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Quality and standards in post-disaster shelter

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The Discussion that followed the presentation of this paper will be published online

Synopsis

Shelter plays an essential role in post-disaster situations both in saving lives and in promoting early recovery by helping to restore dignity, support livelihoods and re-establish communities. To be effective shelter must be of adequate quality, yet there is no commonly accepted definition of what this means.

This shortfall is compounded by the lack of expertise or institutional knowledge within individual organisations, high staff turnover and the large number of new actors that enter the sector for the first time in post-disaster situations. To some extent this has been overcome by the introduction of standards and indicators in recent post-disaster responses combined with recent initiatives to reform co-ordination structures. However inconsistencies in terminology, approach and interpretation prevail and quality is often compromised due to post-disaster timescales and budgetary constraints. This paper proposes that quality should be considered from the shelter occupant's perspective, and whilst this will vary in different scenarios, it can be defined by 12 standard characteristics under two key headings – habitability and durability – which provide a framework for designing and subsequently monitoring and evaluating shelter programmes.

Introduction

More than 300 000 families lost their homes as a result of the earthquake in Yogjakarta in June 2006 (1.5M people). The previous year more than one million people were made homeless as a result of the tsunami in South-East Asia, the earthquake in Pakistan and Hurricane Katrina which devastated New Orleans. Shelter and housing programmes are critical to community recovery after a disaster, yet media reports and evaluations frequently criticise the quality of shelter provided by humanitarian organisations and governments, and express frustration over the pace of both emergency assistance and reconstruction. Meanwhile built environment professionals – architects and engineers – far away from these disaster areas conjure up "esoteric and inventive creations (which) are interesting to others in the design professions but of no value whatsoever to disaster victims"[1]. This paper is intended for manufacturers, academics, humanitarians and built environment professionals alike. It discusses what shelter and quality mean in a post-disaster context, and how they might be defined, with reference to existing standards and guidelines, and recent humanitarian responses; post-tsunami in Sri Lanka, and following the earthquakes in Pakistan (2005) and Yogjakarta (2006).

Emergency shelter

In post-disaster situations the primary purpose of shelter is to contribute to survival by providing protection from the environment: rain, wind, cold or sun. The imperative with emergency shelter is the speed at which it is available; too late simply means increased risk of loss of life. At its most rudimentary level emergency shelter might be plastic sheeting, or blankets which are distributed together with other non food items (NFIs).

Tents are the most common form of emergency shelter and are stockpiled in many hazard prone countries as part of disaster preparedness strategies, and the United Nations High Commission for Refugees (UNHCR) standard specification is widely recognised[2] (Fig 1) Despite this many tents were sent to Sri Lanka post-tsunami – by well meaning but inexperienced organisations - which were uninhabitable due to heat during the day, and in some cases were better suited to an alpine environment (Fig 2). Equally, some tents which provided high quality shelter in Sri Lanka were considered to be very poor quality in the very different climate of Pakistan. Large numbers of tents were readily available as they are manufactured there, and were rapidly distributed by the military. However, mostly these were not well suited to extreme winter environments and addi-

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Fig 1. UNHCR Standard Tent Specification, Sri Lanka (2004-05) (Photo: Jo da Silva) / Fig 2. Alpine Tent, Sri Lanka (2004-05) (Photo: Jo da Silva) Fig 3. Emergency Shelter, Pakistan (2005) (Photo: Mark Buttle)

tional measures were needed to mitigate against wind, draughts, snow loads, and cold temperatures prior to the onset of winter (Fig 3). Conversely, the brightly coloured, well insulated, sealed tents, provided by a Turkish organisation provided excellent protection from the harsh environment, but they were costly and extremely bulky therefore difficult to transport, and so were supplied in limited numbers only (Fig 4). Fire safety was a key issue that led to an extensive debate at the time as to whether the risk of burns, smoke inhalation and fire from heating stoves posed a greater risk can cold temperatures. Similarly in Sri Lanka kerosene lamps posed a risk to lightweight tents that were highly flammable.

In Sri Lanka, the east coast was totally devastated by the tsunami, leaving 30 000 people homeless in Ampara district alone. This is one of the remotest areas of the country, being more than eight hours drive from Colombo with no port, and outside of the LTTE Tamil Tiger controlled areas where there was already a humanitarian community with established delivery networks. Tents arriving in Colombo not surprisingly found their way more readily to the south west or north-east. Instead several agencies constructed emergency shelters en masse using plastic sheeting over simple timber or galvanised iron pipe frames. In the short term these were effective, although where dark coloured plastic sheeting was used, occupants reported eyesight problems and headaches, and the temperature was significantly higher than in good quality tents (Fig 5).

Simple structures created by individuals from salvaged or local materials can often provide more effective protection from the elements than tents in the short term, and enable people to stay on their own land and begin re-building. In Pakistan, sandbags filled with dirt and rubble were used effectively to create insulated walls, whilst above 5000ft distribution of re-construction materials was prioritised so as to encourage reconstruction of at least one room which could be kept warm, before the winter set in. The distribution of 400 000 home repair kits over 12 months by the Pakistan military and humanitarian community meant that up to 2M people were helped to stay at home rather than seek shelter assistance in the valley, thereby helping to prevent vast slum growth in Muzzafrabad and Islambad that has affected other urban centres after similar disasters.

Transitional shelter

All of the above examples illustrate that although timely assistance to prevent loss of life from environmental exposure is the key performance indicator for emergency shelter, there are a number of other factors to consider. Post-disaster shelter is considerably more complex than distributing tents, or providing a roof and walls. Most dictionary definitions of shelter refer to protection from bad weather, danger or attack, which incorporates the principle of environmental protection, and also security. However, beyond survival, the role shelter plays in psychological, physical and social welfare as well as being a catalyst to re-establishing livelihoods in the aftermath of a disaster, is reflected in the accepted definition of transitional shelter as 'providing habitable covered living space, and a secure, healthy living environment with privacy and dignity to those within it'[3].

The term transitional also recognises the role of shelter as bridging the gap between emergency measures and durable housing which is a human right under Article 25(1), Universal Declaration of Human Rights, 1948. Where large numbers of houses are lost as a result of a disaster, re-construction is likely to take years and transitional shelter solutions are critical to re-building communities and economies. In Sri Lanka approximately 120 000 houses were lost in the tsunami, whilst the previous year only 5000 new houses had been built. This illustrates the limitations in local capacity, and the need to involve external expertise, increase the amount of skilled labour through training programmes, and to import materials, tools and trucks. This scale of loss would also pose a challenge to the United Kingdom which builds around 150 000 new homes annually.

The objective of traditional shelter can be summarised as being:

- to provide adequate protection against the enviroment;
- to contribute to personal safety and security, dignity, health and well-being;
- to enable normal household duties and livelihood activities;
- to bridge the gap until durable housing is available.

Shelter in a humanitarian context is increasingly being seen not as discrete product, but as an integral part of a settlement which includes the physical and social infrastructure needed to support communities, including water, education, health and employment. The process, which should involve community decision making and create ownership, is as important as the product. Independent sustainable recovery begins with a home and job, and shelter has been shown to act as a 'catalyst to enable families to make a step change from dependency on external assistance, to self management and self help, enabling and empowering communities to understand and meet their own needs'[3]. This approach – focussed on communities rather than individuals – has led to classification of the range of shelter options adopted by families following a disaster: host families, collective centres, planned or self-settled camps and on-site shelter. Typically, a post-disaster shelter strategy should include a number of these options, each requiring support from government or external aid organisations.

Wherever possible it is deemed preferable for families to return to their own land, and repair or re-construct their homes. In Sri Lanka this was encouraged by providing tents, and subsequently transitional shelter or assistance with re-construction. (Box 1: Navaldy case study). However fear of the sea, fragmented communities, loss of essential infrastructure such as water and electricity meant many preferred initially to seek shelter elsewhere. In both Sri Lanka and Aceh many sought refuge with family or

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Fig 4. Emergency Shelter, Pakistan (2005) (Photo: Mark Buttle) / Fig 5. Emergency Shelter, Ampara, Sri Lanka (2005) (Photo: Jo da Silva)
Fig 6. Transitional shelter, Aceh (2006) (Photo: Jo da Silva)

Box 1
Navaldy in Batticoloa on the east coast of Sri Lanka is a peninsula less than 1km wide which was home to a thriving fishing community who lived in reinforced concrete frame and masonry houses with tiled or tin roofs. The tsunami levelled the buildings, the wells were contaminated with sea water and the road scoured up by the under currents. The families and individuals that survived took refuge in Youth Hostel, and it was proposed they re-settle several kilometres inland. UNHCR engaged in extensive consultation to explain their options and it emerged that their preference was to go back to Navaldy but they were concerned at the lack of shelter, access, water and power. UNHCR worked with Catholic Relief Services (CRS) to meet these needs initially providing tents and basis services, re-building the road and then supplying materials for temporary shelters, and subsequently materials and technical assistance to re-construct their houses.

Box 2 Sphere standards
Strategic Planning: Existing shelter and settlement solutions are prioritised through return or hosting of disaster-affected households, and the security, health, safety, and well-being of the affected population are ensured.
Physical Planning: Local physical planning practices are used where possible, enabling safe and secure access to and use of shelters and essential services and facilities, as well as ensuring appropriate privacy and separation between individual household shelters.
Covered Living Space: People have sufficient covered space to provide dignified accommodation. Essential household activities can be satisfactorily undertaken, and livelihood support activities can be pursued as required.
Design: The design of the shelter is acceptable to the affected population and provides sufficient thermal comfort, fresh air and protection from the climate to ensure their dignity, health, safety and well-being.
Construction: The construction approach is in accordance with safe building practices and maximises local livelihood opportunities.
Environmental Impact: The adverse impact of the environment is minimised by the settling of the disaster-affected households, the material sourcing and construction techniques used.

friends who provided host family support. The introduction of the Coastal Zone Policyin Sri Lanka prohibited those living near the sea from returning to their land, which resulted in 50% of those displaced being both homeless and landless. This led to a large number of camps ranging in size from a few dozen to several hundred families, some of which were planned and others self-settled.

Rather than being considered as a product, post-disaster shelter is part of the process of re-establishing normality, and creating sustainable communities. The role of humanitarian organisations is to support that journey and reduce vulnerability, requiring a consultative and participative relationship with the local community, including local NGOs, architects and engineers, based on a principle of partnership – as opposed to contracting aid – which endeavours to be equitable and is targeted at the most vulnerable.

Standards and guidelines

Corsellis and Vitale strongly recommend that 'co-ordinators involve specialists from the outset, as the complex problems and opportunities encountered require professional input through the extensive strategic and technical expertise gained in this sector.'[3] However, the scale of recent events means that many humanitarian organisations have engaged in shelter for the first time, and even those with a track record suffer from lack of institutional knowledge due to high staff mobility. Experienced individuals are hard to find, and many shelter programmes in Sri Lanka, Pakistan and Indonesia were being run by architects or engineers with no humanitarian experience, or conversely humanitarian professionals with no design, technical or construction project management knowledge.

Shelter standards, guidelines and tools are potentially a means to compensate for this shortfall in resources, and make the most of the expertise that is available locally, as well as providing a framework for the delivery of humanitarian aid, so as to improve the quality, consistency and fairness of response and accountability to governments, donors and those affected by disaster. This is vital in situations where there are a large number of actors; in Sri Lanka 100 non-governmental organisations (NGOs) contributed to the transitional shelter programme.

However, unlike the water and sanitation, food or health sectors which are covered by numerous standards, guidance and tools which are complimented by degree programmes and training modules, the shelter sector by comparison is relatively un-evolved and has suffered from under investment over the past 20 years. The Sphere standards is really the only reference which currently provides specific guidance and standards for post-disaster shelter4. This has international acceptance, but its influence at a national level with local NGOs and government is typically weak. In Sri Lanka, Sphere Standards were known locally, but only from an out-of-date version, which focussed on camp planning based on African precedents. Individual shelter is covered in more comprehensively in recent versions which had not been translated into Sinhalese or Tamil.

There are six standards, each accompanied by several qualitative indicators and supported by guidance notes to facilitate interpretation for the specific context (Box 2). Standards 3. and 4. form the basis for shelter designs with 5. and 6. influencing material selection and construction choices. It is worth noting that Sphere presents standards agreed upon, not standards for everything. For example there are standards for neither host family support nor re-construction.

Other than Sphere there are publications which set out the principles based on human rights of providing shelter[5,6]; whilst *Transitional Settlement: Displaced Populations*[3] provides the most comprehensive guidance to this sector, and is an essential reference. *Shelter after Disaster*[7] (UNDRO 1982) – which is currently under review and being revised[8] – may be 25 years old but much of the guidance is still relevant although too often the same mistakes are being made. It is particularly critical of alien imported forms of shelter, which if transport and development costs are included, cost more than local solutions, generate no employment, and frequently arrive too late to fulfil their role of filling a gap. This latter criticism might well be levelled at the individual transitional shelters adopted in Banda Aceh (Fig 6). The quality of the design itself was proven, having been previously developed for a low cost housing project in Vietnam, but delays in importing the galvanised steel frames from Thailand and the plywood cladding, which having been re-tendered eventually came from New Zealand, meant that the first shelters were not erected until March 2006, 15 months after the tsunami. By then, re-construction of houses was well underway, although many families were living in rotting tents, in cramped conditions with host families or in barracks where they remained dependent on aid.

Shelter module

The consensus of opinion is that local shelter solutions are preferred, as the involvement of local people creates ownership, employment opportunities, and is more likely to be culturally acceptable and respond to a wider range of beneficiary needs. However, there also remains and over-riding need to provide shelter quickly and it is not possible to plan, design and build bespoke local solutions in the immediate days after a disaster. Consequently there is a need for transportable family shelter solutions that can be stockpiled in-country or airlifted in, and overcome some of the limitations of tents including weight, degradation and lack of adaptability. Manufacturers and suppliers have requested clear standards and indicators of shelter requirements from the international community so that they can engage productively in research. These are currently being developed as part of the Shelter Module programme by the Shelter Centre in consultation with a number of humanitarian organisations. The object is to give beneficiaries immediate support which allows for local improvement and adaptation and although still in draft form provides a useful reference both for pre-fabricated and local solutions[9].

Performance standards and indicators are provided under three headings (logistics, physical and social), which are cross referenced to Sphere standards and UNHCR Guidelines. Since their focus is on lightweight pre-fabricated solutions for immediate deployment, speed of delivery is the critical issue and the emphasis on logistics is fundamental. However, the separation of the remaining performance criteria into physical and social standards implies a separation rather than a connection between the needs of the occupants and how these are integrated into the design. The physical parameters focus on provision of 'an appropriate and safe' shelter for 'full-time occupation by a family' and relate to the immediate functionality of the shelter, whilst the social standards cover ease of erection, and repair, maintenance, adaptability, modularity which all affect the longer term usefulness of the shelter and consequently its ability to bridge the gap until a durable solution is found. If considered from the viewpoint of occupant not manufacturer these parameters could be better categorised under two headings: habitability and durability.

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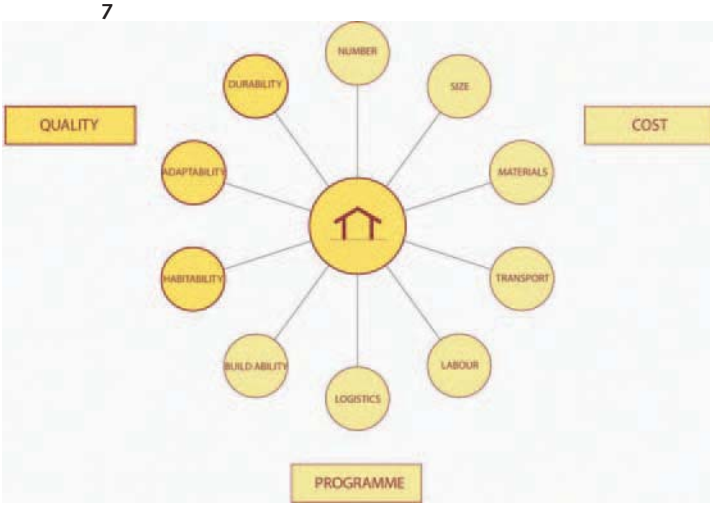

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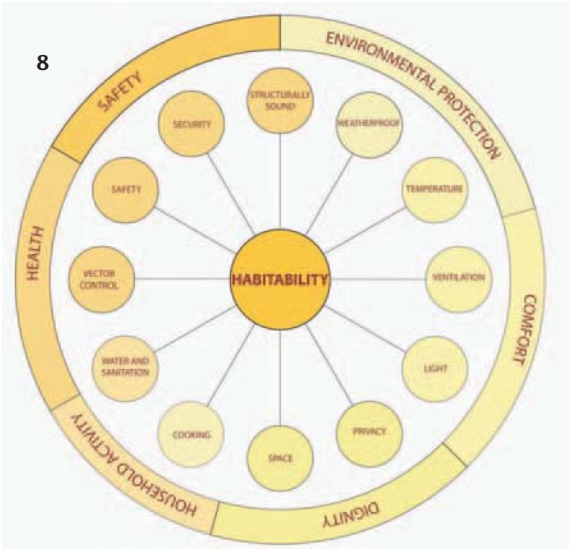

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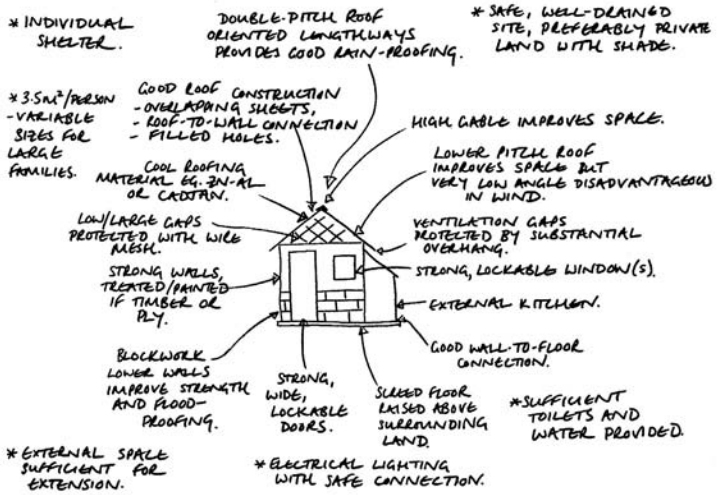

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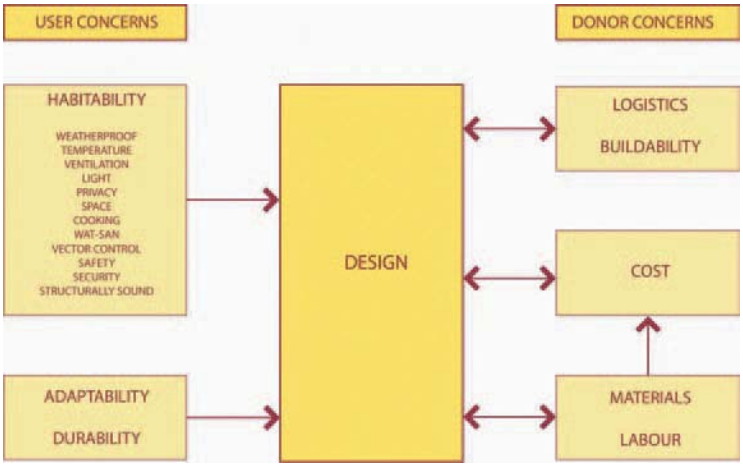

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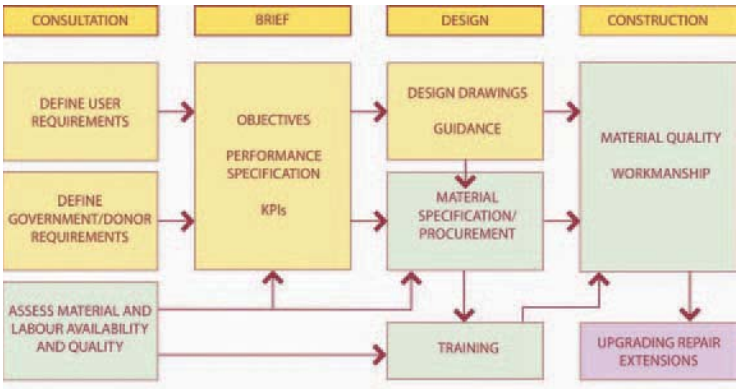

Fig 7. Quality – Cost – Programme (Photo: Jo da Silva) / Fig 8. Habitability (Photo: Jo da Silva) / Fig 9. Post-conflict returnees, transitional shelter, Sri Lanka (2002-04) (Photo: Jo da Silva) / Fig 10. Transitional shelter – Yogjakarta (2006) (Photo: Pete Mansfield) / Fig 11. Transitional shelter – Schematic for Sri Lanka (Photo: Caroline Crook) / Fig 12. Design inputs (Photo: Jo da Silva) / Fig 13. Shelter programme process (Photo: Jo da Silva)

Habitability and durability

From the occupant's viewpoint habitability and durability are their primary concerns; can my family live here and how long for? Whereas a shelter programme manager needs to balance these concerns against the need to provide value for money whilst meeting needs quickly, effectively and efficiently in line with donor and government expectations (Fig 7). Many programme managers new to shelter are more familiar with the relative simplicity of non-food items (NFIs) where both quality and cost are part and parcel of the product specification, and the number of items and logistics of distribution (labour, transport and storage) are the main variables. With shelter the situation is considerably more complex; cost is dependent on design (size, materials, need for skilled labour), programme dependent on the integration of several delivery and production streams, whilst quality is not clearly defined and dependent on the specific context.

Table 1: Habitability qualities and transitional shelter objectives

Habitability qualities	Transitional shelter objectives					
	Environmental protection	Comfort	Dignity	Household	Health	Safety
Weatherproof	*	*				
Temperature	*	*				
Ventilation		*				
Light		*				
Privacy			*			
Space			*	*		
Cooking				*	*	
Water and sanitation				*	*	
Vector control					*	*
Safety (fire, toxicity)						*
Security						*
Structurally sound	*					*

Shelter design

The challenge for shelter advisors and programmers is to articulate precisely what habitability constitutes, and to translate this into a design brief or more appropriately a performance specification. Research undertaken by the author and C. Crook suggests that there are 12 qualities which contribute to habitability; weatherproofing, temperature, ventilation, light, privacy, space, cooking, water and sanitation, vector control, safety (including fire and toxicity), security (personal and possessions), structural integrity (Fig 8). Ensuring that each of these qualities is provided for adequately will result in a shelter that is habitable and achieves the objectives of environmental protection, health and well being, safety and security, dignity, and facilitates household and livelihood activity (Table 1).

Durability relates to the performance of the shelter over time and whether the shelter will remain habitable over the required time period for re-construction or re-settlement. Durability qualities are: structural integrity, material choice, repair and maintenance, adaptability. In Sri Lanka the design life for post-tsunami transitional shelter was initially proposed as 4 years by international donors but political optimism meant the government favoured a shorter period of 18 months. 2 years on many families are still living in transitional shelter due to the negative impact of conflict on reconstruction. The intended design life is less critical provided the basic structure is sound, and if materials are sourced locally. Tools can then be provided or loaned so that there is scope to maintain, repair and upgrade shelters incrementally. Material choice also plays a significant part in cultural acceptability, opportunity for related livelihood programmes, and impact on the environment, which is covered in the Sphere standards 4 and 6.

Adaptability is an integral part of durability as it enables individual families to tailor a basic shelter to meet their particular needs, for instance by altering internal partitions or building extensions. In pre-fabricated structures adaptability generally implies a modular design, but for local solutions it often incorporates the principle of a 'core' house which is then added to over time to provide a permanent house. An example of this is the shelter provided in the last few years for post-conflict internally displaced persons (IDPs) re-settling on their own land in Sri Lanka (Fig 9). In contrast, a significant proportion of post-conflict and post-tsunami shelter in Sri Lanka has been provided in camps on temporarily available land, where adaptability has included the ability to dismantle the shelter and re-locate it or re-use the materials. This principle has also been used in Yogjakata where bamboo frame shelters with permanent roofing materials were supplied. This reflected the need to support the dynamic and differential movement of families from transitional to permanent reconstruction activities and donor concerns that material resources should not be wasted on temporary shelter solutions (Fig 10).

Performance specification

The qualities described above that comprise habitability and durability remains constant in different situations. However, what constitutes an appropriate standard for each and their relative importance to one another will vary. To define this, the author proposes that a specific qualitative performance statement and quantitative key performance indicators are developed for each quality to suit the particular situation, based on local consultation with beneficiaries and other key stakeholders, with reference to guidelines and input from shelter experts. An example is provided for ventilation in post-tsunami shelter in Sri Lanka in Box 3.

This approach provides a systematic means to define shelter standards and key performance indicators across a wide range of circumstances, in a consistent and measurable way that directly relates to the quality concerns of the occupants: habitability and durability. If these are kept simple, they provide a basis for monitoring and evaluation of the design, and the final construction.

To summarise how each quality needs to be translated into the physical design of the shelter, each shelter component can be tabulated against the qualities (Table 2). For instance, the choice of roofing and walling contribute to internal temperatures, in addition to doors, windows and other openings.

Table 2: Habitability qualities and shelter components

Habitability qualities	Shelter components											
	Form (area, height)	Foundation	Frame	Roof	Walls	Gables	Windows	Doors	Partitions	Extensions	Site (layout/Location)	Floor
Structurally sound	*	*	*	*	*						*	
Weatherproof	*			*	*	*						*
Temperature	*			*	*	*	*					
Ventilation	*					*	*	*				
Light	*						*	*			*	
Privacy	*						*	*	*			
Vector control					*	*	*	*				*
Safety (fire, toxicity)			*	*	*	*					*	
Security					*		*	*				
Cooking	*					*	*			*		*
Water and sanitation				*							*	
Space	*										*	

Box 3: Post-tsunami shelter, Sri Lanka
Quality: ventilation
Performance statement: sufficient ventilation should be ensured to minimise internal temperatures
Key Performance indicators:
- Roof height at eaves minimum 6ft and 8ft overall.
- Minimum openings 0.1m^3
- Internal temperatures do not exceed external temperature by more than X degrees
- Internal temperatures do not exceed 25°.

It is then reasonably straightforward to rapidly produce a schematic indicating the quality characteristics of an 'ideal shelter' for a particular scenario. This should identify site wide requirements as well as including material preferences or options (Fig 11). This provides a concise summary and interpretation of the occupants needs both in the short and longer term and highlights associated essential work that may fall outside the shelter programme such as the provision of water, toilets and drainage. The implications in terms of cost, labour, programme, material availability and logistics can then be tested before a more detailed design is developed (Fig 12).

The above is no more or less than a normal project cycle which starts with establishing a clear brief through consultation that meets the client's needs, articulating this as a performance specification, which is then interpreted by the designer as product drawings and specifications. This should be accompanied by a project implementation plan which includes cost, programme, procurement, and logistics, and also a quality assurance plan to ensure the end product is as intended, since the as-built shelter will also be a function of material quality and workmanship. Research at the outset to establish local capacity, and enhance this through training can greatly improve quality, and generate livelihood opportunity. If possible, self-build schemes with some technical assistance are preferable as there is a vested interest in quality and it helps generate ownership. In the long term quality will depend on the occupants approach to upgrading, maintenance and repair (Fig 13).

Strategy and planning

Some individuals and organisations have concerns that standards or performance specifications are too prescriptive, but recent experience in Pakistan, Sri Lanka and Yogjakarta suggests that guidelines, standards and best practice provide valuable signposts and benchmarks in a post-disaster situation. A UN Cluster System Survey in April 2007 in Indonesia indicated that over 95% of agencies participating in the Shelter Cluster used agreed performance standards to improve their programmes and advocate within their agencies for changes to their programmes. Each operational context is unique and it is necessary for key stakeholders to discuss, negotiate and agree the key principles and standards which are relevant, which may need to encompass broader issues such as land, equity, community participation. The Inter-Agency Standing Committee (IASC) cluster initiative where either the International Federation of Red Cross and Red Crescents Societies (IFRC) or UNHCR are mandated to co-ordinate the humanitarian response in the shelter sector is intended to facilitate this dialogue and ensure that it is informed by advice from shelter experts. The following briefly outlines how strategic planning and leadership and the use of standards helped to ensure quality, consistency and coherency in transitional shelter assistance in Sri Lanka and Yogjakarta.

Sri Lanka

In Sri Lanka, the transitional shelter strategy was developed in the weeks immediately following the tsunami by a leading shelter expert working for UNHCR as a consultant with input from donors, UN organisations and NGOs. The strategy included a draft paper on technical implementation which set out key standards, and made reference to UN Guidelines and Sphere Standards[10]. Unfortunately, due to changing roles and responsibilities this was never fully endorsed by the government who adopted a less comprehensive policy, which nevertheless identified key indicators: size, height, ventilation, partitioning, access to water and sanitation and provision of two bulbs and one plug. Its simplicity meant that it could be used by local graduates employed specifically to assess shelters as compliant or sub-standard, as a result of which the government were able to identify shelters that required upgrading. In parallel UNHCR continued to promote the totality of the original strategy which covered process as well as product and encouraged reference to Sphere[11]. Both documents were widely distributed although not translated into Sinhalese or Tamil and therefore did not reach some local participants.

The UNHCR strategy purposefully 'did not offer a detailed design or specification for a single type of modular shelter, as this would mean all those affected would receive exactly the same shelter, regardless of their family size, their culture, their specific needs, or of the building materials available locally. If there was only one design, the NGOs implementing the transitional shelters would also be constrained, as each has different working methods and donor requirements'[9]. This was an appropriate approach as the affected area comprised 11 districts, spread over 950km of coastline, with different cultural groupings: Sinhalese, Tamil and Muslim, different climates, the south west has two rainy seasons whereas the east has one; different construction methods, for instance cadjun (palm leaves) is widely used in the north east but not in the south.

Amongst the 100 NGOs in the shelter sector – both international and local – the degree of shelter expertise and knowledge of design and construction varied widely. Nevertheless the use of standards helped ensure consistency and quality of shelter assistance, and 60 000 shelters were constructed in 6 months with only 20% being identified as needing additional upgrading prior to the monsoon in November 2006[12] (Figs 14–18). Several programmes were influenced more by budgets and pressure to build as many shelters as quickly as possible and as a result the design or construction process was ill informed or cut short leading in some cases to mediocre or inappropriate responses (Figs 19–20). In general time spent in consultation and planning at the outset led to higher quality shelter[13].

Yogjakarta

In Yogjakarta, it was decided that limited resources should be used to move as quickly as possible to permanent re-construction, but that basic shelter should be provided to all families before the monsoon. The transitional shelter strategy has been to provide resources to build a weatherproof roof using bamboo, plastic sheeting, cement fibre sheet or tiles, which are locally available and have subsequently been re-used in the permanent house construction or extension. Over a 7 month period 70 000 shelters have been provided. These provide an interim shelter solution that is more than a tent but less than a complete house. This programme adopted commonly agreed selection criteria in order to assist the most vulnerable members of communities and used shelter standards and indicators agreed with the Government of Indonesia, which referred also to Sphere standards[14].

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Fig 14. Individual shelters, Sri Lanka (2005) (Photo: Jo da Silva)

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Fig 15. Transitional settlement, Galle, Sri Lanka (2005) (Photo: Richard Dietrich) / Fig 16. Transitional settlement, Matara, Sri Lanka (2005) (Photo: Richard Dietrich) / Fig 17. Transitional settlement, Batticoloa, Sri Lanka (2005)(Photo: Jo da Silva) / Fig 18. Transitional shelter, Killinochi, Sri Lanka (2005) (Photo: Jo da Silva) / Fig 19. Transitional settlment, Thiramadu, Sri Lanka (2005) (Photo: Jo da Silva) / Fig 20. Transitional shelter, Ampara, Sri Lanka (2005) (Photo: Jo da Silva)

Conclusion

In comparing the strategies for Sri Lanka and Yogjakarta, the Sphere standards to which they refer, and other guidelines and shelter specifications, the use of the terms standard and indicator are not used consistently. Moreover the tendency when implementing shelter programmes is to focus directly on the desired characteristics of the product or process, rather than relating this specifically to the immediate and longer term needs of the shelter user: habitability and durability.

This paper proposes this is overcome through consciously placing the future occupant at the centre of the decision making process, and that this can be achieved by defining standards for individual shelters in terms of a performance specification based on a set of universal qualities that collectively define habitability and durability. Quantitative quality indicators, against which shelter programmes can be monitored and evaluated, can then be systematically derived in response to qualitative performance statements, and also used as a basis for monitoring and evaluation.

The role of design in interpreting and optimising the contribution from each shelter component is essential and must reflect but not be subsumed by cost, programme and logistical considerations. Equally, consideration must be given to the way in which quality is influenced by other stages of the project cycle: consultation, training, workmanship, as well as future maintenance, repair and adaptation.

It is essential that humanitarian organisations engaging in post-disaster shelter co-ordinate their efforts and build on existing knowledge and expertise. This is equally important for volunteers, academics, architects and engineers working with humanitarian organisations in the field, or in helping to capture and disseminate learning from recent responses, and to develop standards, guidance, training and other tools to support future shelter programmes. Shelter is much more complex than simply providing tents, huts or houses.

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