1. Australia

International disaster management is managed through the Australian Government Department of Foreign Affairs. Large scale disasters will often involve a whole of government response with resources from the Australian Defence Force included. Many multinationals and NGOs like World Vision who are part of disaster response have offices in Australia. Domestic disaster response is managed by the States within a federated system which is coordinated by Emergency Management Australia.

Emergency Shelter

Emergency Shelters Australia as part of a worldwide organisation has a "Shelter Box" which is used both internationally and domestically. ShelterBox is a disaster relief tent for a family of up to 10 people. It is custom made for ShelterBox by Vango, one of the world's leading tent manufacturers, and is designed to withstand extreme temperatures, high winds and heavy rainfall. In addition to the tent, there is a range of other survival equipment including thermal blankets and insulated ground sheets, essential in areas where temperatures plummet at nightfall. Where malaria is prevalent mosquito nets are supplied, as well a lifesaving means of water purification. Each box is tailored to a disaster but typically contains a disaster relief tent for a family, thermal blankets and groundsheets, water storage and purification equipment, solar lamps, cooking utensils, a basic tool kit, mosquito nets and children's activity pack. [i]

Deployable Structures International (DSI), a Brisbane based Australian company, produce their fourth generation product FLATTS (FLAT Transportable Structures) RCS (Rapid Construction System). FLATTS RCS is patented worldwide, and manufactured in the first instance by DSI's licensee partners Group Five in South Africa, this building system has been tested at the US Army Proving Ground in Aberdeen Maryland USA, and placed into field trials in the Middle East for energy efficiency trials. FLATTS RCS modules can be assembled in many configurations as a robust and versatile component to help resolve shelter issues.[ii]

Eden Power market the InterShelter, a patented revolutionary portable shelter, made of a high-tech aerospace composite material, or cutting edge HD plastic that has bridged the gap from tents and trailers to traditionally built framed houses. Built to sustain hurricane strength winds or earthquakes and insulated to stay warm in extreme arctic sub-zero degree weather or cool in hot desert climates, these structures can be assembled in just a few hours by three untrained people. The pieces can fit in the back of a pickup truck, single helicopter sling, or a bush cargo plane and can be set up on almost any terrain. The Dome is a frame-less structure consisting of aerospace composite panels. It has the strength of a standard building but the mobility of a tent. An exterior gel coat which is virtually indestructible covers the panels. This gel coat is resistant to sun, snow, rain or temperatures over 120°F or below 0°F. The gel coat is moulded into the fiberglass giving the Intershelter Dome incredible structural strength.[iii]

2. Brunei Darussalam

Brunei Darussalam has a National Disaster Council with a subordinate National Disaster Management Centre (NDMC) was set up to manage the impact of a natural disaster. The founding of the NDMC provided Brunei Darussalam with the essential institutional expertise required to coordinate information and assistance in the event of disaster. Apart from that the role of National Disaster Management Centre is to assists and advise the Council in performing its functions. Under the NDMC a team of representatives from relevant ministries were appointed as the focal-point officers in the event of a disaster occurring, these officials will alert the focal point officers for relevant follow-up actions and assign to work 24 hours at the NDMC Centre to respond to any assistance required by victims. It is the responsibility of the NDMC to alert the public in the event of the scale of disaster occurring in Brunei Darussalam. Overall the NDMC manages, coordinates and mobilizes any disaster that happens in Brunei Darussalam.

Brunei Darussalam has a relatively low risk profile for natural disasters.[iv]

Emergency Shelter

Brunei Darussalam does not have an indigenous shelter design and construction capacity. There is little evidence of any multinational basing shelter capacity in Brunei. Significantly Brunei has not recently required international assistance in disasters and therefore does not have any locations that have used emergency shelters.

3. The Republic of the Philippines

The Philippines is one of the most hazard prone countries in the world. Its location in the tropics and in the Pacific Ring of Fire exposes it to multiple natural hazards including typhoons, floods, drought, as well as earthquakes and volcanic eruptions. This inherently high disaster risk is exacerbated by the effects of unplanned urbanization, environmental degradation, and global climate change. The resulting human and economic costs of disasters are significant. Over the last ten years, the Philippines have witnessed over 6,000 people killed, over 23 million people affected, and about 1.3 billions of dollars in economic damage.[v]

The National Disaster Response Plan (NDRP) is the Government of the Philippines "multi-hazard" response plan. Emergency management as defined in the NDRRM Act of 2010 (RA10121), is the organization and management of resources to address all aspects or phases of the emergency, mitigation of, preparedness for, response to and recovery from a disaster or emergency. Local government institutions are responsible for the development and improvement of local response plans relative to their areas of responsibility and underlying risks. The most devastating disasters, depending on capacities, may require the full range of government response National/Regional agencies shall respond according to

the severity and the magnitude of emergency. INGOs, NGOs, CSOs and private organizations will mobilize their resources and respond quickly.[vi]

Emergency Shelter

Emergency shelter from a wide variety of sources has been employed in the Philippines in the last decade to support a multitude of disaster responses. As described in Case Study 1 of the Response to Typhoon Haiyan in SPESS literature Survey, most of the emergency shelter is provided by international organisations and therefore is mainly tents. Some innovative steps have been made to take advantage of local Philippine indigenous materials and construction techniques in shelter construction.

After Typhoon Nesat the IFRC in consultation with Philippine authorities constructed 1800 shelters with indigenous planning and design. This shelter was a rectangular structure with a single pitch roof and a covered floor area of approximately 4.8m x 3.7m. The shelter is supported on concrete piers and footings such that the first floor is raised approximately 750mm above grade. The floor and roof are framed with coconut wood beams and joists. The floor is plywood and the roof is corrugated metal roofing. The exterior walls consist of amakan (woven panels of bamboo or palm leaves) fastened to the coconut wood frame. The light weight wood frame can be lifted off the concrete piers and moved to a different location by a small number of people. As designed, the shelter has one door and two windows. Detailed designs of this structure are available through the IFRC shelter design catalogue. [vii]

4. Canada

Canada's international disaster response involves the close cooperation among Global Affairs Canada humanitarian officers, Canadian representatives in the field, representatives of other government departments, and international and Canadian humanitarian partners, such as the Office of the United Nations High Commissioner for Refugees, the International Committee of the Red Cross, and the United Nations World Food Programme.[viii] Canada has well established domestic emergency management system which acknowledges an all hazard approach through the Canadian government.

Shelter

Weatherhaven Shelters provides a wide range of deployable shelters in disasters and for military forces. Weatherhaven is headquartered in Canada and has manufacturing facilities in Vancouver, Canada, as well as in South Africa and South America. Combined production facilities cover over half a million square feet (45,000 square metres). Weatherhaven's fabric shelters are the result of 30 years of engineering, designing, and manufacturing tensioned fabric structures. With the standards and footprint of an ISO shipping container and 463L pallet, Weatherhaven's expandable container shelters were built with tactical efficiency and transportability in mind. From concept to deployment, and

post-project support, Weatherhaven provides hands-on assistance in all aspects of remote-site logistics including:

- Initial Camp & Shelter Design
- International Transportation & Documentation
- Site Installation
- Dismantling
- Redeployment
- In-Service Support.[ix]

In the months following the devastating Haiti earthquake in 2010, shelter was one of the most urgent needs for displaced populations. Many found shelter in makeshift camps but further natural disasters such as hurricanes and tropical storms continued to destroy homes and batter Haiti. The Canadian Red Cross Society Transitional Shelter Project, provided medium-term shelter solutions to more than 35,000 Haitians in or around their original places of residence. These shelters were built with consultation with humanitarian experts, architects, and engineers. The result is a safe and dignified shelter, at low-cost, with a high level of adaptability to local needs and conditions.

The shelter is built of wood instead of concrete or bricks, and provide safe, secure and weather-resistant living space. They are modest homes measuring 18 square metres, meant to accommodate five people. To avoid flood damage during the rainy season, the shelters are slightly raised and are engineered to withstand Category 1 hurricane force winds and to be earthquake resistant. Of the more than 7,000 shelters built for the project, none were damaged by the passage of Hurricane Sandy in October 2012.

Since 2010, the Government of Canada, through its Department of Natural Resources, has been exploring ways for the Canadian forest sector to play a more important role in providing shelter solutions for recovery after disasters and civil conflicts. Through a program on expanding market opportunities, the Quebec Wood Export Bureau, a wood industry association, and its members were provided support to bolster their efforts to develop improved housing solutions for people displaced from their homes.[x]

A separate innovative shelter design from Canada for the Haiti disaster was a ‘Shipping Container Pop-Up Village for Haiti’. Shipping containers sit in port cities around the world, empty and unneeded. Designed by Montreal organization Vilaj, the community of 900 shipping containers housed 5,000 people and would provide open spaces, parks, and playing fields. Each 320-square-foot shipping container home would come complete with running water and bathroom facilities.[xi]

There are several small to medium enterprises located in Canada design and delivering emergency shelter. One of these is Deployable Structures Inc which design and manufacture fully articulated aluminium framed, vinyl coated polyester soft walled portable shelter systems with optional cold and tropical weather insulation kits. Complete standalone HVAC

and air purification systems are offered for remote camp locations. The Habitat and Long Habitat series of shelters require no tools for setup. All shelters are free standing with full 185 cm vertical sidewalls and come with an array of supporting accessories like shelter interconnection kits, custom fit vinyl ground covers, and portable bunks, table/desk sets with shelves, integral light and wiring harness sets.[xii]

5. Hong Kong

While Hong Kong has been relatively free of natural disasters like earthquakes and tsunamis, there is still a need for the city to strengthen its preparedness and capabilities for handling a disaster or major emergency. Led by the Hong Kong Academy of Medicine (HKAM) in collaboration with the medical schools of The University of Hong Kong (HKU) and The Chinese University of Hong Kong (CUHK), and supported by international experts from the universities of Oxford and Harvard, the Hong Kong Jockey Club Disaster Preparedness and Response Institute (DPRI) was established in 2014

The HKJC DPRI aims to consolidate and institutionalise the current capabilities of disaster preparedness and response in Hong Kong, with the ultimate goal of developing a sustained local, national, and regional centre of excellence in this field. The Institute concentrates on medical response and preparedness.[xiii]

Emergency Shelter

Emergency Shelter Design in Hong Kong is focussed on the very real need of managing a substantial need within the confines of Hong Kong. However, some of this work and knowledge is transferable to the international disaster response. Working with Hong Kong architecture studio AONA and charity One Village Focus Fund, the Hong Kong architects have built their first prototype in the village of Duwakot in Nepal following the 2015 earthquake. Measuring three metres wide and six metres deep, the building is clad with timber and metal sheets sourced from wrecked houses. It was built in two days by a team of four paid workers and 10 volunteers. The same triangular-frame structure could also be used to build nurseries, clinics, community centre or schools, said the team – as will be illustrated in the downloadable assembly guides.[xiv]

6. China

With its vast territory and diverse climatic and geological conditions, China is subject to a wide range of natural and man-made disasters. The operational mechanism of disaster management system in China can be summarized as: unified leadership, graded response and functional division, based on local government, supplemented by central government. Unified leadership means the government issues policies, regulations and planning, and makes decision, commands, supervises and coordinates in the course of implementing disaster management measures. Graded response means central government is responsible for management of catastrophe relief, and local government for disaster management in

their administrative areas. For example, the central government takes responsibility for major disasters, provincial government for large-scale, municipal government for medium-scale, and county government for minor disasters. Functional division is that relevant departments of the government shall be responsible for relevant work of disaster management in accordance with their respective duties. The practice and expenditure mainly depend on local government and supplemented by central government.[xv]

China is increasingly playing a leadership role in international response and making the immense domestic disaster response capacity available as part of humanitarian action. There is a strong desire to improve the planning and implementation of assistance to make it more efficient and effective. This includes engaging more directly with affected governments to assess needs, improving coordination among China's agencies, and increasing coordination with donors and international agencies. Organisations like the Chinese Red Cross and China Foundation for Poverty Alleviation have extensive experience working in China and are now expanding their activities internationally.

For the SPESS project it is important to note the primary role of Tianjin University as the key promoter, the APEC Sustainable Energy Centre. The centre is a mechanism and platform for sustainable energy development in the Asia-Pacific region, APSEC will enhance information sharing, policy exchange, joint research, demonstrations and promotion, and capacity development among APEC economies, spreading advanced ideas and mode of sustainable development throughout the region.

Emergency Shelter

China has tremendous capacity to produce shelters. Mege Shelters was stablished in 2000, and is located in,Guangzhou City. Mege owns independent technology of composite materials, staff with many years' experience in practical projects and complete production facilities and is a market leader in shelters, container houses, special truck bodies, recreational vehicles, and modular houses. In a similar method to Canadian works in Haiti, Mege was responsible for the Re:START village project in Christchurch New Zealand in 2011. The recycled shipping containers served as a fast yet crucial solution in the process of urban renovation. The development took only a couple of months to construct a comfortable public and social areas capable of sheltering local stores that were destroyed in the earthquake, making a unique shopping mall made out of shipping containers.[xvi]

Mege is able to produce a fibreglass replacement panel structure, with a welded steel framework, and integrated solar panel, good water-proofing performance, durability and easy maintenance. The shelter is convenient to transport has good thermal insulation, corrosion resistance and anti-aging.[xvii]

Nanjing Sanchuan Pavilion Mfty. Co. Ltd is a large professional tent manufacturer for emergency shelter and military tents. Currently Nanjing Sanchuan Pavilion Mfty. Co. Ltd

produce emergency shelter for refugees, refugee tents, military tents, administration shelters, wedding tents, garden pavilions, carport and Mongolian round tents (Yurts). All designs are made of sturdy frames and resistant, durable fabrics. The UNHCR utilises the tents which are produced to meet international and UN approved standards at low pricing. All tent shelters are simple to erect and very durable, even in heavy weather conditions with a usable floor area between 12m^2 and 16 m^2, depending on needs. Winter tent kits and winter tents for housing refugees and disaster victims in colder climates are available and large qualities of tents are available for immediate shipment if required. [xviii]

China is also able to offer innovations outside large production businesses such as the 'Folding Bamboo Houses' by Ming Ting. The concept utilises a system of bamboo poles that are pre-assembled into rigid geometric shapes. The geometry of these forms provides each structure's integrity, allowing a range of lightweight modular structures to be quickly assembled in factories and transported to their destination. Once constructed, the shelters are then covered by using post and pre-consumer recycled paper. The Flexible structure is designed to resist earthquake, easily produced, cheap and environmentally friendly. The geometric folding houses are architecturally appealing, dynamic, and can adapt to respond to the needs of different situations.[xix]

7. Japan

As it is situated along the circum-Pacific volcanic belt, Japan has several volcanic regions and frequently affected by earthquakes and Tsunami. The Disaster Management Plan is the master plan and a basis for disaster reduction activities in Japan, and is a plan made by each designated government organization and designated public corporation. The plan clarifies the duties assigned to the Government, public corporations and the local government in implementing measures. For easy reference to countermeasures, the plan also describes the sequence of disaster countermeasures such as preparation, emergency response, recovery and reconstruction according to the type of disaster. In prefectures and local municipalities, the prefectural and municipal Disaster Management Councils are established with the members of representatives of local government organizations including police and fire management department, and designated local public corporations. [xx]

Toward reconstruction from the Great East Japan Earthquake, the Government of Japan sets it as our foreign policy to make consistent contribution in humanitarian assistance. It is one way to acknowledge solidarity expressed by the international community after the Great East Japan Earthquake. From these standpoints, the Ministry of Foreign Affairs formed basic concepts of humanitarian assistance of our country as "Humanitarian Aid Policy of Japan". The Government of Japan has three tools for emergency assistance for overseas disasters: Dispatch of Japan Disaster Relief Team; Provision of Emergency Relief Goods; and Emergency Grant Aid. [xxi]

Emergency Shelter

Japan has constructed established permanent emergency shelters across Japan to come with the imminent threat of disaster in Japan. There is also a thriving market for delivery of transportable temporary emergency shelters. Daiwa Lease has an extensive track record in both permanent and temporary emergency shelter production. They provide design based on customer needs and speedy construction of buildings that present prefabrication in an entirely new image, covering everything from the construction of temporary structures to public facilities such as hospitals and schools.[xxii]

The EDV-01 Emergency Shelter is a high-tech shelter from Diawa Lease and is about the size of a shipping container, though it can double in height with a flick of a switch. It can sustain itself without any outside resources for up to a month by catching and reusing water, and generating electricity with a sizable solar array. The EDV-01 can be transported by truck or helicopter to areas in need. Bunk beds and an office desk are built in. The lower portion has a shower and a bio toilet, a small kitchen, storage for supplies, and equipment. A unique aspect of this shelter is its pixelated skin that can light up and serve as signage, providing critical emergency information to people in the community.[xxiii]

Innovative shelter is a strong characteristic of Japan's emergency shelter industry. Shigeru Ban Architects are a world leading innovator of emergency shelters. Architect Shigeru Ban has proven that paper tubes are a strong, durable, cheap and simple way to build emergency shelters. Ban's disaster housing has been used everywhere from Rwanda to Kobe, Japan. Ban also recognised that while evacuation centers were providing a safe refuge to Japanese citizens, they would also become crowded with little provision for privacy. In response, he devised a curtained partition system that could provide some relief to the individuals – an important point, as they will likely have to wait months before the government-built relief homes are completed.[xxiv]

8. Republic of Korea

The National Emergency Management Agency (NEMA) established under the umbrella of the Ministry of Public Administration and Security (MOPAS) is comprehensively in charge of disaster management policies in Korea. The National Disaster Management Institute (NDMI) established in 2006 prepares and trains for national and international disasters. The National Disaster Management System (NDMI) includes disaster management support systems that are installed in the central and local governments to take action against both natural and human-made disasters. The NDMS is jointly operated by the national government, local governments, and related authorities. It is a nationwide information system to prevent dangerous factors that can threaten human lives and properties, to promptly respond to emergency situations, and to support recovery and restoration. The local systems are for users in the local governments in 231 cities and provinces nationwide. [xxv]

Emergency Shelter

Korea has a large network of permanent emergency shelters in preparation for potential conflict. There is some well-developed temporary shelter design and production in Korea. 'Love Homes' are built for neighbours who have lost their homes. Over 300 homes are completely destroyed every year due to natural disasters. Hope Bridge provides temporary residential facilities to help support those in difficulty. The temporary residences are assembly-type homes that are 6m x 3m (about 16m2) and can be moved and installed conveniently. Each residence is equipped with electric and communication facilities, bathrooms, sinks, boilers and fire extinguishers so that two to three adults can live in it comfortably. The temporary residences are built with high quality materials that have passed inspections by official testing institutes, and can be used in both the summer and winter seasons.[xxvi]

9. New Zealand

New Zealand's greatest natural disaster risk comes in the form of earthquakes, due to its location in an area of seismic shift. A devastating 6.3-magnitude earthquake struck Christchurch on the South Island in late February 2011, killing more than 180 people and resulting in severe structural damage. Thousands of aftershocks have been recorded since then, including one which was as big as the original quake and brought down more buildings. New Zealand has The National Crisis Management Centre (NCMC) which facilitates the Central Government crisis management arrangements and offers inter-agency and scalable operability to deal with any type of emergency. The NCMC is managed and maintained in a continued state of readiness by the Ministry of Civil Defence & Emergency Management (MCDEM).[xxvii]

The Pacific is the core focus of New Zealand humanitarian and disaster management efforts. New Zealand shares close cultural, political and social links with the Pacific and are a trusted partner that can respond quickly in support of Pacific governments when a disaster strikes. Pacific island countries are among the most vulnerable in the world. They are particularly susceptible to cyclones, floods, droughts, volcanic activity, earthquakes and tsunami. The impacts of climate change and unpredictable weather patterns are exacerbating disaster risk. Small island developing states in the Pacific also face disproportionally high risks to extensive loss and damage due to their small and vulnerable economies. The impact of multiple disaster events can have devastating consequences on the lives of people and their communities, as well as on entire economies for many years. Providing technical expertise from New Zealand helps re-establish essential infrastructure such as telecommunications, airports and power services for example – often in partnership with the private sector.

Emergency Shelter

New Zealand does not have a significant shelter design and construction capacity. There is little evidence of any multinational basing shelter capacity in New Zealand.

Emergency Shelters New Zealand like Australia is part of a worldwide organisation has a "Shelter Box" which is used both internationally and domestically.[xxviii]

10. Singapore

The Singaporean Ministry of Home Affairs is the principle policy and directing authority responsible for civil defence emergency preparedness and disaster management. Under its command are two emergency agencies - the Singapore Civil Defence Force (SCDF) and the Singapore Police Force which are responsible for planning, co-ordination and implementation of the various programmes and activities. To fulfil its roles, the SCDF has established 4 systems to cater to Singapore's emergency needs - Warning; Protection; Rescue; Command, Control and Communications.

The SCDF maintains a dedicated 76-man standby contingent round-the-clock codenamed Operation Lionheart where its core function is to provide urban search and rescue and/or humanitarian relief assistance to countries afflicted by major disasters. The Operation Lionheart contingent comprises rescuers from the SCDF's elite Disaster Assistance & Rescue Team (DART) and from the frontline units including Operationally Ready National Service (ORNS) men.[xxix]

Emergency Shelter

Singapore does not have a large shelter production facility but has innovative niches. An example of this innovative niche is the Adaptable Metaplate Disaster Shelter by Singapore designer Kelvin Yong. The 'Metaplate' disaster shelter is made from durable but inexpensive materials like cardboard impregnated with resin and can accommodate piping, drainage and other necessary domestic facilities. The prefab housing simply folds up into a rectangular structure, making it very easy to transport and assemble.[xxx]

11. Chinese Taipei

Located on the East side of Asia, Chinese Taipei is an island with significant risks for natural disasters. The 2011 Disaster Prevention and Response Plan is a comprehensive plan for dealing with the different nature of disasters.

Shelter

There is limited evidence of emergency shelter production or innovative design in /Chinese Taipei.

12. The United States

The initial First Response to a disaster is the job of local government's emergency services with help from nearby municipalities, the state and volunteer agencies. In a catastrophic disaster if the governor requests, federal resources can be mobilized through

the U.S. Department of Homeland Security's Federal Emergency Management Agency (FEMA) for search and rescue, electrical power, food, water, shelter and other basic human needs.[xxxi]

The Office of U.S. Foreign Disaster Assistance (OFDA) is responsible for leading and coordinating the U.S. government's response to disasters overseas. OFDA responds to an average of 65 disasters in more than 50 countries every year to ensure aid reaches people affected by rapid on-set disasters—such as earthquakes, volcanoes, and floods—and slow-onset crises, including drought and conflict. OFDA fulfills its mandate of saving lives, alleviating human suffering, and reducing the social and economic impact of disasters worldwide in partnership with USAID functional and regional bureaus and other U.S. Government agencies.[xxxii]

There are many NGOs that work from the United States. For example, the Harvard Humanitarian Academy which is dedicated to educating and training current and future generations of humanitarian leaders. The academy aims to create a professional pathway for students and practitioners of all levels in the humanitarian space and to serve as a prototype for other academic centres of excellence in humanitarian education.

Emergency Shelter

The United States has a very comprehensive shelter design and production capability. There is a significant domestic market that deals with storms and tornadoes each year. For example, Sprung Structures provides Government agencies, non-profit and non-governmental agencies, and disaster relief organizations with instant building solutions. A Sprung structure is ideal for disaster recovery operations that require immediately deployable buildings for temporary emergency applications. Available as semi-permanent alternatives to conventional construction, Sprung structures are flexibly designed to be constructed and built quickly and effectively to help you save time, money and even lives. With limited need for foundations and attractive energy-efficient insulation packages available, Sprung structures are also easily dismantled and relocated for any future disaster recovery needs.[xxxiii]

There are many innovative emergency shelter designs in the US. These range from implemented to concepts only. The Mastodon 'Transient Response System' is a concept only and is designed by, from SCI-Arc in Los Angeles. It is a mobile skyscraper which has a deployable architectural base (called the MASTODON) that self-assembles using four giant jacks into a shelter for earthquake, flood and other natural disaster victims. The tower will be equipped with solar panels, wind turbines and a rainwater catchment system to generate power and provide water for its temporary residents.[xxxiv]

The New York–based architectural firm Gans and Jelacic has developed disaster-relief housing that is more than temporary shelter, which was deployed in Bosnia/Kosovo conflicts. The structures also attempt to accommodate the long-term hopes and dreams of displaced people. It starts out as a small triangle, but unfolds into a four-by-eight-foot room that can not only withstand years of use, but can be used as a basis for more permanent housing. Architects Deborah Gans and Matthew Jelacic created this compact concept for the

Architecture for Humanity competition after studying both immediate and long-term disaster housing and realizing that permanent homes are often constructed around emergency settlements. The unit, made of scaffolding, is easy even for elderly people to assemble and the beams are strong enough to be used as structural support in long-term construction.[xxxv]

Nader Khalili has designed the Sandbag/Superadobe/ Superblock Construction System. This simple emergency and safe structures gives maximum safety with minimum environmental impact, using natural materials Emergency Shelters. This type of emergency shelter was used as a response to the 2005 earthquake in Pakistan. The challenge was to provide quick, safe, decent shelter with minimal tools and supplies to sustain life through the winter. It could provide more permanent shelter with modest modifications. The First Aid Earthquake House is made out of very simple materials: sand bags, rope lines, tape and available insulation materials. The construction process begins with filling the sand bags with fine and heavy materials, where this is possible. The house is designed in such a way that people can construct this facility themselves.[xxxvi]

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