paradigms of design to truly understand what design should be and what it can achieve. In a tragedy there are numerous problems and requirements, and the challenges you face are real and can have an enormous impact on others. If we don’t broaden our understanding of design, how will we grapple with the hardships that may face humankind? Designers have the ability to materialize products that can alleviate pain, meet the requirements of everyday life, and create laughter and joy. I have slowly learned to release the fascination of designing consumer products, which is a challenge that faces many industrial designers. So I have speculated, if we are not designing products, what are we doing? Simon Curls responded, “We design a difference.” I know that what we have in our hands can be very powerful; it can enhance the lives of others. I admit there was a tremendous sense of insecurity when I embraced this field, I felt anxious and constantly questioned my place, and I doubted whether or not it was design and if what I was experiencing was normal. Then Tony Fry responded, “There is nothing normal in a disaster anyway.” I now know that anything that we do that contributes to the wellbeing of humanity, is what design can achieve.

### Specific actions

1. Engage your local community and local problems before going somewhere else

2. Initiate student project in local vulnerable areas and current events

3. Establish communication with local aid organization and when possible, do a live project in a collaboration as a way of practice exchange between student/staff

4. Learn to raise capital and funds whether it is personal, public or private

5. Have knowledge on humanitarian propaganda and communication of intention, i.e. proposal writing

6. Be an expert of gathering public interest in what you do. Support is often just around the corner

7. Bring in beneficiaries/communities to discussion and go into their environment/living space for each to have knowledge on each others’ capacity to help and ability to receive.

8. Involve as much as possible local person to every task from planning to execution, allow them to feel it is their project

9. Establish/facilitate mentorship as a method of education for the community. Even as little as once a week or once a month

10. Learn existing local appropriate technology and culture, before suggesting any ideas. Many things often does not requires fixing/improvement.
Way to the future

My project in Aceh has taught me many things that will be invaluable to my practice in design. I now understand the importance of delving into new areas that design can function and assist in. Design has the ability to enhance lives and resolve complex matters. As beings we are able to adapt to changes in our environment, we can look into various aspects of life and ask ourselves how we can help. My experiences throughout my Masters project have equipped me with the fundamental techniques to practice design in areas that may be murky for the designer. It has given me the confidence to leap into areas that aren’t entirely clear to me. As an example, I now understand that I could arrive in a disaster area, find a local guide and document my findings. I could confidently aid the most immediate needs before working on my own projects. Alternatively I could use the emergency response strategy who are frequently utilized by aid agencies. On a larger scale, it would be advantageous for a design team to work in conjunction with an aid organization to provide relief to victims.

My journey has also taught me the value of caution in difficult areas. I have learnt to be vigilant when commencing projects that may have long term implications. There were many projects in Aceh that met the objective of the project but did not answer the local’s need. To achieve a successful long-term project I know that I would need to work humbly with the community and completely understand their requirements, which could prove a slow and difficult process. Design in such a field can not exist without empathy and consideration for the local residents. It is pertinent to distinguish their capacity to cope with the hardships that have faced them and consequently facilitate solutions that confront their daily challenges. Unfortunately many disasters are unavoidable and happen more frequently in some countries than another. I hope my journey presents designers with a launching point to help victims in their own countries.

It is through the engagement of various social structures that design is able to function in this situation. I propose this model since disaster area produce a climate of need that is likely to coexist and dependant on other need. To work on a solution, that is design intervention in disaster, there is likely to be a need to relate to other sector/social structure.

For example, by engaging the urban level a need for bricks for construction is found. Current practices determined that wood fire kiln would utilize too much timber thus taxing the environmental stability. Proposing of the solution need to consider factors such as the livelihood of the community and the sustainability of the solution, availability of the constituent material which are in control of the material excavation, safety of the area, and the economics.

Further into the example of design intervention may propose production of bricks by the use of gas kiln. Say this brick making will be generated in the brick making village that use to operate wood fired bricks factory. We have had a community that are ready to embrace this as part of their livelihood, and this project is likely to be sustained because of their previous background. And then, we need to build logistical chain; we would need to set up gas infrastructure that will need the cooperation of the administrative level, we would need to find the soil and sand that makes the bricks and find the authority that manage the land which could be state owned, military, or civilian, and we need transportation of gas and bricks to the site. The area that is moderately peaceful and is operated by cultural hierarchy, and we have worked out the incentives for the producer, the authority, and the village, and we establish supply of the produce to the benefactor i.e. aid organization, and supplied to the construction material store.
Conclusion

Utilization of D4D theory to re-look into aid practices of current organizations.

The result of reconstruction has been costly, time consuming, and often just ‘miss’ dissatisfaction from the recipient. Resources that aid organization has can be better utilized to support community action as a method of reconstruction rather than generating contracts for bidding.

Diluting design authority to community level and social structure by opening local workshop or studios.

This maybe closely identified with discovering local capacity to responds to their own needs and problems. Exercising possibility out of a problem has been a key of design potency in many situations. This skill is most useful as a paradigm shift when problems occur. Because I am an outsider, in Aceh I was a not focusing on waste as useless, rather than waste as cash and income and livelihood. I recognized it is simply different perception. Community can be gathered in a workshop to experiment with design exercises so that it may be useful for their own life.

Introducing school and students to D4D

Design school often produces great minds. We can look to increase awareness of what is happening and local context by live action such as to bring in more real problem to be solved rather than waiting for the new ones to be serious. Design for real life must include life itself, the people, the environment, and the experience. Practical recommendation is for design students not only just pursuing a utopia but also to venture into life problems since it would bridge designer to be much more readily available to our life. In this case, it could be started with design studio in a design school, and establish communication of D4D into relevant areas such as social sciences, politics, architecture, economy, transportation and logistic, etc.


<TT style="font-family:times; font-size:12pt; text-decoration:underline;">http://books.google.com/books?id=GHuhD DcF9b0C&dq=reconstruction+integrated+energy&source=gbs_summary_s&cad=0>

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Building School: A Reconstruction Project of Schools and Houses for the Displaced

Vendy Oliver
”The best way to waste your life, ... is by taking
notes. The easiest way to avoid living is to
just watch. Look for the details. Report. Don’t
participate.”

Chuck Palahniuk

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A local newspaper in West Borneo held a charity to raise funds for the tsunami that hit Aceh. In due course the public and private organisations gathered a significant amount of money to support the victims of the tsunami. The West Borneo team is represented by the Department of Public Works, the Department of Education, the newspaper delegate and the Ethnic and Cultural Assembly (Chinese, Malay, and Dayak indigenous) Receiving a trust to extend the humanitarian endeavour, a construction company from the West Borneo province in Indonesia was chosen to build a set of educational facilities. The requirement for the education buildings was proposed by the Acehnese government after the post-tsunami inquiry for reconstruction. The educational facilities to be built consisted of two primary schools and teacher’s housing. At a similar stage, it was also decided to build a kindergarten and more houses. The project was separated into two locations. The areas chosen for construction were Kajhu, which was heavily affected by the tsunami and earthquake, and Jantho, which had the most IDP. During this time, I had already been in Aceh for a few weeks conducting my Masters project. I was in search of aid organisations that would allow me to participate in their field work. Despite hoping that I could develop my own project in Aceh, I only had one goal; to be involved in the post-tsunami reconstruction. I attempted a few avenues on my first days in Aceh, however results were not promising. My persistence was driven by a brazen eagerness to do something great, something significant. I continued to pursue organisations and a few offers arrived, but none were remotely related to the field of design, until the construction offer came from the West Borneo team.
The project wasn’t presented with a flair for design, but at the least it would allow me to interact with the disaster field. I was offered a position in the project on the proviso that my work was done entirely on the field, so I agreed. The stipulation of the construction was to build the facilities to a certain level of quality and within a short period of time. The reconstruction of schools within Aceh began shortly.

Throughout the project the construction company had no influence on the design of the buildings, their duty was only to execute the project. The design was developed by the West Borneo Government (ref. Map pg. 8). The project entailed the building of public schools; therefore the construction bears the national standard and authorisation given by a government official. From a construction perspective the project can simply be translated as buildings of West Borneo architecture that are situated in Aceh. The main intention of the educational facilities was to relieve the Acehnese region of their losses by reconstructing facilities that are necessary to rebuild the health of their society. Furthermore the project aimed to bring solidarity and compassion towards other regions of Indonesia and develop a sister and brotherhood through this cultural exchange.
Setting up was perhaps the most challenging part of the construction. I soon learnt that there is a technique to how the project develops. The project was executed by a construction company based in West Borneo, an island which is quite far from Aceh. The architecture of the buildings possessed an intrinsic character of West Borneo culture with a blend of Acehnese architecture.

The project had to be completed in a very short period of time. Many factors lead to the decision that the construction work would be carried out entirely by labourers from West Borneo. If Achenese locals were included in the project issues such as the unavailability of workers after the disaster would make the project run slowly, as well as their unfamiliarity of West Borneo construction techniques, language barriers and site coordination. So the entire construction team was shipped from West Borneo to Aceh. Initially we were going to ship materials, machinery and pre-made parts from West Borneo. However a great deal of authorisation was required and time was running short. Under ordinary circumstances large construction projects would not be initiated after June because of the monsoon season that pours down rain from August onwards. Nevertheless the schedule could not be interrupted and productivity had to remain at a constant. Under the poor circumstances of Aceh, convenience was not an option.
Within a week, a strategy had been devised and I received news that the construction company was going to mobilize 50 people from Borneo Island to Sumatra Island, where Aceh is located. The 50 people being transported were construction workers from all areas of West Borneo. The majority of labourers had a minimal level of education, but were highly skilled craftsmen in the areas of masonry, wood work, metal work, plumbing, painting and assorted construction work. Transporting the labourers required a lot of thought and planning. It was not as simple as buying 50 tickets for buses and driving them to Aceh.

For a start, it was a brave matter for people dare to go to Aceh which rumoured to be a dangerous area. One parent of the labourer cried and almost cancel the trip of her son. The largest interstate bus in Indonesia can only seat 47 people. Travelling from West Borneo to Aceh is much more complicated because they are separated by water. Aceh and Borneo do not appear far away if you draw a straight line between them, but unfortunately the route is not so simple. There is no ‘closest and fastest route by the ideal straight line’, so travelling can only be done by existing paths. The transportation of labourers included the use of minibuses, buses and ships. The journey was connected by ports, bus terminals and interstate stations.
The journey from West Borneo to Aceh could almost be described as a tour of duty; it took seven days and nights. During their travels the construction workers past through many cities. The journey from Borneo was travelled by sea and the first stop was Jakarta. From Jakarta they boarded another ship and sailed to Sumatra. On their way to Sumatra they stopped at many cities and finally arrived in Sibolga, situated in the middle of Sumatra.

The journey was then continued on land. Buses drove them from Sibolga to Banda Aceh and then straight to Kajhu, the disaster hit village. They arrived at approximately 1.30 am and one by one they made their way out of the bus into the darkness. Not a single noise could be heard except the choir of crickets in the distance. I could make out the silhouette of people unloading bags and boxes from the bus lights that cut through the night. The men had been rocked by ships for four nights and shaken by buses for three nights. Sympathetically the project manager ordered a day off for the team.
Before the workers arrived in Kajhu we had time to prepare the site. My first day on site began a few days before the construction crew arrived. We had a brief discussion with the village leader and we asked him for some kasau and some papan mal, which is wood to set up hurdles. We also inquired about hiring men for the day. Then we began marking and measuring the area with our hired help. Part of site preparation included researching material suppliers and their ability to deliver to the site.
In the afternoon I documented site findings and continued to explore the flat area that was surrounded by patches of grassland and ponds. Occasionally I came across broken pieces of ceramic tiles and concrete floors that reminded me that people had once lived here. I also found portions of broken telephone cords, a piece of a ceramic plate, the skull of a cow, a worn out doll and a shirt caught on barbed wire. The remains were silently telling me stories of the people and the tragedy.
Early on we were approached by a man who came to the site with a village leader. The village leader wanted to supply our project with construction material and the man that accompanied him claimed that he was in charge of the village security. The village security guard claimed that we were about to build on his land. Voices began to rise among the project manager and the men. The man insisted that he participate in the school construction, initially he wanted to sub-contract many of the jobs. He claimed that he was the only survivor in his family, he seemed fearless and maybe this was because he had nothing left to lose. Our project manager was a compassionate man with a strong sense of integrity. He settled the man with grace and developed a friendship with him. Our project manager possessed a social skill that I would like to have.

The next day we visited the other construction site in Jantho. Jantho is an hour drive from Kajhu and has completely different scenery. It is a mountainous area that is quite far from the city. The site is a beautiful area with a magnificent backdrop. It has a peaceful, quiet morning breeze and a gorgeous sunset in the afternoon. The surroundings of Jantho are very serene. Similar to preparation in Kajhu, we began measuring, setting hurdles and establishing a network of local material suppliers. The preliminary tasks were completed within a few hours. We were informed that the Regent of Jantho wanted to see us. This was considered an honour. So we headed to the Regent’s office with the team from West Borneo. We were met with a warm official welcoming and the Regent expressed his gratitude to the team.
There is an inherent professional process that is abided by the construction sector in Indonesia. The building projects require numerous quantities of paperwork, permits and a constant relationship with the stakeholder and the authorities. In addition, projects have the tendency to operate with a customary framework rather than written rules and regulations. For the unsuspecting newcomer, expect surprises.

After 30 years of political turbulence, Aceh has been irreparably changed. Many rights that may be taken for granted in a Western country are strictly controlled in Aceh. For the construction duty I was apart of, there were three local authorities to engage with; the village authority, the district police and the district military. Initially we had to report to each authority with a list of the entire on site team. This was the first time I had been exposed to this level of administration. The authorities were often equated to a ‘local immigration office’. Essentially the authorities owned, surveyed and operated the area. When we first arrived at the site we were requested to report to the authorities and provide photo identification of the entire construction team. A stay that is longer than 24 hours must be reported in the same manner. I made a few photocopies of my identification card and gave them to the village authority and local police as requested. Regrettably I made the mistake of leaving an extra photocopy with the police to pass on to the military. Approximately a month after our initial administration I was called to the district military office.
One of the engineers in the team accompanied me to the office. We were both lectured for an hour and a half in regards to the inappropriate delivery of our identification. It was unacceptable to leave our documents with the police for the military. Early on I made the ignorant assumption that the police and the military were of the same ‘team’. I quickly learned to be more astute to such assumptions.
Managing and Revision

During construction, the projects underwent many revisions. Aspects that were modified included the method of construction, budgets and strategies. The first revision occurred when it was proposed that the architecture would represent the West Borneo style. One of the buildings was intended to be built with a foundation made from large wooden stilts. The proposed stilts had a diameter similar to that of a 25 year old tree. In Borneo such resources were available and widely used however in Aceh this particular type of log is very scarce. After many discussions the foundations were modified to a modest concrete option. Although the original concept using wooden stilts can be viewed as an abuse of natural resources, it was designed as a strategy to relieve the effects of earthquakes. For this reason traditional Acehnese architecture is built on stilts.
The second area of revision appeared in the building budget. Timber prices were five times greater in Aceh than in Borneo and they continued to increase throughout our project. The scarcity of materials was attributed to the prevention of illegal logging and the extremely high demand that was generated in the Reconstruction phase after the disaster. The prices of materials continue to rise, causing the once expensive materials to become an acceptable standard of trade.

In addition to timber, materials such as concrete and brick also became costly. I was astounded and disturbed by the quantity of timber that was required throughout our project. Rightfully I believe that design intervention is imperative to aid in sustainable construction. On the positive side there was minimal waste of materials on the construction site and I was equally impressed by the reuse of timber throughout the entire process. We re-used column casts from another location and brought them to another building site. Similarly, wood for supporting frames were later used for roofing.
Relentlessly, supplies became more expensive. Containers and trucks frequently delivered full loads of materials from neighbouring towns. The Acehnese economy was on the rise and the next significant price jolt came from fossil fuels. Most gases and oils were double the standard price. The price hikes consequently affected the price of delivery and consumables such as food. I was grateful that queues at the petrol station decreased from an hour to five minutes, however small industries and enterprises were suffering.
## REKAPITULASI

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**DIREKSI**

PT. "KALENCO INDAH"

Pontianak, 27 Juli 2005

Direktur :

PT. KALENCO INDAH

**PERINCIN BIAYA**

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**DIREKSI**

PT. "KALENCO INDAH"

Pontianak, 27 Juli 2005

Direktur :
We have two projects in two locations, separated by an hour drive. We have first started in Kajhu village which was located on the skirt of the city area of Banda Aceh. Kajhu was an area which was severely affected by the Tsunami. Buildings, houses, and livelihood above it were completely destroyed. When we arrived, there were barely anything left but the remains of many houses’ foundation.

After working for two weeks, we transfer half of our crew to Jantho regency and we started another project there. Jantho was initially an area where the people flee to when the disaster occur, and this area has been used to set up camps and barracks immediately after the disaster. Jantho regency was situated in a much higher altitude where further travel will lead to the mountains region. It was in this area too that arm-conflict often occurred since the Free Aceh Movement (GAM) often hide within the jungle on those mountain. However, it has been years ago when that happen, and conflict has been very mild since Aceh was declared as civil emergency area. It has to be remembered that GAM has declared to cease fire after the disaster.

We set up the project in this two location and I travel to both area, the distance between this area was an hour by car. The building project was set up to receive supply from nearby material supplier. Kajhu was much fluent in supply since it was close to the city, on the other hand Jantho was quite slow and much harder since choices were very limited. While working in Kajhu, it was much easier to find alternative solution when a problem appear. What I was adviced more often was personal security since I travel to both location throughout the week. The locals of Jantho often offer me a place to stay if sun has set.
Over the course of building the schools management faced multiple challenges. When one of the projects was finished and the other 90% completed the construction team decided to go home. There was still plenty of work to be done to finish the project in Jantho, but the men were exhausted and irritated.

Some commented that we had experienced all the problems and havoc of construction of the company’s 30 year careers in the project in Aceh. To add to the chaos the West Borneo Governor and a government official were coming to Aceh to examine our work. Our strategy was revised and made twice as productive by recruiting new labourers (ref. building process) to complete the task.
Project Management Summary

1. Think in bulk, wholesale, and contract. Discount favours the quantity
2. Allow flexibility and embrace uncertainty, accept ‘anything can happen’
3. Do whatever it takes, focus on end result, when focus on what it is, we easily get confused
4. Be careful on contribution, unless you are ready to give more
5. Feed the angry people. When they are full, the energy goes on digestion not on you.
6. On a confrontation, hold on to your truth but let them win and stay alive
7. Have options, lots of them. In fact, prepare your options early
8. Know the customs!
9. Authority does not hang out together, they are separate entity of power
10. Allow entertainment, disaster area can be boring
The Building Process

Jantho Crew Barrack

Kajhu Crew Barrack
Construction Intervention

I took the offer to volunteer for the West Borneo Aid committee. Towards the end of our project the ‘success strategy’ came from employing double the previous amount of labourers, working one and half times longer each day and working six to seven days a week. Fortunately the labourers were prepared for the long exhaustive work. Half of the crew were skilled craftsmen, and the other half were labourer.

Unlike Western construction workers, the Borneo crew had tremendous experience working only manually with materials and processes. Among the skilled workers were men with 10 years experience in masonry and eight years experience in woodwork. The group were chosen as ‘local experts’ to specifically represent the pride of West Borneo. The target completion of the project was four months.

The level of work was comprehensive and fast. To my amazement on the first day we built the worker’s barrack, complete with kitchen. Attached to the barrack was the director’s room. We made two toilets, dug a well for our water needs and most importantly we dug the foundations for the school and assembled the reinforcement metal needed for the concrete to be poured the following day. On a political note, we erected a pole with the Indonesian flag in front of the barrack to illustrate our political alliance with the Republic of Indonesia. It was an act of compliance to the sovereignty of the Republic of Indonesia since Aceh was still an area of conflict.
Since the beginning of construction, the only way I can describe the phenomenal amount of work produced is to say that the construction was turbo charged. The pace was very fast and many onlookers said it was like seeing magic. Most stages of development only took a day. Digging the channels for the foundation work was completed within a day and then the next day we filled it with rocks and poured the concrete. On the third day we erected the cast for the columns and by the fourth day we poured the concrete into the columns. Within a week we had the framework of the building completed. The following week the bricks were already forming the walls of the building. The secret to the rapid process was to ensure that the construction materials were abundant and continuously restocked as they decreased.

Working in this manner ensures that unnecessary delays do not occur. Another valuable lesson I learned is to ensure that when the first step is started so is the second, this brings continuity to the building process.
Many people say that the shortest and quickest way to get from A to B is to go directly. In an ideal situation this would happen, however in most cases you go around, backtrack and then move forward. At first I hoped my journey would be down a straight line, but I soon realised I was learning much more by going around. My journey was often distracted, challenged and sometimes stuck, but it made it all the worth while. Some of my stories are small incidents that I faced along the way, but they all amount to my core theme of working in a disaster.

The Building Process

Site Story

The wind became a constant companion in our work. The monsoon season began which highlighted frequent rain and stronger winds. Sleeping inside the barracks on September nights was an experience to say the least. The barrack was one of only a few structures within a couple of acres of barren land. The wind was unforgiving when it trembled and vibrated the barrack. Every few days reinforcements were added to the barrack to strengthen it. On a peaceful rainy afternoon the workers were taking a break in the barracks. It was also time for our three-times-a-day coffee break. Inside the barracks the atmosphere was serene with the light sound of drizzling rain on the tin roof. Halfway through their cup of coffee the rain became very heavy. All of a sudden the wind had picked up and was rustling through the barracks. Abruptly a large gust of wind tore through the barrack.

Half of the tin roof was lifted from the nail reinforced frame. Everybody scram. Fragments of the roof flew away. One of the pieces was disastrously heading for...
some of the workers who instinctively ran in the wrong direction. Fortunately the debris landed ahead of them. Thankfully there were no injuries and everybody chattered about the incident for the rest of the day. The flying roof fragment was a sheet of .35mm corrugated metal, which with that kind of force could have cut through flesh. When one of the school buildings was partially finished we moved our belongings into it and used materials from the barrack to make individual beds. The electrical cables that were attached to the barrack appeared flimsy but remained firmly attached during strong winds. If the cables had detached, blackouts would have occurred causing potential delays in our work.
As I arrive to the building site one day, I was welcomed by a few grumpy faces. ‘We haven’t bathe since last night…’ I was told that the water has stopped since last night. So they have to use the water from the well which was slightly salty. When you bathe with that kind of water, somehow it felt sticky when dry. Quite similar to swimming in the ocean. So these boys don’t have clean water to drink and to cook. The well water was not clear, it is brownish grey taste rather neutral, just on the margin before salty.

Not only they have problems at water for consumption, the construction also experience challenges. We were laying bricks at that stages and also doing some concrete works which need a copious amount of water. The crew couldn’t carry out that job that day, but we find some minor work to do on that particular day. In the mean time, I investigate the water situation.

Our early access to water was through siphoning water (with permission) from the nearby Mosque which is about 200 meters away. This water came from a natural ground water that is quite abundant, it flows by itself as it was drilled 150meter in depth. This water from the ground is driven to the tank with an electric pump, and we siphon from this tank. For some reason this tank was empty as nobody came to plug in the pump to fill water to the tank. I consult with the crew on the site and discover that often they run out of water as well. And have to use our well (slightly saline) water for construction, which wasn’t very good for construction because the concrete wouldn’t be as strong.
At one point after a few hours of investigation, I decide to drill our own well on our site. I get a quote for drilling of 35 meter. The company agree if that is what it takes, but first I have to make sure if this is the right decision. Accidentally, I met the village leader which happens to run all the most of the drilling projects in the district of Kajhu. I was told that 35 meter would yield the same saline water that we had, even 60 meter it would still be salty and bitter. ‘You need 135 meter for clean water, but if you go to the depth of 150 meter the water will shoot out.’ said the village leader. I was excited until I found out the cost.
The water deficit lasted for three days while we seek for a few solutions on the pumps. On day three after I tussle with a few possibilities, at the end after the day I came back to the site and to my bewilderment, one of the boy was a mason plus plumber walked up to me with a smile. ‘I fix it.’ He said. ‘I moved our pump all the way to the mosque.’ I was amazed that it was a very simple solution that works. Instead of pulling water from the Mosque from our site, he moved the pump to the Mosque so it pushed the water from the mosque to our site. I actually had that idea earlier, as I was consulting with the engineers and we did some calculation and found out that our small pump would be too weak to push the water. It turns out different. Practical action can produces results different on what is said on paper. The plumber just saw the problem, try what he knew and fix it. I remembered the easiest solution is often the hardest to find. This plumber is practicing Looking, Thinking, and Doing. Orienting himself to an action instead of analytical and ‘intelligence’ oriented practice.
Should it be wood?

We delegate a few task such as making window frame, door, and furniture to a local contractors. He had received the assignment before the building was started. We wait, week in and week out, even months! We keep waiting and I keep pestering since they promised a definite date, and the crew was getting impatient since they doesn’t have anything to do, and they only get paid if they work. Many jobs were held back.

So we keep allocating workers to do something else until the frame comes since they can only move on to the next stage of building a wall if they have installed the frame. It turns out that our delegate could not meet with the date promised over and over again. Until one day I accept the issue at it was and try to see this in a different way. I come to a conclusion that they were making false promises because of this whole interconnected chain of high timber demand throughout Aceh, scarcity in supply, and legal attempt to prosecute illegal loggers that simply became a hard task to obtain this raw material. This had fundamentally affected a large part of our construction activity because the school we were building relied so much on timber; the window frame, the door, roofing, moulding, scaffolding, and all structural support during casting.
Worker’s Strike

The school project was only supposed to go for four months. We were even expecting completion of less than 4 months. The track record of this construction company has shown the ability to complete most projects on time or less than expected time for more than 30 years. So, there were not even a thought of delay come pass through the mind.

One after another, hurdles sets in... such as delay of material delivery is the first, weather, holiday, political issue with local supplier, and assign too much responsibility to sub-contractor. Furthermore, we were contracted to build just two primary schools in the beginning. Later on, a follow up came. We were asked to build a kindergarten and a few more houses as well. For humanitarian purpose it sounds like a noble thing to do, for a construction team it was an irritation since we have to start the kindergarten and the houses from scratch again. When we put the news out that we have extra jobs to do we thought that they will be glad for the extra income... Nobody wants to listen. They pull a strike instead...!

My previous experience did not help too much in a delay. This limitation made me search and expand my option much more rapidly. In construction, many of this issue were one interconnected ‘familia’, for example, the absence of kusen or window frame disallow the completion of stacking the brick wall, thus surface plasterer and painter has to wait. So when the window frame was not being delivered, we see a group of mason, woodworker, and painters got frustrated and whinging in the first week, at the second week, third week, and so forth (yes, it was delayed for more than six week) this emotion then later grown into resentment and anger.

Due to many delays that occur through out the project, it runs overtime and passed the four months contract, the Ramadhan and furthermore the Idul Fitri. The crew were not happy, the plan was to finished somewhere along the Ramadhan and the crew can go home to be with their family in the Idul Fitri. Many of this delay sets in and accumulate time. One day they just got mad and refuse to work. Overall, along the Aceh school project they had strike three times. Each time got stronger and they even establish their own on site Union. This ‘union’ phenomenon was uncommon, so I consult with the Police in how to handle angry masses. They said, “Feed the angry people.” usually they will be tame after the stomach is full. Well, they did, for a day only.
I was aiming for effective construction and doing the best I can when a problem occur. Such as shortage of material such as sand that didn’t come for days after order, and timber that was promised and did not come after we wait for days or weeks. I began to source material from other places as the construction has to go on no matter what. We were running behind schedule. I was warned by the village’s ‘Head of security’ that I could not order material from other places. Occasionally, I have been buying material from him. Clear at that point that he was running a mob scheme. I raised the issue that he has not been delivering and we could not work because of that. The issue almost got ‘hot’ and it could be a possible danger, so I let him win, I retreat… We were working peacefully when again one day he had not been able to supply sands for many days, and it goes on for one week which was very detrimental for us. I expand my contacts and paid for more expensive sands, after a few hours… pickup trucks began to flood in to our site. We purchase 20 loads. I was relieved…glad that I had solved a problem.

I think that was the signal that I did not know… In the afternoon, I was approached. He said that we could not buy sands from other places. I said, “I thought the restriction was only on timber! The workers were sitting down waiting for your supply.” I was startled and conflict nearly happen again. Again, I settled down and retreat. I was unaware that local ‘lord of the land’ was a practice of protecting a security of whoever resides and taken security of whoever resides as well. It is a double bind. I had a commitment to deliver aid (the school building) to that village without realizing specific control that operates within the village. After all, it wasn’t too much of a hard call because he was selling at a cheaper price. I avoided confrontation and I chose to buy from him, as long as he kept his service on time.
The boys started to drink

In Indonesian culture there is a low tolerance for drinking because of its high association with crime. Drinking in Aceh is against their religion. Alcohol invites prosecution by the Syria law that is instigated in Aceh. The team I was working with have various backgrounds that are less strict in their Muslim rules. Temptation occurred when the men were bored and in search of entertainment in Aceh.

The men initially played soccer and guitars to release themselves from their daily routine. Soon after, they found a pharmacist who administers isopropyl, a medicinal liquid that contains 70% alcohol. They drank the liquid with Red Bull while they played guitars. I found out what they were doing one Sunday afternoon. It didn’t bother me until their behaviour caused fights among themselves and with me.

The party ends when one day the police came and settled them down because they were making too much noise and I was reminded to watch them carefully since Aceh is an area culturally different than the other.
Before the tsunami there was conflict between Indonesian armed forces and the Acehenese separatist movement. Working in Aceh has highlighted my awareness of the conflict. Whilst I was in Jantho, I was told to be especially cautious. After sunset it was not wise for me to return home to Banda Aceh.

I heard stories a few years back that still haunt the locals; at night there were many ambushes and gunfights between Indonesian forces and the Acehnese separatists along the path from Jantho to Kajhu. Those who were caught in the path of fights had to duck to avoid stray bullets. Nonetheless Acehnese are renowned for their hospitality and on many occasions I was offered to stay at their homes when it was too dark to depart for Banda Aceh.

It became well known that Gerakan Aceh Merdeka (GAM) the Separatists, were extorting civilians, businesses and many projects over the years. Their name has not been well associated within the community. One day a strange visitor who claimed to have come from the mountain stopped at our site. He claimed to be a soldier. I became uncomfortable with this Acehnese man hanging around our site in Jantho. He was in his early-thirties, of decent appearance usually wearing a checkered shirt. He enjoyed coming to our site in the afternoon, we gave him food and hospitality and he drank coffee with the man.

Game of GAM*

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* GAM = Gerakan Aceh Merdeka (Aceh Separatist Movement) fought with Indonesian government for 30 years and finally be at peace with Indonesian Government after signing MOU in 2006
I remember my first conversation with the suspicious ‘soldier’. I asked him what he did for a living and he responded that he was an Acehnese guerrilla fighter. I was taken aback by the man. In my mind I started to wonder ‘is this the day? The day that the notorious GAM extortion happens to us?’ I cautiously released my title as a site manager and instead told the man that I was a humble charity worker here on behalf of the Australian Government. I have heard that non-Indonesian identities could draft them off. Usually they tend to respond better as Lesley McCulloch and Damien Kingsbury has an affinity towards Aceh. His eyes widened and became excited, saying ‘Australia is very well!’ We exchanged ideas and later he jokingly asked if I had ever been hit by the military. I laughed and said no, but I could sense where the conversation was heading. At the end of the day he asked for some money to buy cigarettes. I told him I didn’t have any, that we were just donating our services to Aceh. I welcomed him to our food and coffee, but that was all I had to give him.

The following day the soldier reappeared and again asked for money. I responded in a similar fashion to the previous day and he left. The next day he returned again asking for money, I decided to give him a little. I told him that it was all I had so use it well. The soldier kept coming back to our work site, each time his attitude was more aggressive. The soldier drank a lot and became inebriated with the Borneo men. I consulted with our timber supplier who knows the GAM district leader in Jantho. He offered to sort out our problems but I told him I could handle them at that point. When our site team was increased with labourers from a local tribe from Northerm Aceh, the hostile men threatened the ‘soldier’ and he never returned.
December was a very wet time in Aceh. We began working on the internal components of the education buildings. The only external work that needed completing was the concrete fence. I searched for many sand suppliers but none of them came through for our project. Most companies responded that it was high tide. At the time I didn’t understand how this affected their supplies. A few weeks later I went sight seeing and drove passed a river. I learned that the sand was manually mined from the rivers. A mini barge, similar to a raft is floated into the middle of the river and two men scoop the sand with rattan baskets and load the contents into the barge. In high tide the river is too high for the men to stand in the water and scoop the sand.
Daily Consumption

The village of Jantho is rather far from the local market. The workers consumed large quantities of food. The men toiled under the blistering sun and were rewarded for their efforts with a nap and lunch. We ate, worked and slept on site during construction. On occasions I helped do the grocery shopping. Every week the Jantho construction crew consumed 70kg of rice, 300 eggs, 30kg of vegetables, 5kg of coffee, 10kg of sugar, 5kg of cooking oil, 3kg of shallots and garlic, 5kg of chilli, 5kg of salted fish and 1 packet of MSG. Later on the demands grew to cigarettes and mobile phone recharge cards. Nearly every team member smoked. In a week one man might smoke 1 to 2 packets a day. In a week the men would order anywhere between 10 to 20 cartons of cigarettes.
After starving the nation of fuel for months and with demand increasing, it was inevitable that prices would increase. In addition the prices of construction materials, transportation, mobile phones, fish, meat and vegetables escalated considerably. The price increases were a nationwide issue that were accepted similarly to taxes. Overtime people adjusted and construction resumed as usual.

Timber and sand were the dominate materials used in construction. Our project represented a very small portion of the materials needed to reconstruct Aceh. Many homes, hospitals, bridges, roads and government buildings were still awaiting materials for construction.

During building, the two primary schools consumed more than 100 tons of cement. One of the loads of soil I ordered to fill the foundations was 32 truckloads worth and each truck could hold 4m³ of material. This particular load of soil is equal to the area of a basketball court and 3m high. Many more orders such as this were placed throughout construction. The reason why we try to visualise how much material is being used, is to understand where it comes from and the magnitude of materials that are being sourced to rebuild the area.
The figures relating to the usage of materials in Aceh have been phenomenal over the past two years. At a glance it appears that the Northern Hemisphere are more environmentally friendly than the South, who have been assumed to be consuming our natural resources. However, when taking a closer look, the initiatives taken on in the South, especially Aceh whilst harming the environment, are re-developing the livelihood of devastated villages (ref. to study of wood-fire brick making).

The Western world and developed countries are directing their markets towards being environmentally friendly. They have gathered awareness to environmental issues that have manifested into recycling programs, biodegradable initiatives and low energy productions. In contrast, this doctrine is not applicable to Eastern and developing countries that rely on their natural resources to build their economy.

At our construction site we used a considerable amount of timber. At first I was concerned about the quantities of timber that we were buying but as time went on I accepted the circumstances we were working under and happily expressed that we reused as much of the materials as we could within the site. The need to reuse materials was also driven by financial pressures. The concept that materials are so expensive that we have to re-think and re-design how we use them intrigues me. It has proven to tremendously affect our consumption.

While building the schools we obtained materials as we needed them. Unlike a typical construction site, we did not have a warehouse we could go to, to pick up stock. We relied on good organisational skills and precise monitoring of our stock and the delivery process. Unfortunately when this didn’t run smoothly, work was delayed. On many occasions we had to ‘hunt and gather’ materials when our usual suppliers had run low of stock. This ‘game’ we were apart of was a constant source of amusement. It was part of a much larger ‘game’ of the distribution of materials and services in Aceh, Indonesia and the world.
Construction in Indonesia favours dry weather. Heat is not an issue in labouring work. Timing is the second crucial impact on construction. Public holidays can also delay work so they must be anticipated before work begins to ensure work is carried out efficiently.

Whilst building the primary schools we were aware of the seasons and public holidays. However we were not exactly sure how they operated and what local customs and celebrations took place. We soon learned that when a calendar holiday is supposed to be two days long, it can often run for much longer. Idul Fitri, which begins at the end of the fasting period, is a two day celebration according to Muslim laws. In reality, it is common for people to celebrate for a week or even a month! This is a case of understanding the culture rather than the calendar. In Manado on the island of Sulawesi, it is customary to celebrate Christmas for a month, similar to the Chinese New Year in West Borneo. During Idul Fitri we declared two days off because 90% of our team were Muslim. We were well prepared on site because I was informed that many people who live in Banda Aceh return home to the Northern, Eastern and Southern provinces, leaving most of the shops closed. At this time the streets were decorated and people were merrily dressed in new fabrics. Ramadhan is another cultural event that one has to be aware of when working in Aceh. Ramadhan is when the ritual of half a day of fasting is performed for a whole month.
Our construction site was quite isolated from the village which gave us independence and allowed us to run our own small, independent cultural system. Obviously we were still dependent on the outside world for supplies and products. The city of Aceh has a great level of solidarity within their culture. During Ramadhan, nobody is allowed to sell food from 8am onwards. Throughout the day restaurants, cafes and food stalls are closed, with the exception of some who allow the business of non-Muslims, expatriates and the army. During the day the streets are practically empty and most doors remain shut until 7pm or 8pm. At 4pm stalls selling breakfast open and people begin to emerge. Ramadhan is an event that required consideration in our work. The change in eating habits means that energy levels drop and can be potentially dangerous when operating tools and machinery. Within our team, each person made the individual choice whether to fast or not, most opting to work and did not fast but also join the Idul Fitri celebrations that follow.
Kajhu is near the city, which allows supplies to be easily obtained. If there was a shortage of materials, there were greater options of suppliers and most readily delivered because of the short distance. In comparison, Jantho is quite far from major cities, resulting in a limited number of suppliers. Often when shortages or delays occurred there was nothing that could be done except wait. For this reason the expected construction time in Jantho was doubled.
Crew Management and Restaffing

Before construction began 50 labourers were brought to Aceh from Borneo. We arrived in the Kajhu district and began building the first primary school. Within two weeks the building was well underway and work was moving quickly. Later on the crew were split into two groups; one group remained in Kajhu and the other commenced work in Jantho. The building in Kajhu had a month’s lead on Jantho, which was started with only 25 people.

After many strikes and heated discussions, the crew decided to return home after 6 months work in Aceh. The entire Kajhu complex was completed, however the Jantho project was only 90% completed. The team that worked on the Jantho project were originally 25, however over time many ran away. At one point there were only 15 men working on the building. At the time recruiting labourers in Aceh was a difficult task because the city was celebrating Idul Fitri, a new year for the Muslim faith. We had to re-staff so we searched for Chinese descendants in Aceh who were equipped for construction work. Many people that we approached said they were too busy and the work was too far from home. Shortly I found a church group who were willing to help gather Christian labourers from the neighbouring town of Medan. Thankfully the new group of labourers were able to work up until Christmas. The hectic time of Idul Fitri made me realise the significance of holiday celebrations and how they affect the entire culture. It also taught me how to make the best of a difficult situation, to accept others beliefs and to continue to work productively.
The Building Process
Building Process Summary

1. When working rapidly, ensure that other areas are completed at a similar level. Many stages are interdependent upon one another.

2. Construction contributes to a large amount of waste. Manage your resources and leave with as little waste as possible. Re-use materials wherever possible.

3. Be aware of weekends and holidays; make sure supplies are abundant beforehand.

4. Keep the labourers in high spirits; high energy levels can perform extraordinary tasks.

5. The lessons learnt involve problem solving and dealing with social challenges. Embrace the learning process.

6. Be pro-active. Observe, reflect and perform to produce positive results.

7. Local knowledge is crucial. Understand the system that operates within.

8. Diligently apply knowledge of the weather and culture of the area to the construction schedule.
## Building Documentation

### Project Calendar - Kahju Village

#### Primary School

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<th>Aug</th>
<th>Sept</th>
<th>Oct</th>
<th>Nov</th>
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<td>Site clearance and set up hurdles</td>
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<td>Wall construction - blocking and framework</td>
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<td>Plumbing and waste systems construction</td>
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<td>Tile, painting, electrical, and finishing</td>
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#### Kindergarten

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<td>Site clearance and set up hurdles</td>
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<td>Foundation work - footing and slab on ground</td>
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<td>Wall construction - blocking and framework</td>
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<td>Roof construction - framing and cladding</td>
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<td>Tile, painting, electrical, and finishing</td>
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#### Monitoring

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<td>General inspection 1</td>
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<td>Official keys handover and traditional blessings</td>
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## Project calendar - Jantho Regency

### Primary School
- Site survey
- Site clearance and setup hurdles
- Foundation work - footing and slab on ground
- Column and beam work
- Wall construction - bricklaying and framework
- Roof construction - framing and cladding
- Plumbing and waste systems construction
- Tile, painting, electrical and finishing
- Fence construction

### Teachers Housing - Six Unit
- Site clearance and setup hurdles
- Foundation work - footing and slab on ground
- Column and beam work
- Wall construction - bricklaying and framework
- Roof construction - framing and cladding
- Plumbing and waste systems construction
- Tile, painting, electrical and finishing

### Monitoring
- General Inspection 1
- General Inspection 2
- Formal Ceremony
This area was heavily affected by the tsunami. There were 13,000 people before the tsunami hit and only 2,000 were spared. There were only 14 students and 8 teachers left in Kajhu, the previous school was completely destroyed.

Aid work:
The designated area for the new school is located across the road from the original site. The Kajhu primary school complex has a total area of 722.63m². The complex consists of one primary school, one kindergarten and two teacher’s houses. The new primary school consists of three buildings with six classrooms in total. It has the capacity to facilitate 240 students.
Jantho is an hour drive from Banda Aceh. It was once a place of recreation and fun until years ago when conflict scared civilians from returning to Jantho. After the tsunami the area received a large number of IDP. The village is an ideal place for refuge because of its high altitude and distance from the beach. Since the previous school was too small to facilitate then new influx of children, a new primary school was built.

Aid work:
The available area for construction in Jantho is much larger than Kajhu. The total area used in the project is 1201m². It is comprised of one primary school and six teacher’s houses. The school has administration offices and nine classrooms. It has a similar classroom capacity to Kajhu of 40 students. However in contrast the school can accommodate 360 students.
Jantho Primary School - Perspective

Jantho Teachers Housing
Facade ornament
The Building Process
The Building Process

Ceremony
The Word ‘Project’
In Indonesia, the word ‘project’ is commonly associated with large sums of money being allocated to public structures. During my time in Aceh I dismissed the word ‘project’ and replaced it with ‘research’, so as not to confuse locals. When describing my ‘research’ I often explained that I was involved in a lot of academic activity so that people would not confuse my work with profit oriented activities.
Illegal logging was a heated topic of discussion during the reconstruction of Aceh. The concept of prohibiting logging is agreed upon to protect the natural resources of a particular area. In some circumstances the act of logging is employed to protect humans, at this point can it be justified for humanitarian purposes? Are we more concerned with protecting humans or forests?

Vast quantities of materials are required to rebuild homes in Aceh. Of the rebuilt homes the primary material used is timber. In Aceh materials have cultural significance. The underlying perception is that a sturdy, strong, proper house is built from concrete and bricks. Acehnese architecture was challenged when a Chinese organisation donated pre-fabricated houses. It is a self contained house complete with electrical wiring within the walls and lighting installed in the ceiling. It can be viewed as a hybrid of a truck container, apartment and train carriage. At a glance the room looks very modern and neat. It appeared to be a solid structure and suitable as a house. But I could not understand why the donation was rejected by locals. Some IDP commented that it did not look like a house. Their traditional understanding of what constitutes a house was questioned and they did not feel comfortable with the new approach. On further inspection of the pre-fabricated room, I noticed that parts of it had been pillaged. Evidently there was some interest to some parts of the house but not the entirety.

At times during construction we bought timber, unaware of it legitimacy. As we became desperate for materials we purchased timber from wherever we could find; whether it was from vendors or people who came to our site. Often we were obliged to receive materials from government officials, local mobsters and armed forces. We denied witnessing illegal activity and unethical practices and worked to the best of our ability in an imperfect situation. There was limited choice among timbers and despite the quality legal timber cost 30% more when it was in surplus. Illegal timbers were equally priced with legal timbers. In the early stages of Reconstruction, there were discussions about using ‘green timber’ from eco friendly plantation, which costs 40% more than the ordinary. It was rejected because it wasn’t economically feasible.
When we first arrived on site and began marking the area we were approached by many locals. The local village authorities engaged us in conversation, trying to persuade us that they should be sub-contracted to do the fence, foundations, roof and many other areas. They insisted that it was their village that we were working on and they should be apart of the processes. It was less than an ideal situation given that we did not know the men or their qualifications. After a long spiel about our purpose and the donations from West Borneo the men subsided. While we were building many people intruded, trying to gain work and money. It seemed inevitable that the whole community was going to try to get work out of our project. The village leader supplied us with general building materials such as bricks, cement, sand and soil. The police station across the road was keeping a watchful eye on our work. Later on the police wished to supply our team with soil, so they ‘shared’ their position with the village leader. At a later stage the military also supplied us with soil. On a positive note, our electrical installer was a victim of the tsunami and did an excellent job during the project. As a token of my gratitude I gave him our scrap timber to built his house. Ultimately contentment was achieved by most parties.
Whether it is considered a bribe or a system to compensate for unpaid services, money handling prevailed in Aceh after the tsunami. A few days before the Idul Fitri celebrations I stood clear of our work site because policemen were circling hoping for ‘contributions’. They took turns ‘patrolling’ our site and furthermore I heard that the Free Aceh Movement troops liked to visit and ask for ‘tax’ money. For almost a week I dealt with my site responsibilities elsewhere to avoid interactions with officials.
Recomendations for working in a disaster area - 10 lessons that I learned

1. Be aware of the leading drive of the place or the field that you are working in. Be it religion, industry or political situations, know how they influence the movement of people, services and goods distribution.

2. Natural resources depend on nature. Understand where certain materials come from, have interest in how they are obtained or extracted and any depending factors, i.e. sand and stones are hard to obtain in rainy seasons.

3. Pre-made made components. Construction from scratch relies on many factors that can often make matters complicated. It may prove beneficial to look at current architecture and alternative methods of construction.

4. Have backup plans. When plans don’t run according to schedule or deliveries are delayed, have alternative strategies to ensure work continues.

5. Build fast. Employing extra staff towards the middle or end of the project can help guarantee the project is completed as scheduled.

6. Deliberate responsibility. When you are accountable for a task you are required to produce a successful result and often learn more from the task.

7. Be an action seeker. Do not always deliberate challenges on paper, sometimes practical work can offer the best solution.

8. Keep a low profile. By understanding and accepting local values and systems, you can work around them without causing conflict.

9. When confronted, let them win. Conflict can be fatal; humility has the power to diffuse the tension.

10. Learn how to handle confrontation. Threats and bribes are common in some areas and it is best to deal with them in a calm and rational tone.

11. Document. Take more pictures and videos than you think you need and if possible, collaborate with a documentation crew.

12. Increase participation. While we often live individually in the Western world, in the East social interaction is intrinsic to the culture.