

Designing Temporary Shelter for Post-Disaster Situations

Robert Kronenburg

There can be no doubt that the potential of demountable and portable structures for use shortly after disasters occur has long been perceived as a real avenue for development by those involved in the architectural design and construction world.¹ Experienced and respected architects have devoted time and energy to the creation of new, innovative and sometimes ingenious prototypes for disaster relief situations, amongst many Buckminster Fuller, Alvar Aalto, Future Systems, and Shigeru Ban. Industry has also engaged enthusiastically with the problems of shelter manufacture, and many prototypes of varying degrees of complexity have been produced, tested and in some cases deployed in post-disaster situations. And yet the scenes that are still sought out by the media each time a disaster occurs are remarkably similar - people who are without adequate shelter, in obviously needy circumstances, surrounded by the destruction that was once their own homes. It therefore appears from the selective images of television and the press, that despite the wide-ranging and diverse activity carried out into the problems of disaster response, much of the work by architects, designers and the manufacturing industry seems to have had minimal impact on the relief of human suffering on the ground.

The reasons for this apparent mismatch between the problems of disaster relief and many well-intended design solutions are complex, but are primarily related to a fundamental misunderstanding of the victims' circumstances in a post-disaster situation. In the 1970s Ian Davis, the respected researcher in the field of post-disaster shelter situations labelled these misunderstandings as 'myths'; incorrect yet striking images that have led relief agencies and their agents to gauge their response on seemingly potent concepts that are unfortunately based on an unverified and inaccurate understanding of the actual situation.² Many of these myths surround the response of victims to the disaster in which they are involved, myths often perpetuated if not created, by the media. For example, it is a common and understandable misconception that disaster victims are dazed and helpless, simply waiting for outside aid. It is true there is a short period of shock at their misfortune but very quickly, far more quickly than

¹ This essay is extracted from the author's book *Architecture in Motion: The History, Development and Potential of the Portable Building*, to be published by Routledge, Oxford, UK in Spring 2013.

² For a full list of these myths and their factual counterparts see Ian Davis, *Shelter After Disaster*, Oxford, 1978, pp.25-31.

the space of time in which the authorities are usually able to react, victims become actively involved in the task of saving lives and property. Another myth is that people camped out in the wreckage of their home impede reconstruction efforts, sometimes resulting in them being forcibly evacuated whilst the sites are cleared. In fact their actions are the first coherent acts of rebuilding property and community - inhabitants staying close to their belongings to protect them and maintain their personal geographical identity.³

In order to understand better how these myths have developed and how they have influenced response effectiveness it is important to understand the nature of the disaster situation. Disasters can be roughly divided into three types; natural disasters that have as their source a phenomenon such as extreme weather conditions or geological disturbance; wartime or post-war disasters that occur as a by-product of human conflict; refugee situations which may occur as a result of natural disaster, a conflict situation, escape from famine or plague, or migration for economic reasons. Though only 4% of all natural disasters between 1991-2005 were earthquakes, these were by far the most destructive event type resulting in more than 40% of all deaths, of which 95% are attributed to building failure. Floods are highly destructive events accounting for 21% of all disasters although only 12.7% of deaths. Storms account for 15% of all natural disasters, which result in 23% of all deaths.⁴ Beginning in 2010 a team from the UNHCR, the IFRC and UN-HABITAT have published annual project summaries of the major relief efforts carried out around the world. Aimed at managers working in the humanitarian field at all levels of expertise these documents share experience and lessons learnt at a level unprecedented in the preceding century.

The scale of the problem is huge. In 2010 alone over 400 natural disasters were reported, killing over 304,000 people, and displacing and affecting 300 million.⁵ The two single largest international emergency responses in that year were the Haiti Earthquake and the Pakistan Floods but 43 million people were also forcibly displaced by conflicts. It is

³ Authorities' misunderstanding of this situation has led to forced evacuation of inhabitants to remote camps without facilities whilst the sites of their homes are bulldozed, destroying reclaimable belongings and reusable building materials. Ibid, p.25.

⁴ Shelter Centre, *Shelter After Disaster: Strategies for traditional settlement and reconstruction*, DFID and UN/OCHA, 2010, p.xx-xxi.

⁵ *Shelter Projects 2010*, UNHCR, IFRC, UN-HABITAT, Shelter Case Studies, 2012, p.vii.

important to acknowledge that regardless of the cause of a disaster, the severity of the problems it causes are inevitably and inextricably linked with mankind's ability to respond.

However, in the past few years the coordination of information and research into shelter after disaster situations has improved dramatically, and just as important, so has the communication of this experience to the multitude of groups and organisations involved in the area. In 2010, after in-depth consultation with UN institutions, key NGOs, international organisations and government bodies over a three-year period, a revised accessible edition of the seminal 1982 *Shelter After Disaster* report was published. Taking into account holistic research and experience, *Shelter After Disaster* (2010) sets out the context of post-disaster situations, describes appropriate patterns of response, and creates a series of management toolkits to aid with this.⁶ An important starting point is recognising that every disaster response project is different. Understanding local conditions (both physical and institutional), local cultures, and priorities crucially affects decisions as to what the best response should be. This community involvement must remain at the heart of the reconstruction process throughout, engaging all participants - not only will local people know what transitional help and reconstruction is most urgent, they will also carry out most of the work. Ultimately they will also form the social and commercial basis of the successfully rebuilt neighbourhood, city or region.

Shelter After Disaster also promotes the cluster approach, in which it is recognised that there are many different organisations trying to assist with similar issues, and that these can be more effectively used if coordinated under a lead agency. For example in emergency shelter the Global Cluster Lead agency is UNHCR (United Nations High Commission for Refugees) with IFRC (International Federation of Red Cross and Red Crescent Societies) as the convener. The cluster acts as a forum to enable all agencies to contribute opinions and experience but it also coordinates leadership and responsibilities.

One year after the Tōhoku Great East Japan Earthquake in 2011, it is estimated that more 260,000 people are still living in temporary accommodation, and though some of this has

⁶ Shelter Centre, *Shelter After Disaster: Strategies for traditional settlement and reconstruction*, DFID and UN/OCHA, 2010.

been designed with longer-term use in mind, much of it delivers only minimum standards of diminishing comfort. For example in the town of Ishinomaki, Miyagi Prefecture, the local government is intending to build new housing in two new areas, although they have yet to agree a price for the land from private owners. This has delayed construction and prolonged the use of the emergency shelters for 10% of the town's population, 16,800 people, from months to several years, during which time the buildings, not meant for such long occupation, will deteriorate.⁷

Large organisations such as governments and humanitarian organisations like those helping residents in Ishinomaki tend to think of their support as occurring in phases – gradually moving from emergency response to rebuilding. Recent studies have show that phased response to disaster situations leads to less efficient aid that takes longer and helps fewer people. Immediate, continuous, user focused aid is more likely to provide help where and when it is needed. For the many people who do not leave their homes but remain to secure their property and livelihood, reconstruction begins immediately, and speedy aid with this rebuilding can prevent much hardship and suffering – this is particularly true for those involved in urban disasters. Better construction design and choice of location could mitigate much of the damage and health hazards associated with the major natural disaster types (earthquake, flood, storms), and it is essential that in the rebuilding process safe construction methods are incorporated so in the event of further events the population and their property is protected rather than injured by their homes. Specialist advice from architects, engineers and experienced building contractors are of crucial value in this area.

For some, displacement is inevitable and the need for appropriate 'transitional shelter' is crucial – shelter that is flexible enough to be of use immediately but also to be adapted as need continues and changes, for example to be relocated, upgraded, reused or recycled. The *Transitional Shelter Guidelines* published in draft form by the Shelter Centre in 2011 defines transitional shelter as '...a process rather than a product. It is not another phase of response as

⁷ Malcolm Moore and Danielle Demetriou, 'Japan earthquake and tsunami anniversary: quarter of a million face five years in shelters'. *The Telegraph*, 8th March 2012.

it begins with the first assistance offered, such as the distribution of plastic sheeting.’⁸ A particularly speedy, simple and effective approach to emergency aid is that provided by Shelter Box, a charity that delivers the essentials a family needs to survive in the immediate aftermath of a disaster in a large green box, the contents of which are tuned to the environment in which they will be used. These include a specially designed tent, a tool kit, cooking and heating supplies, fabrics for warmth and comfort or insect protection, and children’s learning and play pack.⁹ The aid can be distributed from a central supply base in the UK but also from pre-positioned depots around the world. Local information is gathered to ensure the boxes are distributed to those most in need and the impact of the boxes is assessed in the post-disaster period.

Transitional shelters built after the initial emergency situation should be made with, and by the community, to standards agreed by them. The objectives should be to maximise safety and health, and the materials and construction methods chosen should be familiar, making use of skills local people have access to. An important issue in transitional shelter is land tenure, which can often form a stumbling block in allowing homes to be built because of fear from the landowners that their property will never be returned. In addition, building codes and regulations designed for permanent buildings by local authorities can also form hindrances. It is therefore essential that transitional shelter, which is often first erected not long after the disaster situation first occurs (when land rights and government control are temporarily set aside) is designed as something that can be relocated, providing less of a threat to landowners, and is clearly perceived as outside normal building conditions by regulators. This also makes it more effective in the medium and long-term, being not only relocatable but resalable, reusable (for the same or other functions) and recyclable.

In terms of the design of appropriate mid to long-term transitional shelters, though it may take some additional time, it is first necessary to determine the functional, social and cultural demands that will be made on the building. These will be different for each situation and the determination of the actual parameters for form and construction should only be made

⁸ Shelter Centre, *Transitional Shelter Guidelines*, International Organisation for Migration, 2011, p.9.

⁹ See Shelter Box (www.shelterbox.org) accessed 12/04/2012.

after appropriate use of local knowledge. Though the building should protect the inhabitants from harsh weather conditions, cold, heat, wind, rain, and snow, it should also establish an area of territory for its inhabitant, either of occupancy or ownership. It should provide a physical manifestation of personal identity, privacy and security and an address for the receipt of communication, services and aid. It should support the continuation or establishment of a form of income, either from business or by adjacency to previous or new employment and should be capable of expansion to accommodate family members. It should have the capacity to store and protect personal property, and be capable of maintenance and upgrading. Shigeru Ban's temporary housing in Onagawa, Miyagi Prefecture, completed six months after the earthquake struck, is designed within a community area that also incorporates a market, a library and an assembly space. Constructed using shipping containers in conjunction with more conventional prefabricated building methods, the three-story apartment dwellings are designed to be earthquake proof. The housing has several different flexible apartment layouts from small single rooms to larger multiple room family units, in order to offer a longer term dwelling alternative if residents cannot, or decide not to return to their damaged homes.¹⁰

Esoteric and inventive creations for shelter after disaster are interesting to others in the design professions, but of no value whatsoever to refugees and disaster victims. What is required are dedicated design and construction responses focused on the geographic locations where disasters are known to occur. The role for specialist mobile structures is very limited, perhaps only to medical or command facilities, however, the role of building professional advisors is essential in advising on effective, responsive transitional shelter, and in ensuring that the long term reconstruction process incorporates designs that protect inhabitants from future disasters such as earthquakes, tsunamis and floods.

¹⁰ Kyodo, 'Miyagi completes work on temporary housing'. *The Japan Times*, 7th November, 2011.