Improving Sustainability and Cultural Integration in Post-Disaster Temporary Housing

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Abstract

Natural disasters have drastically increased over the last decades causing extensive material and non-material damages. The destruction of houses and the increasing number of homeless are some of the most visible effects of post-disaster scenarios. Housing is one of the people's most important needs and it is essential for their well-being. After a disaster, it is crucial to supply temporary accommodation in order to provide survivors with comfort, protection, and privacy until they have permanent houses. Temporary housing is, therefore, an extremely important solution of temporary accommodation allowing victims to gradually return to their normal life activities during the reconstruction process. Although it has been widely used, especially after large-scale disasters, temporary housing as a fast solution adopted in emergency situations has not always proved to be an effective option. Moreover, temporary housing has been greatly criticized mainly for being unsustainable, and culturally inadequate to local contexts. Through a literature review and case studies, the research points out the main causes of problems in temporary housing units. It also discusses possible solutions to overcome or minimize these problems, offering recommendations based on concepts that have proved to be effective in previous studies. The recommendations focus on useful concepts in the development of more sustainable, locally sensitive and culturally integrated solutions. It is found that an essential change is needed in the development of temporary housing solutions. These solutions should be developed through a people-oriented strategy, rather than focusing on the technical aspects of the units.

Keywords: Temporary Housing, Sustainability, Local Integration, Cultural Adequacy, Post-Disaster Reconstruction.

Introduction

Housing plays a crucial role in people's lives, providing a space to live with dignity, security and comfort. Therefore, it is essential for people to feel socially integrated and to develop a sense of belonging. A house is also a source of pride and cultural identity (Barakat, 2003), and it reflects that identity, hence, reflecting people's personality (Kellett and Tipple, 2000). While inhabiting a house, people create a strong relationship to it, and this relationship becomes more important than the house's physical structure and value.

As housing is an extremely vulnerable asset, its destruction is one of the most visible post-disaster effects (Barakat, 2003), which leads to the loss of those symbolic references

(Bedoya, 2004). Thus, post-disaster re-construction should be fast as losing a house is more than a physical deprivation; it signifies losing dignity, identity and privacy (Barakat, 2003).

Repairing and building houses damaged in a disaster usually takes a long time. Due to their precarious conditions, often these buildings risk collapsing and can hardly be repaired, thus constructing new ones becomes imperative. Between the aftermath of a disaster and the conclusion of reconstruction works, the provision of temporary accommodation is crucial to provide victims with a secure and private space. Post-disaster temporary accommodations can widely vary in terms of different typologies (Johnson, 2002), however, two main types can be identified: (1) *sheltering*, namely emergency and temporary shelters, and (2) *housing*, which are temporary houses.

The main difference between *sheltering* and *housing* is that, while shelters provide a secure place to stay during the period that immediately follows the disaster when daily activities are interrupted, housing allows for a return to household responsibilities and daily routine (Quarantelli, 1995). Since people cannot stay in shelters for a long time, as they cannot resume their daily lives there, and reconstruction works often take a long time, there is a time gap to bridge, and temporary housing seems to be the obvious solution (Johnson et al., 2010). Not only does it protect and provide privacy, but it also allows people to regain their daily life and introduces some sense of normalcy, enabling them to perform subsistence activities, such as housekeeping, cooking, working, etc. Additionally, housing may promote a successful overall reconstruction process, since it allows for more time and better community planning to reduce risks and improve the sustainability of reconstruction (Johnson, 2008).

Temporary housing can be defined both as part of a post-disaster re-housing process and as a physical type of building used temporarily by families during the reconstruction works (Johnson, 2007b). This research focuses on temporary housing as a physical type of housing unit, that is to say, the temporary building that people inhabit after a disaster until they have a permanent house to live.

In spite of its importance, temporary housing is a controversial issue of post-disaster reconstruction programs, and it has been criticized due to the persistence of problems it raises (UNDRO, 1982; Barakat, 2003; Johnson, 2007a; Johnson, 2007b; Johnson, 2008; Hadafi and Fallahi, 2010).

Why Have Temporary Housing Solutions Been Criticized?

Even though there is a wide range of different temporary housing solutions available, they have frequently led to unsuccessful and undesirable outcomes. Most available solutions are more concerned with the units' technical aspects than with the people that will inhabit them, leading to culturally inadequate and locally inappropriate designs. Likewise, the implemented solutions have been economically and environmentally unsustainable.

Inadequacy Issues

Most of the times, temporary units are designed by experts that are not familiar with the contexts where disasters occur. This cultural distance between professionals and local communities affected by disasters reflects in the proposed housing units that often are not the most suitable for users, but are the result of what professionals imagine to be appropriate (UNDRO, 1982; Lizarralde and Davidson, 2006). This approach neglects cultural patterns, local conditions, as well as users' needs (El-Masri and Kellett, 2001). Besides being developed in a foreign country, these solutions are often based on standardized and

mass-produced units in order to reduce costs and maximize production. Thus, standard solutions tend to ignore the real needs of users, the variations in cultural values, the climatic differences, the variations in family size, the diversity of local housing architecture, among other parameters (UNDRO, 1982). Therefore, units end up having inappropriate architectural styles and characteristics that often do not reflect local people's expectations and create a totally alien built environment (Gulahane and Gokhale, 2012).

After losing their homes, which is one of the primary factors of stress for disaster survivors, being relocated in temporary housing often becomes a relevant secondary source of stress (Caia et al., 2010). Certain solutions, however, resemble the prototype of a home more than others do, and people may become attached to the temporary house, having benefits for their long-term psychological well-being (ibid). On the contrary, when temporary units do not meet the users' needs and expectations, they frequently abandon or modify them, which in turn may affect the safety conditions of the building (El-Masri and Kellett, 2001; Dikmen et al., 2012; Sener and Altun, 2009).

The Unsustainability of Temporary Housing

Since most of temporary units are produced in industrialized countries, they have to be imported and transported to the sites where they will be placed. This procedure can be highly expensive because it involves the cost of the units, their transportation, and skilled labour to set them up. These investments have been considered both high and unnecessary, due to the units' expected short period of usage. Thus, temporary housing is very expensive when compared with its lifespan, considering that it can cost as much as a permanent house (UNDRO, 1982), or even up to three times more (Hadafi and Fallahi, 2010). Consequently, temporary housing has been criticized for drawing away resources from the construction/reconstruction of permanent houses (Johnson, 2007a), negatively affecting the overall reconstruction program. Moreover, the lack of planning for units' disposal after their usage has led many critics to consider temporary housing solutions as unsustainable. Previous studies have found that temporary units can be re-used (Johnson, 2007a), but they are often simply dismantled or demolished regardless of the potential for reuse or recycling, which is a very unproductive approach (Arslan and Cosgun, 2007). This unsustainable waste of resources adds to the negative effects that temporary houses normally have on site due to the pollution caused by foundations, infrastructures, and garbage resulting from their removal.

Guidelines for Improving Temporary Housing Units

The problems previously identified motivate us to propose and discuss some guidelines for improving temporary housing units. The problems identified above seem to result from misconceptions about the circumstances in which post-disaster survivors live, unfamiliarity with the local reality, depreciation of the potential of local resources, and investment in technologically-oriented approaches to the detriment of a socio-economically and culturally-sustainable approach. Strategies for overcoming these problems may involve the application of some principles that emerge from our literature review: designing for people, community participation, usage of local and indigenous resources, simplicity of construction systems, flexibility in spaces and solutions, designing units and their sites as a whole, and designing for long-term possibilities.

Designing for People

More than just physical structures, temporary housing is a space that provides for social, spiritual and psychological needs (Hadafi and Fallahi, 2010). Thus, solutions should be designed with attention to the users' point of view (UNDRO, 1982). It is imperative to shift

the focus from the units' construction aspects to the development of more sensitive and friendly solutions, considering creating 'homes' rather than designing houses. There is no need for new inventive or original solutions. Those kinds of "interesting creations" may be attractive for other approaches related to design, but have no significant value for disaster victims (Kronenburg, 2009). Design priority should be users' needs and expectations, rather than aesthetics or form.

Community Participation

Community participation is a crucial aspect for improving the outcome of temporary housing units. On the one hand, users' satisfaction is greatly related to their participation (Lizarralde and Bouraoui, 2012). The affected community should be involved in the assessment of their own needs and expectations, so the units can address these needs (UNDRO, 1982). On the other hand, people are often capable of actively participating in the re-housing works, since they usually have basic knowledge about construction and the will to contribute. Indeed, survivors have often provided the primary response to their shelter needs after disasters (UNDRO, 1982), and this ability to respond should be enhanced (Bedoya, 2004). However, participation is not always necessarily required, and it has to be carefully and contextually defined and planned (Davidson et al., 2006).

Local and Indigenous Resources Usage

The use of local materials and building techniques, as well as local workforce, contributes to considerably reducing costs and improving local economies. In addition, temporary housing units may be available earlier once the time-consuming transport of materials and labour is no longer required. And, if construction materials belong to the affected region, cultural and local integration can be promoted as well as the participation of local workers that master local materials and construction techniques. The fact that local resources and construction systems are adopted also allows for better maintenance and modifications. Furthermore, some indigenous building solutions may even be more resistant to disasters and more effective, and may probably suit local needs better than foreign technologies do (Twigg, 2006; Shaw et al., 2008; Gulahane and Gokhale, 2012).

Simple Construction Systems

In addition to the previous concepts, simple construction systems facilitate and accelerate the construction process. Construction systems should be based on light and small elements, which are easy to handle, assemble and dismantle (Arslan, 2007). In the same way, solutions should be non-polluting, and easy to remove and dispose (Johnson, 2007a). However, preferring simple and local construction systems does not mean rejecting innovation. Actually, if properly introduced and culturally integrated, new materials and technologies, such as prefabrication, may provide a useful contribution to improving temporary housing solutions (Davidson et al., 2008; Garofalo and Hill, 2008).

Flexible Spaces and Solutions

Generally, flexible spaces can be easily modified by final users according to their needs. In disaster scenarios, housing is frequently combined with working activities (Kellett and Tipple, 2000), and designing flexible solutions enables the co-existence of various activities. Flexibility in temporary housing units design allows users to customise the spaces according to their tastes, and therefore getting them to feel more attached to the house. Flexible solutions also allows for expanding the original unit, promoting the development of the building overtime and according to the families' means. Due to these advantages, the concept of flexibility of spatial solutions has been considered essential for post-disaster temporary housing (UNDRO, 1982; Kellett and Tipple, 2000; El-Masri and Kellett, 2001;

Barakat, 2003; Bedoya, 2004; Lizarralde and Davidson, 2006; Lizarralde and Root, 2007; Arslan and Cosgun, 2008; Sener and Altum, 2009).

Designing Units and their Site as a Whole

The spaces surrounding the units are as crucial as the units themselves. Designing buffer zones between the public domain and the private area of the units is essential for creating privacy among neighbourhoods, and promoting socializing and interaction (Caia et al., 2010). Possible uses of gardens surrounding the units can range from entertainment or work purposes to growing fresh produce, thus improving the family finances.

Designing for Long-term Possibilities

When designing temporary units, it is imperative to determine sustainable re-use options to apply after their intended period of usage. In this way, it is possible to compensate the high initial investments and reduce the environmental impact of temporary housing. Previous researches have demonstrated the possibilities and advantages of reusing and recycling the units (Johnson, 2007a, 2007b, 2008; Arslan, 2007; Arslan and Cosgun, 2007). With a similar aim, a study developed by Bologna (2004), presents the concept of reversibility of the construction process, which is the possibility of re-introducing the materials in another production cycle, or re-integrating them in the natural environment without causing waste. All of these alternatives improve the sustainability and outcomes of temporary housing units; therefore, these alternatives should be well planned and developed during the design phase.

Case Studies

There are numerous examples of different kinds of temporary houses. In this section, four examples are presented and analysed considering the previously discussed principles. Particularly, two examples seem to suffer from the problems identified above, while the other two seem to reflect the successful implementation of some of the proposed principles.

Future Shack

Future Shack is a prototype for mass-produced emergency housing built from recycled shipping containers (Fig. 1Left). This solution requires heavy machinery, and the volume of the entire unit occupies much space. Thus, the transportation to areas that are difficult to access is complex since a truck or crane has to be placed on site, which may be expensive and time-consuming. Despite being referred by Helsel (2001) as a friendly object with a roof adapted to local versions of “home”, the possibilities of customization are scarce, preventing ethno-cultural and social-cultural adequacy. Moreover, the solution is entirely based on standardized materials, and interior details seems superfluous and expensive (Hamilton, 2012), hindering the use of local materials for future expansions or user's modifications (fig. 1 center and right). The unit seems to be closer to what El-Masri and Kellett (2001) consider an expensive and alien housing unit, rather than a friendly object. The solution also matches what Lizarralde and Davidson (2006) describe as the “box effect”, which considerably decreases the conditions for mixed indoor and outdoor use, and the opportunities for expanding or modifying it according to the users’ needs over time. Although it is claimed that Future Shack can be fully erected in 24 hours through the simple assembly of parts that require basic tools and skills, the solution requires some specific machinery and skilled workforce, which discourages the participation of local inhabitants in the construction process.

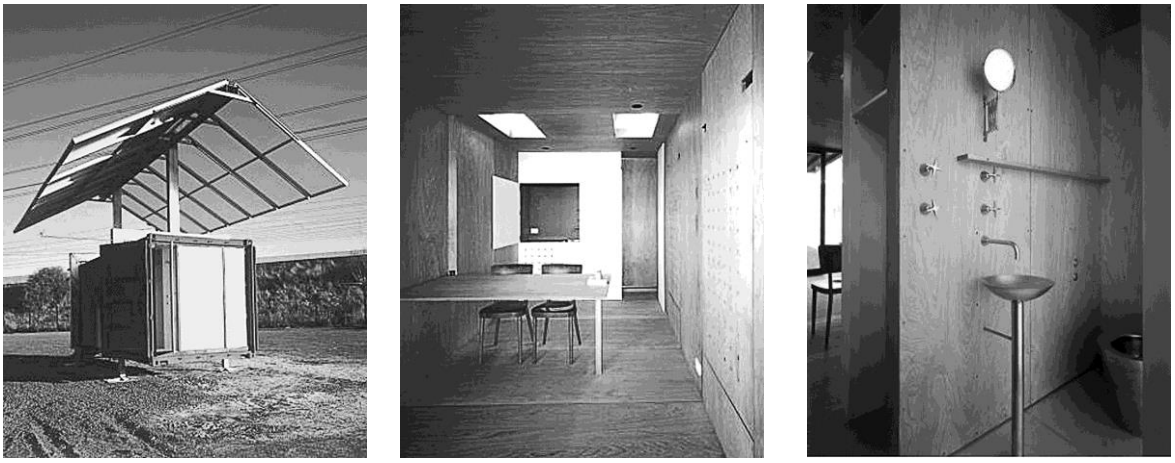

Figure 1: Future Shack. Left: Exterior; Center and Right: Interiors.
Source: http://www.seangodsell.com

International Organization for Migration (IOM) Unit

The IOM Unit was used in Haiti to re-house the victims of the January 12th 2010 earthquake, and it seems to have had several problems similar to those of the previous example (Fig. 2 left). The unit is built in-situ, which means that only the materials need to be transported from the production site, while the construction system is relatively simple. However, the foundation is made of concrete blocks under a concrete slab for the floor, and these are difficult elements to remove after dismantling. The walls consist of a wood frame covered with plywood, and the roof is made of corrugated steel, but the hurricane straps were not consistently installed in Haiti (Saltzman et al., 2010). The unit has one door and two openings, which are minimal and provide poor ventilation. This is another example of the "box-effect" (Lizarralde and Davidson, 2006) that does not address the needs of people affected by disasters. As a result, users in Haiti frequently added a covered exterior area to meet their needs and accommodate a variety of activities. Nevertheless, this design solution creates a clear barrier between interior and exterior space, and makes it difficult for users to integrate their exterior additions to the original structure. As well, structural insecurity due to weak connections and poor materials of the added elements are problematic (fig. 2 right).

Figure 2: IOM Unit. Left: Exterior; Right: Addition.
Source: http://openarchitecturenetwork.org/

Paper Log Houses

Paper tubes are the main construction material used by this temporary housing solution (Fig. 3). The lightness of these elements, which are easy to transport, and the simplicity of the structure allowed several affected communities to perform the erecting works (fig. 3). This housing solution was designed by the architect Shigeru Ban, and first used in Japan, after the Kobe earthquake, in 1995. It consisted of a foundation made of donated beer crates loaded with sandbags, walls and structures made of paper tubes, and a roof made of tenting material. An outdoor common area was created between the units that could also be used to expand the houses over time (fig 4 left). After their usage, the units can be easily dismantled and the material easily recycled, leaving the place completely recovered since the foundations do not cause irreversible damage to the ground. The solution has shown to be flexible and to adapt to different contexts and functions, such as temporary schools and churches. In Turkey, in 2000, the units had a different configuration to fit the standard size of the country's plywood as well as the size of the families. The solution implemented in India in 2001 used rubble from destroyed buildings for the foundation, due to the lack of beer crates. A traditional mud floor was used as well as a locally made woven mat on a bamboo structure for the roof. The small holes in the mats provided ventilation, allowing people to cook inside and helping to repel mosquitoes (Fig. 4 right). Ultimately, this solution is easily erected by local people, enhances community participation, adapts to different circumstances, and uses recyclable and reusable materials. In addition, it can be mass-produced and standardized, and allows interesting combinations with local materials and construction techniques.

Figure 3: Paper Log Houses. Up-Left: Assembled units.
Source: http://www.shigerubanarchitects.com); Up-right, Bottom-Left and Bottom-Right: assembly works by local people. Source: https://archnet.org.

Figure 4: Paper Log Houses. Left: Transformation of two units into a three-room dwelling using the space between concrete. Source: Johnson, 2008; Right: Solution used in Gujarat, India. Source: http://www.shigerubanarchitects.com/.

Temporary Units

At a school in the state of Myanmar, the need for space and immediate accommodation for new students, victims and refugees of the armed conflict in the Karen State of Myanmar, led to the construction of temporary low-cost and easy-to-assemble dormitories. These buildings were constructed with local available materials and through simple structures that are erected only with labour (fig. 5 left and right). The assembly and maintenance are easy because the construction techniques and materials are well-known by local people. The spaces meet the students' lifestyle, creating semi-private spaces, rooms for storage, and also an open and airy interior adapted to the climatic conditions. Using local materials, such as bamboo, recycled timber from old buildings in town, and leaves, the building fits the local environment (fig. 6), and provides a sustainable solution because there is no need for complex ways of transportation or tools. After the intended period of use, the building can be dismantled, the place totally cleaned and restored, and the materials may be re-used or easily disposed of.

Figure 5: Left and Right: Temporary Dormitories assembly process.
Source: http://openarchitecturenetwork.org/.

Figure 6: Temporary Dormitories' exteriors. Source: http://openarchitecturenetwork.org/.

Conclusions

The provision of temporary housing units is undoubtedly a crucial task to improve a community's quality of life after a disaster. The flaws of some of the solutions that have been implemented seem to result from misunderstandings about the realities of disaster scenarios. Most of these misconceptions are based on a gap between people's real, lived experience after a disaster and professionals' perceptions about the local capacity for reconstruction.

This research has revealed that a careful understanding of the context, identification of the real needs of the survivors, and a correct evaluation of potential local resources, combined with a people-oriented design approach, will certainly help to develop more sustainable and culturally-appropriate solutions. There is no need for new sophisticated or high-tech solutions. The key to develop effective and successful solutions is to design temporary housing units according to precise context-based specifications, thus allowing people to transform their units into temporary *homes*.

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References

Arslan, H. 2007. Re-design, re-use and recycle of temporary houses. *Building and Environment* 42, 400-406.

Arslan, H., and Cosgun, N. 2007. The evaluation of temporary earthquake houses dismantling process in the context of building waste management. *International Earthquake Symposium. Kocaeli, 2007.*

Arslan, H., and Cosgun, N. 2008. Reuse and recycle potentials of the temporary houses after occupancy: example of Duzce, Turkey. *Building and Environment* 43(5), 702–709.

Barakat, S. 2003. *Housing reconstruction after conflict and disaster.* London: Overseas Development Institute. http://www.odihpn.org/documents/networkpaper043.pdf (Accessed 16 June 2011).

Bedoya, F.G. 2004. Hábitat transitorio y vivienda para emergencias. *Tabula Rasa* 2, 145-166.

Bologna, R. 2004. Transitional housing for emergencies: temporariness and reversibility of the building process. *Conference Proceedings of the 2nd i-Rec International Conference on post-disaster reconstruction ''Planning for Reconstruction''*, 2004, Coventry, UK.

Caia, G., Ventimiglia, F. and Maass, A. 2010. Container vs. dacha: The psychological effects of temporary housing characteristics on earthquake survivors. *Journal of Environmental Psychology* 30(1), 60-66.

Davidson, C. H., Johnson, C., Lizarralde, G., Dikmen, N. and Sliwinski, A. 2006.Truths and myths about community participation in post-disaster housing projects. *Habitat International* 31(1), 100-115.

Davidson, C., Lizarralde, G. and Johnson, C. 2008. Myths and realities of prefabrication for post-disaster reconstruction. *Conference Proceedings of the 4th i-Rec International Conference ''Building resilience: achieving effective post-disaster reconstruction''*, 2008. Christchurch, New Zealand.

El-Masri, S. and Kellett, P. 2001. Post-war reconstruction. Participatory approaches to rebuilding the damaged villages of Lebanon: A case study of al-Burjain. *Habitat International* 25(4), 535-557.

Gulahane, K. and Gokhale, V.A. 2012. Design criteria for temporary shelters for disaster mitigation in India. *Conference Proceedings of the 5th i-Rec International Conference ''Participatory design and appropriate technology for disaster reconstruction'',* 2010. Ahmedabad, India.

Hadafi, F. and Fallahi, A. 2010. Temporary housing respond to disasters in developing countries- case Study: Iran-Ardabil and Lorestan province earthquakes. *World Academy of Science, Engineering and Technology* 66, 1536-1542.

Hamilton, N. 2012. Post-disaster shelter: A studio-based response to emergency shelter in natural disaster zones. *Conference Proceedings of the International Conference ''Sustainable Futures Conference: Architecture and Urbanism in the Global South''*, 2012. Kampala, Uganda.

Helsel, S. 2001. Future Shack. *Architecture Australia 89 (5).* https://www.architecturemedia.com/aa/aaissue.php?issueid=200109&article=11&typeon=2 (Accessed 4 January 2013).

Johnson, C. 2002. What's the big deal about temporary housing? Planning considerations for temporary accommodation after disasters: example of the 1999 Turkish earthquakes. *TIEMS Disaster Management Conference*, 2002, Waterloo.

Johnson, C. 2007a. Impacts of prefabricated temporary housing after disasters: 1999 earthquakes in Turkey. *Habitat International* 31(1), 36–52.

Johnson, C. 2007b. Strategic planning for post-disaster temporary housing. *Disasters* 31(4), 435-458.

Johnson, C. 2008. Strategies for the reuse of temporary housing. In: I.A. Ruby (ed): *Urban Transformation.* (pp 323-331) Berlin: Ruby Press.

Johnson, C., Lizarralde, G. and Davidson, C. 2010. A systems view of temporary housing projects in post-disaster reconstruction. *Construction Management and Economics* 24(4), 367-378.

Lizarralde, G. and Davidson, C. 2006. Learning from the poor. *Conference Proceedings of the 3rd i-Rec International Conference ''Post-disaster reconstruction: Meeting the stakeholders' interest''.* May 17-19, 2006, Florence, Italy.

Lizarralde, G. and Root, D. 2007. Ready-made shacks: Learning from the informal sector to meet housing needs in South Africa. *Conference Proceedings of the CIB World Building Congress.* May 21-25, 2007, Cape Town, South Africa.

Lizarralde, G. and Bouraoui, D. 2012. User's participation and satisfaction in post-disaster reconstruction. *Conference Proceedings of the 5th i-Rec international conference*

''Participatory design and appropriate technology for disaster reconstruction'', 2010, Ahmedabad, India.

Kellett, P. and Tipple, A.G. 2000. The home as workplace: A study of income-generating activities within the domestic setting. *Environment & Urbanization* 12(1), 203-214.

Kronenburg, R.H. 2009. Mobile and flexible architecture: Solutions for shelter and rebuilding in post-flood disaster situations. Blue in architecture 09_ PROCEEDINGS_IUAV Digital Library. http://rice.iuav.it/351/1/KRONENBURG.pdf (Accessed 29 December 2011).

Quarantelli, E.L. 1995. Patterns of sheltering and housing in US disasters. *Disaster Prevention and Management: An International Journal* 4(3), 43-53.

Saltzman, A., Speziale, C., Cesal, E., Arnold, H. and Kernizan, S. 2010. *Transitional to What?* http://openarchitecturenetwork.org/projects/transitional_to_what (Accessed 17 March 2012).

Sener, S. M. and Altum, M.C. 2009. Design of a post disaster temporary shelter unit. *ITUA|Z Journal of the Faculty of Architecture* 6(2), 58-74.

Shaw, R. 2009. *Indigenous knowledge: disaster risk reduction, policy note.* http://www.unisdr.org/we/inform/publications/8853 (Accessed 7January 2012).

Twigg, J. 2006. Technology, post-disaster housing reconstruction and livelihood security. B.H. Centre (ed.) *Disaster Studies Working Paper* No.15.

United Nations Disaster Relief Organization – UNDRO. 1982. *Shelter after disaster: Guidelines for assistance*. New York: United Nations.

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