



report title

overview of shelter in 6 refugee camps in Herat province, Afghanistan, march 2002

date published

August 2002

mission duration

1 month, March-April 2002

who undertook the mission

The mission was undertaken by Joseph Ashmore. Joseph is part of the **shelterproject.org** group:

shelterproject.org is associated with the University of Cambridge in undertaking two projects to:

(1) develop, with the aid community, the first detailed field guidelines for the physical planning and shelter sector (funded by DFID); and

(2) develop, with the aid community, a full understanding of shelter in cold climates (funded by EPSRC).

Organisations participating with **shelterproject.org** in the review and implementation of these projects include DFID, UNHCR, UNICEF, UNDP, The Sphere Project, IOM, ICRC, IFRC, CARE, MSF, LWF, and CRS, with Oxfam GB acting as lead collaboration agency.

See www.shelterproject.org for more information on these and other projects.

acknowledgements

ICRC ● EPSRC ● Fulcrum Consultants ● Buro Happold ● University of Cambridge ● Tom Corsellis ● Peter Manfield ● Kate Crawford ● Rachel Battilana ● Ilan Kelman ● Allan McRobie ● Robin Spence ● Nancy Peskett ● shelterproject.org

1 executive summary

1.1 introduction

This report examines emergency shelter and insulation systems currently in use in Afghanistan. Its primary purpose is to provide base data for further research into insulated liners for supplied shelter systems. This will be necessary to improve year round environmental performance, in order to:

- improve the thermal environment for inhabitants and hence safeguard health
- mitigate against adverse environmental impacts of temporary settlements
- reduce the logistics overhead of fuel supply by lowering fuel consumption

The report documents a field survey undertaken in March, 2002, in six IDP camps in and around the city of Herat, Western Afghanistan, as well as some smaller settlements near Kabul.

The following types of shelter are examined:

- a) shelter types used by the host population (section 8.2)
- b) shelter systems belonging to the IDP's (section 8.3)
- c) shelters made locally by IDP's (section 8.4)
- d) supported locally built shelter types (section 8.5)
- e) agency-supplied shelter systems (section 8.6)

The manufacture and supply chains of the various shelter systems are also investigated.

The field survey was carried out as part of shelterproject.org research, funded by the EPSRC (The Engineering and Physical Sciences Research Council, UK). The project was strongly supported by the ICRC (international Committee of the Red Cross), which offered full logistics support.

1.2 findings

The following conclusions are reached about the shelter typologies listed in section 1.1, above:

- a) **shelter types used by the host population have many features to improve environmental performance**, e.g. thermal mass, under-floor heating and wind scoops.
- b) **existing transportable systems are not a feasible solution for large-scale deployment**. Systems used traditionally by the host population, such as 'Kuchi' tents, employ low-cost and appropriate technology. However, they rely on a nomadic existence with a sustainable supply of woodlands and livestock for maintenance. Supply issues and weight prevent their large-scale deployment and purchase by agencies in the emergency context.
- c) **IDP's tend to adapt shelter over time**. Over time IDP's improved their shelters, often building inside existing tents that they had been given. These **composite typologies** were one of the most common shelter types to be found in the older IDP settlements, where occupants are healthy enough to construct them. This process should be supported by agencies.
- d) **sustainability of agency-supported and locally built shelter should be questioned where used in temporary settlements**. Agency-supported shelters are generally constructed to a high standard. However the appropriateness and political wisdom of building permanent structures in temporary settlements should be questioned. Some shelter designs were found to employ unsustainable materials in their construction.
- e) **supplied shelter systems, or tents, varied highly in quality and specification**. In Maslack camp, although IDP's faced the same conditions, both the specification and the quality of tents distributed were found to be highly variable.

1.3 key conclusions

In Maslack camp, many IDP's interviewed were very poor: food security and the desire to return were their main concerns.

The **diversity** of shelter provision for many people at Maslack camp in similar circumstances represents an **uneven and unsatisfactory** deployment of resources. Partly attributable to the different arrival times of IDP's to the same camp, it is primarily the result of **highly variable specifications and solutions** for the same population. While some agencies were constructing earthquake-resistant houses, others provided tents.

Similarly, the **planning** of IDP settlements was problematic. Many were laid out in a rectangular grid, which ignored topography and social/community structures and created various problems. In places, 'wind tunnels' were created, leading to the damage and destruction of shelters. The layout also undermined a sense of ownership and community. This in turn had led to destructive behaviour, such as misuse of toilets. The physical lack of protection of tents near the peripheries caused significant failures due to wind exposure.

summary

This report finds that **it is desirable to provide a wind proofed and insulated shelter system for use in cold climates**. However it is important to provide shelters that are adaptable and flexible. For example, in the summer months, insulating a shelter will reduce direct solar heat gains and keep the shelter cooler, but can also cause overheating by storing body heat. The benefits of a **demountable or ventilated** system for both hot and cold climates therefore warrant further research.

However the problems of different agencies providing different solutions for the same IDP community must be addressed. A consistent technical brief for shelters being deployed in the same area should be established. Due to time pressure and variable expertise in the field it should be agreed at the point of purchase. A technical brief might be developed around the following points:

- 1.4.1 **insulation and wind proofing** would provide protection in cold and windy weather.
- 1.4.2 heaters should arrive integrally with the package in winter or form part of a properly phased response.
- 1.4.3 **adaptable, modifiable designs** and the supply of **component parts** would facilitate the transition to more durable housing.
- 1.4.4 **flooring** should be provided with the shelter, especially in cold climates.
- 1.4.5 the shelter should be **easily repairable** and should not include any specialist materials, such as zips and bolts that require specialist tools, in its construction.
- 1.4.6 the shelter should have a **lifecycle of at least two winters**.
- 1.4.7 the shelter should be **usable in summer**.
- 1.4.8 the logistics of lead-time, cost, weight and packed volume should be minimised

Where IDP's fabricate their own shelters, a similar level of support should be given, whether with materials or with tools.

2 table of contents

report title

date published

mission duration

who undertook the mission

acknowledgements

1 executive summary

1.1 introduction

1.2 findings

1.3 key conclusions

2 table of contents

2.1 executive summary

2.2 table of contents

3 introduction

3.1 introduction

4 objectives and purpose

4.1 objectives

4.2 purpose

5 methodology and standards

5.1 introduction

5.2 methodology

5.2.1 IDP settlement selection.

5.2.2 shelter type selection

5.2.3 shelter selection for survey

5.2.4 installation of temperature / humidity sensors.

5.2.5 survey compilation

5.2.6 manufacturers

5.3 constraints and limitations

6 existing conditions

6.1 introduction

6.2 political history

6.3 climate

7 results - camps

7.1 introduction

7.2 camps around Herat

7.2.1 Maslack

7.2.2 Shaidai

7.2.3 Minaret I+II

7.2.4 CTC

7.2.5 Rowsebad

7.2.6 transit camps

7.3 settlements near Kabul

7.4 conclusion

8	shelter typologies - Herat
8.1	shelter types used by the host population
8.1.1	environmental design
8.2	shelter systems belonging to the IDPs
8.2.1	Kuchi tents
8.2.2	yurts
8.3	shelters made locally by IDPs
8.3.1	adaptation of supplied shelter systems – mud walls
8.3.2	adaptation of supplied shelter systems – wind proofing
8.5	supported locally built shelter types
8.5.1	shelter for life case study
8.6	supplied shelter systems
8.6.1	IOM hoop shelters
8.6.2	ridge tents
8.6.3	high walled centre pole tents
8.6.4	low walled centre pole tents

9	manufacturer visits, Pakistan
9.1	Introduction
9.2	worker conditions
9.3	procurement
9.4	conclusion

10	other shelter materials
10.1	blankets and quilts
10.2	mattresses
10.3	plastic sheeting
10.4	clothing
10.5	stoves

11	conclusions
11.1	introduction
11.2	shelter in the field
11.3	shelter manufacture
11.4	lessons learned
11.5	further work required

annexes	
annex a	initialisations and abbreviations
annex b	map of the region
annex c	notes on tent design details
annex d	tent fabrication process
annex e	mission itinerary and people met
annex f	distribution list

3 introduction

3.1 introduction

This field survey was carried out with the original aim of improving insulation for shelter systems for deployment in Afghanistan and in other cold climates. The aim of this insulation is to reduce fuel consumption and increase survivability for occupants living in emergency shelter in cold climates. It was designed to provide a background from which occupant responses could be compared. As part of the survey, several settlements were surveyed with the intention of identifying suitable sites for further field tests. In these sites both qualitative and quantitative data were recorded on specific shelter systems in use.

4 objectives and purpose

4.1 objectives

The objectives of this report are to

- 1) Develop an understanding of appropriateness of shelter options currently available in Afghanistan.
- 2) Discuss the applicability of demountable insulated liners for tents in cold climates.
- 3) Comment upon the IDP camps around Herat in terms of site planning and camp types.

4.2 purpose

The reason that this study was undertaken is because there is limited feedback from the field in relation to shelter provision. This has several effects which are outlined below.

In practice it is difficult for procurement staff to identify which shelters work. Procurement is often carried out under time pressure and the workload in the field often makes it difficult to get detailed feedback to those who procured the shelters in the first place. Staff change over, with many staff being employed on short term contracts combined with poor communications make follow up difficult. These same issues mean that a lot of work is repeated in the field in terms of program design, both within agencies and between agencies. In this context it is also difficult to assess whether the shelters being used are the best solutions available. The purpose of this report is to aid by sharing feedback from the field.

5 methodology and standards

5.1 introduction

Several approaches were used in assessing shelter options and settlement in and around Herat. These were:

- 1) camps were visually inspected
 - 2) surveys were carried out in Maslack camp using locally hired college students
 - 3) thermal sensors were placed in shelters to gain numeric data relating to thermal performance
 - 4) information on project histories, scopes, mortality rates and was collected from active agencies
-

5.2 methodology

5.2.1 IDP settlement selection

All of the camps in the Herat area were assessed on shelter types available. As the primary aim of the field survey was to assess tents and shelter systems, Maslack was chosen as a specific case study. This is because it was the only camp in the vicinity of Herat to contain significant numbers of new and unaltered tents.

5.2.2 shelter type selection

The following types of shelter were selected as they were found to be relatively abundant.

- 1) Shelter For Life houses – representing supported locally built shelter types
- 2) IOM hoop tents – representing supplied shelter systems
- 3) ridge tents – representing the current standard canvas tents

The agency assisted self-build houses were selected as they were solidly built and represented the upper end in terms of quality of what was available on the site.

5.2.3 tent selection for survey

Maslack camp was divided into three camps, each of which was divided into blocks. Each block generally contained one type of shelter. Survey teams were set to work within one block at a time, selecting shelters randomly with the proviso that the occupants were happy to be questioned. The majority of occupants were happy to be questioned, although confining the questions to one individual appeared to be an issue.

5.2.4 installation of temperature / humidity sensors

A certain number of each type of shelter were selected for temperature and humidity sensors to be placed in them. Selection was largely at random, the critical issue being whether the occupants wished to have sensors placed in their tents or not. Sensors were placed in shelters for between 3 and 7 days.

5.2.5 survey compilation

A draft survey was created in UK. Initial field visits were carried out over 4 days to ascertain likely responses and reword questions. A new draft questionnaire based on cultural practices and likely responses was produced. The questions were numbered and the majority of questions were reduced to check boxes. This survey was then carried out on sample families in Maslack camp and a new survey produced.. this new survey was carried out and again amended after one day's survey. This progressive refinement process was carried out three times. The final questionnaire was redrafted in a bilingual version: *English* and *Farsi*, translated by Wakil Ahamed and independently verified by ICRC translators. This would allow the questionnaire to be asked by translators with a limited level of English.

5.2.6 manufacturers

Five tent manufacturers were visited in Pakistan in Lahore and Karachi. Visual inspections of some of their premises were carried out, guided by factory management. Comments were made upon what was seen and verbal information received, taking into account stated production capacity and techniques, previous track record and the surveyor's personal impression.

5.3 constraints and limitations

the limitations of this report are

- 1) The settlements assessed represent a small and confined geographical area
- 2) The report represents a snapshot in time, whilst some of the settlements change rapidly with time.
- 3) The field surveys were carried out in spring. The camps will perform differently in different climates
- 4) The surveys are limited to only a few of the many camps in Afghanistan and the surveys are limited to 160 camp residents.

6 existing conditions

6.1 introduction

As of 14th March 2002 there were officially 150,000 IDPs in Herat's main six camps. These people had been displaced following many years of war and several years of drought. Following the first rains for several years, there was an eagerness to return home

6.2 political history

Afghanistan has suffered from 20 years of war and several years of drought. This has hit a population whose income is based largely on agriculture. Many people have been forced to flee their homes and serious food shortages have been occurring across the country. In this context temporary settlements have been set up and grown very large. In the case of Maslack camp, Herat, food was being distributed to 350,000 IDPs. Although there was significant leakage it indicates the scale of the humanitarian support operation with the largest camps in the world.

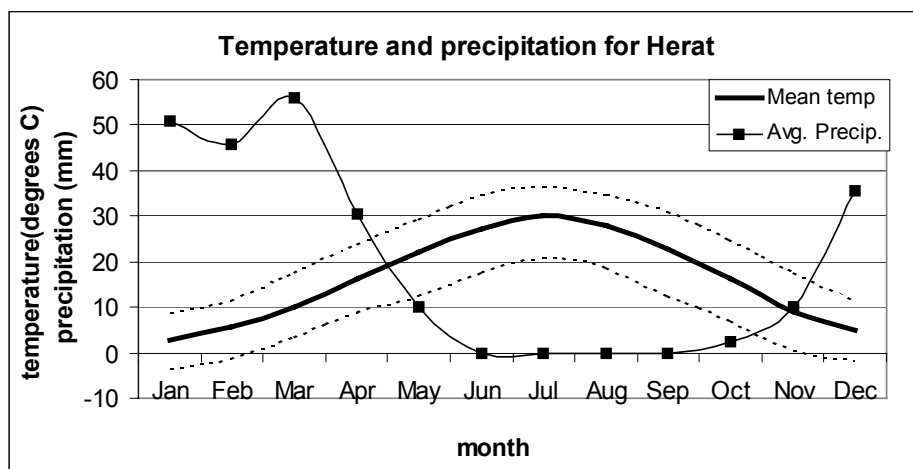
2002 saw some the first proper rainfall for several years. This combined with the change in politics and relative peace in western Afghanistan has saw the beginnings of a return by IDPs. As a result it is expected that camps will diminish in size and many refugees will return¹. However the scale of the displacements and the relative security of the IDP camps mean that it is likely that tens of thousands of IDPs will remain in Herat's IDP camps.

6.3 climate

Herat's climate varies significantly with season. In summer it can reach 40^oC, whilst in winter it can fall to a minimum of -24^oC ². These extremes of cold can be life threatening. Last winter, an estimated 80 people died from "coldness" in Maslack camp³, the year before the death toll was up to three times higher. Temperatures outside the city are slightly lower at night than in the city.

Annual precipitation is low, especially in summer in summer.

Herat is also known for its strong winds, with inhabitants often referring to the "one hundred and twenty days of wind" starting at the beginning of April. This has major implications for the structures of shelters to be able to withstand it and for the comfort of occupants who need shelter from the accompanying dust storms



average maximum, minimum and mean temperature as well as mean precipitation for Herat

¹ As of June 2002, it was estimated by UNHCR that 900,000 refugees had returned to Afghanistan

² source UNICEF website

³ source MDM Herat June 2002

7 results - camps

7.1 introduction

Several camps in the area of Herat were visited as part of an assessment for later testing of insulated liners for canvas tents.

As of mid March 2002, there was a significant IDP population living in camps in the vicinity of Herat. Officially this was approximately 152,500 IDPs 4, although in reality multiple registrations by IDPs may have slightly over inflated this figure. The majority of these were living in Maslack camp. Following rains and the beginning of the planting season, the population of these camps was falling due to both assisted and voluntary returns. It was envisaged, however, that this return rate was not high enough to empty the camps before the following winter. Furthermore some new arrivals were coming and were being settled in Shaidai camp, all other camps being closed to newcomers.

Below is a table of the IDP population that were in various temporary settlements around Herat. Please note that this represents a snapshot in time, taken in March 2002.

Camp	Size(*)		people / family	return rate***	shelter types
	Families	occupants			
Maslack	*30,509	*115,999	*3.8	240/day	I,T,K,AT,H
Shaidai	*4,609	*25,232	*5.5	0	I,H,A
Rosebot	*990	**4,000	**3.8	0	AT,H, I(4),T(3)
Minaret I-II	*1,250	*7,079	*5.7	0	AT,H
CTC	**120	**450	**3.8	0	AT,A,Y
Islam Qal'eh Transit camp	200	1000		1000	AT,A,Y
TOTAL	**37,500	**152,500			

T=ridge tent – just occupied and held up by pegs
I = IOM tents
K=Kuchi tent
A=adobe house-owner built
AT=Adobe walls and tented roof - tent pegs are no longer supporting the structure
H= adobe house – agency built – often cement base
Y=yurt

*figures courtesy IOM (Herat)
**estimate based on average family size of 3.8 people from Maslack census statistics. We note that this denotes a small family size for Afghanistan, and may indicate multiple distributions to various families!
***These are assisted returns being carried out by IOM. Spontaneous returns were also occurring

table giving an overview of the IDP camps surrounding Herat in March 2002

Regarding shelter, there is a significant move within the camps to more durable shelter options. The majority of IDPs around Herat are now housed in adobe constructions, either self-built or agency built. The majority of tents are of the IOM poly-tunnel design (Turkish fabrication). There were less than 500 canvas tents in use in Maslack, although some self-built shelters use canvas tents for their roofing, many starting out as tents.

4 Source: IOM, Herat

Maslack camp is the only camp in the Herat region with any quantity of ridge tents that have not been rebuilt in adobe. Maslack camp suffers from a very high turnover of tents, and tent life is relatively short. From early march onwards, cold is not a significant issue to settlement residents, though wind is. It is very unlikely that tests of insulated liner would prove successful in this environment. However testing of the IOM tents in comparison to canvas tents could prove a useful test case for the high tech concept.

7.2 camps around Herat

Six camps in the vicinity of Herat were surveyed with the view to carry out test on insulated liners over the following year. The results are detailed in sections 7.2.1 - 7.2.6 below and give an overview of the camps from the perspective of shelters present.

7.2.1 Maslack



agencies Involved

HRS (Herat Rehabilitation Service-distributions/management), WFP (distributions), Save the children (bakeries), MDM (medical), MSF (medical), UNICEF (schools, distributions), Shelter for life (shelters, wells), DACAAR (water supply), IRC (water supply), UNHCR (protection), CHA, FTC, Islamic Relief, IMC, MoR (Afghan government representatives), HAFO, GAA.

overview

shelter largely transferred to solid construction

shelter types as of March 2002

- There were less than 2000 tents remaining in the camp, most of which are the IOM hoop type shelters (cf. section 8.6.2). There were also ridge tents of varying origin and quality and design.
- Owner built adobe construction. Discussions with camp staff indicate that roof collapse is an issue.
- Semi-permanent houses, agency built with latrines. Some with raised stone bases and some earthquake proof with wooden ring beams. (cf. section 8.5.2)
- There was a high turnover of tents due to
 - Wind damage. The usable life of some tents is less than 3 weeks. The cotton canvas tents were found to be of variable quality.
 - Camp restructuring. IOM tents visited on first afternoon had been moved by the following day.
 - Sale and taking of tents by occupants. Although it is the camp policy that tents are to remain, many tents were sold or taken by the IDPs. Many further tents were stolen by the military. Returnees were being donated one tent per family on return.

return rate

As of mid march 2002 agency supported returns were just starting at the rate of eight lorry loads per day which was equivalent to 240 people per day. Non-assisted returns were also occurring. The slow start of the assisted returns project caused some unrest among IDPs in the camp.

winterisation project analysis:

Maslack camp had the highest concentration of new tents in the Herat area, although it has a very high turnover of tents. It is unlikely that many tents will be traceable after one year (or even 1 month), so follow up for this insulated liners project would not be successful.

7.2.2 Shaidai

overview

As of March 2002 this was the second largest settlement in the Herat region, and was taking all newcomers to Herat camps.

shelter types

- IOM tents (approx 300)
- shelters made locally by IDPs. the majority of shelters
- supported locally built shelter types

winterisation project analysis

There were no canvas tents present.

7.2.3 Minaret I+II

overview

This is the oldest and most established camp in Herat, being opened in 1994.

shelter types

The majority of structures are self build adobe buildings. Some have tented roofs with adobe structure and walls. There are also several adobe walled compounds.

winterisation project analysis

This is a semi permanent site with very few free standing tents.

7.2.4 CTC



CTC camp march 2002, Herat

overview

CTC camp was located in the centre of Herat and had the most permanent structures on site. In March 2002 it was being demolished so that a school could reopen.

shelter types

- Adobe walled enclosures with adobe structures.
- Some old ridge tents were incorporated as roofing in self-built shelters.
- Several Yurts within camp.

winterisation project analysis:

CTC camp has no freestanding tents and it is intended that the camp close in the short term.

7.2.5 Rowsebad



Rowsebad camp march 2002

overview

This camp is located next to the ICRC warehouse, in the outskirts of Herat. It is a fairly static camp and has been in existence for approximately 6 years.

shelter types

- Adobe structures. canvas forming the roof. (majority of structures)
- 5-10 IOM hoop tents
- 5-10 ridge tents
- agency build solid structures.

winterisation project analysis

The population are more static than those in camps such as Maslack. However there are very few freestanding tents in the camp (less than 10) – most tents have already been assimilated into adobe structures.

7.2.6 transit camps

overview

as of March 2002 three transit camps for overnight stays were being planned in the Herat region. In addition several large temporary structures (Rubb Halls) existed in the town for further short term stays. The camps were

- Islam Qua'leh near the Iranian border. This camp was planned for 1000 returnees in 200 tents overnight.
- Morghab 1 day's drive from the Iranian border. 80 tents are planned.
- Chashisherif, one day's drive from the Iranian border. This camp is for returnees travelling to Ghor and onto Bamyan. 30–40 shelters are planned.

shelter types (proposed)

- Rubb halls – large structures
- UNHCR ridge tents
- Potentially some durable adobe structures in some camps for communal structures and for temporary housing.

winterisation project analysis

It was anticipated that these sites would contain new tents, which are intended to remain for at least a year. However, there will be a high turnover of occupants and none will be static.

7.3 settlements near Kabul



Ka Karha temporary settlement 30km from Kabul, march 2002



tents in Quarabagh, outside Kabul, march 2002

overview

several small temporary IDP settlements, of varying sizes, existed in the vicinity of Kabul. Some of the settlements were agency supported, others were non-supported groups living in tents. Two of these were visited and were located on the road north to Chorekar. These settlements were identified as:

- Quarabagh - a small settlement of four clustered tents in a bombed out village. The tents appeared to be less than one week old.
- Ka Karha – a settlement of 124 tents of varying age about 200m from the main road. The settlement was supported by ACTED and UNHCR.

Local staff commented that some of the visible tents along the road were unlive in but placed there so that the IDPs would qualify for aid.

shelter types

these camps were all tented, although some of the some of the tents had been built up with internal walls

winterisation project analysis

Camps such as Ka Karha would be good sites for field-testing of insulated shelters as they are static camps and are largely tented. It would have been more cost effective to make temporary repairs to the existing structures using plastic sheeting.

7.3 conclusion

Each of the camps around Herat has a different size, a different population demographic and differing shelter types. In March 2002 they varied in size from 500 occupants to approximately 115,000 occupants. It is not clear how large the IDP population will be by the following winter, and some of the camps were growing, others were shrinking.

This overview of camps was carried out with a view to selecting suitable sites for field-testing of insulated liners. Of the camps visited only Maslack camp was really suitable for field tests of differing winterised shelters as it was the only camp to have significant numbers of shelters. For this reason this report focuses on the shelter types as found in Maslack camp.

8 shelter typologies - Herat

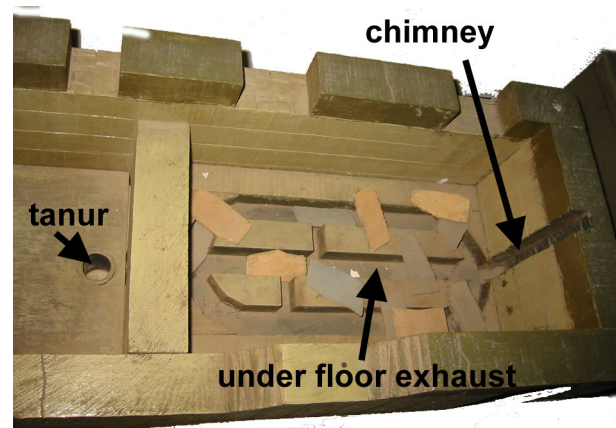
8.1 introduction

many different shelters were visible in around Herat. For the purposes of this report, they have been split into shelter systems (traditional and imported), self built shelters (in temporary settlements and in existing settlements), and agency built shelters. These are covered in sections 8.2-8.6.

8.1 shelter types used by the host population

In Herat there are a diversity of house styles and construction techniques, many of which have some features which improve their environmental performance. In an emergency situation there is insufficient time to build such houses and it is questionable whether it is beneficial to house IDPs in such permanent structures. However, these local solutions should be considered in reconstruction and resettlement projects.

8.1.1 environmental design



cut away model of an under floor heating system as found in village houses. Model AREA – afghan rehabilitation and energy awareness agency, Peshawar

Shelter types used by the host population in and around Herat have many features to improve their environmental performance.

- Traditional construction is of Adobe and thus buildings have a relatively large thermal mass. Thus they stay warm by night and cool during the day.
- Windows are small minimising heat loss in the winter and keeping the inside dark and shaded during the summer.
- Some houses have under floor heating systems in which exhaust gasses from an oven pass under the floor thereby heating it and using the bread oven to maximum efficiency.
- In the town of Herat itself, many houses have wind scoops on the roof to aid ventilation in the hot summer months. The wind passes over the wind scoop, which causes a negative pressure, which draws air from the house.

8.2 shelter systems belonging to the IDPs

There are two types of transportable system used by IDPs. The Kuchi tent (section 8.3.2) and the yurt (section 8.3.3)

8.2.1 kuchi tents



Kuchi tents near Maslack camp, Herat, Afghanistan

quantities

Kuchi tents are seen dispersed about the Herat region. Relatively small numbers are seen in the IDP settlements. As of March 2002, there were less than 100 in and around Maslack camp. There are some cases of the material being used in combination with agency donated shelter systems.

description

Kuchi tents are made from panels of woven goat's wool that are stitched together over a wooden frame. The wool is thick and black and works well as an insulator both in the heat and in the cold of winter. It is also thick enough to repel rain water. The structure is adaptable so that it can be raised for ventilation in the heat or lowered in the cold or in strong winds.

weight

Kuchi tents are heavy, weighing several hundred kilograms.

lead time

Each tent takes one family one month to fabricate, if the wool is available. There are currently insufficient supplies of wool in Herat for large-scale production. Furthermore, the logistics of setting up large-scale production are difficult. However, there is some local support for setting up fabrication projects to create a locally procured emergency solution.

analysis

Kuchi tents are very well adapted to the local environment, and are a good shelter solution in terms of thermal performance in a diversity of different weather conditions. They cannot be mass-produced and so are inappropriate for emergency deployment.

8.2.2**yurts***Yurt in CTC camp***quantities**

Yurts are uncommon in Herat and were only present in CTC camp in relatively small numbers. The IDPs living in them came from the North East of Afghanistan.

Description

The yurts are dome shaped and are based about a wooden frame. The ones seen in Herat had been static for a significant amount of time, built up with mud for approximately the first metre. They were covered with a combination of animal skins, plastic sheeting and felt.

weight

Yurts are heavy weighing several hundred kilograms

lead-time

The fabrication of Yurts is a labour intensive and skilled project.

analysis

Yurts are known for their excellent performance in cold climate but are heavy and require a large quantity of wood in their construction. They would not be available in the large quantities required for of an emergency deployment. The poverty of the occupants of those yurts seen meant that roofing was lacking due to absence of source materials.

8.3 shelters made locally by IDPs



inside a self built shelter with adobe walls and plastic roof, , Maslack camp

the majority of self-built shelters appeared to be made from the available materials, generally with adobe walls, and roofs using plastic sheeting, canvas and wood. In some sections of Maslack camp there was a policy to remove some of these shelters due to issues of poor site planning and the danger collapse and leaky roofs. Projects to aid IDPs to build their own shelters by distributing and aiding IDPs to make mud blocks had been completed.

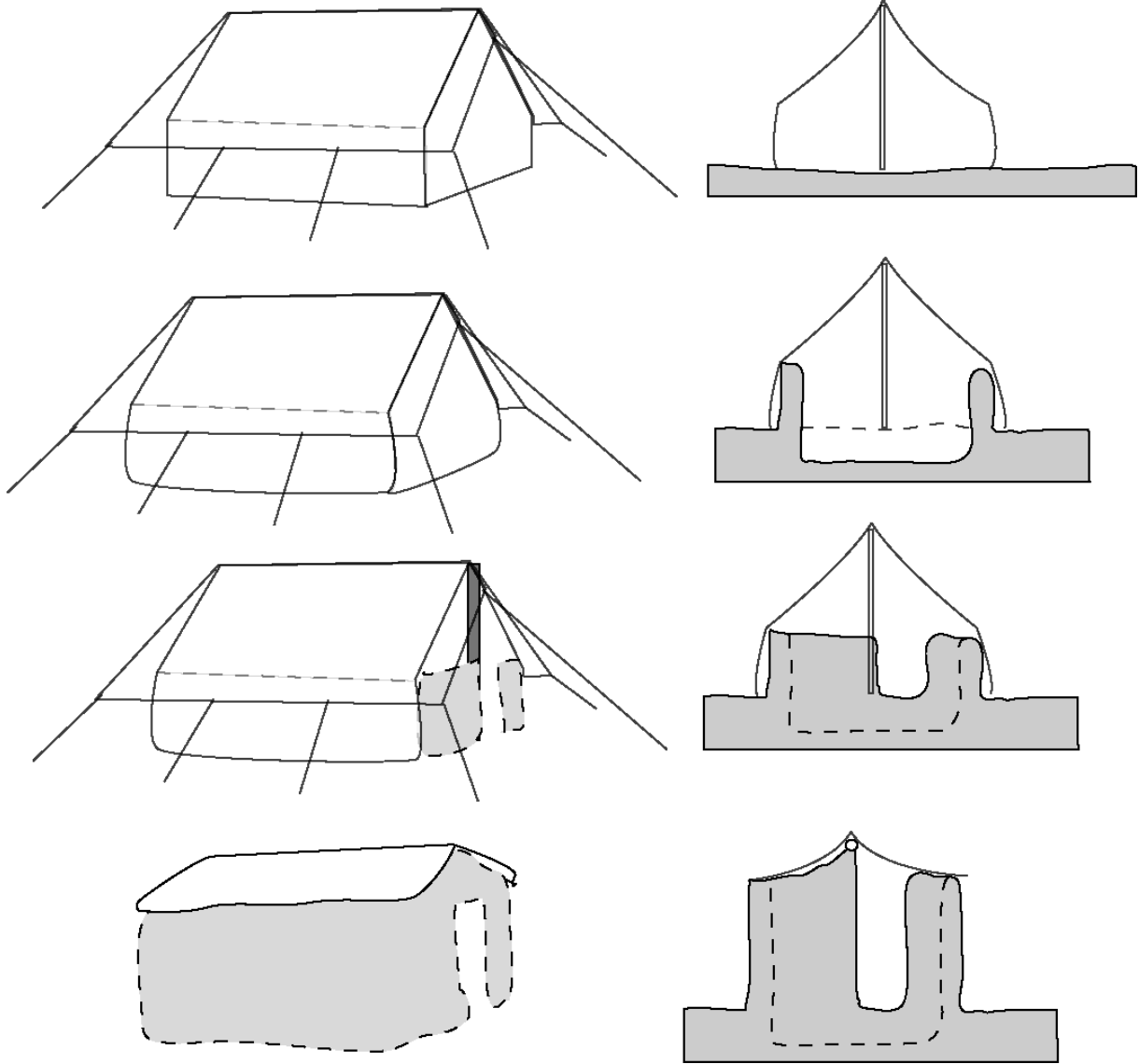
8.3.1 adaptation of supplied shelter systems – mud walls



examples of tents being converted into semi permanent structures by IDPs.

After a long period of occupation in temporary settlements, IDPs were found to make themselves mud shelters to live in, often using sections of plastic sheeting or building on existing tents that they had been donated. The diagrams below show how this transition from tent to semi permanent structure occurs. Shelters in a transition from tent to semi-permanent adobe structure were one of the most common shelter types to be found in IDP settlements in and around Herat. This construction occurs when occupation of a site is for a long time and presupposes individuals to build them. It is fairly common for the roofs to remain of canvas. There are several reasons why the roofs may not move to a more solid construction.

- Families are too poor and lack the materials to make a durable roof
- Some families did not have the skills or physical ability to make a durable roof
- By maintaining a canvas roof it is possible that some families believed that they would continue to qualify for distributions



diagrams of how a tent is converted into a semi permanent structure by IDPs around Herat

8.3.2 adaptation of supplied shelter systems - wind proofing



it should be noted how these IDPs have put blankets over the doors of their tents and strung ropes over the canvas to prevent the wind from flapping . Maslack camp march 2002



tent being insulated with the fabric from a Kuchi tent, Maslack march 2002

In Maslack camp, IDPs were seen to block draughts using spare materials. These small amounts of material represent a fairly major material investment for otherwise very poor families. It is also interesting in terms of the idea of insulated tent liners to note that many IDPs were making a form of liner of their own. The placement of the blankets also indicates that the major leaks were at the doors, and that attention to door detailing or even fabrication of ridge tents with a door at only one end could reduce infiltration of cold air.

It is interesting to note that many IDPs also found canvas flapping a problem. Several cases were seen of ropes or the heavy woollen material from Kuchi tents being tied over tents to stop the canvas flapping in the wind. Flapping tent roofs create draughts, as well as being annoying, damaging the tent and the loosening of the pegs.



ventilation of an IDP tent, Maslack camp, march 2002

The design of a canvas tent also allows IDPs to ventilate the tent when the weather is hot and not windy. When it is windy, the dust makes it necessary to close the sides of the tent. The ability to ventilate is certainly an approach that should be considered for insulated liners as it allows the tent to be ventilated when it is hot but for draughts to be blocked when it is warm. This ventilation is not possible once the walls have been permanently trenched in or when internal walls built, and as a result many of the tents that had been put up during warm weather were not trenched into the ground.

8.5 supported locally built shelter types

Agency supported and locally built shelters are generally built to a very high standard, but there are significant issues regarding the appropriateness of building permanent structures in temporary settlements. Furthermore many were found to employ unsustainable material usage, particularly wood in a deforested region of Afghanistan.

8.5.1 shelter for life case study



shelter for life house, Maslack camp, Herat, march 2002.

quantities

3800 shelters were complete by mid March 2002, a total of 4200 were scheduled as part of the construction project.

description

dimensions 5m x 3.6m x 2.5m. mud and stone base, adobe block walls with a wooden ring beam and a flat wooden roof sealed with mud. Finished with wooden doors and windows.

analysis

In the context of Herat, these shelters were solidly constructed to a very high specification. The occupants questioned, some of whom had always lived in Kuchi tents, were generally very happy with their shelters. This high quality of construction is a problem as creating permanent accommodation in a temporary settlement can be seen as a disincentive to return home, particularly when seen in the context of the traditional dwellings of the occupants. From a planning perspective, the shelters were built with large spaces between them in a very clear grid pattern along one side of the camp. This layout does not take account of traditional community structures. The construction project suffered serious problems due to falling Afghani / dollar exchange rate between the start of the project in summer 2001 (where \$1USD rose to 60,000 Afghanis) and payment of project costs in December 2001 (when \$1USD fell to \$12,000 Afghanis).

8.6 supplied shelter systems

Supplied shelter systems were found to be highly variable in terms of quality and specification. In Maslack camp, all IDPs were facing the same conditions, but the agency specifications and the quality of tents distributed was found to be highly variable. These are currently less common than many other shelter types in and around Herat, but form the basis of this report.



damaged tents in camp management compound, Maslack, Herat
 (a) damaged canvas, (b) damaged joints, (c) damaged bamboo poles, (d) damaged end spikes for steel poles

From the case study of Maslack camp, Herat, durability of shelters was a significant issue. Piles of poles (representing several hundred broken tents) and approximately 30m³ of damaged cotton canvas (representing an estimated 200 tents) was stored in the camp distribution compound. The age of these samples and the origin of the tents was unclear, although failure was generally decayed and torn canvas as well as some failed stitching. The poles tended to break either where the end spike joins the poles in the case of ridge tents or at the welded joints in the case of a frame tent.

8.6.1 IOM hoop tents



IOM Turkish tent, Maslack camp, Herat



IOM hoop tent being used as a mosque / community centre, Maslack camp, Herat

quantities

this was the most common type of family shelter system in and around Herat. By march 2002, IOM had procured approximately 10,000 of the shelters for use in Afghanistan.

description

this shelter consists of a steel tubular frame with a three layer skin – the outer layer being a strong pvc canvas, the middle being a layer of silver bubble wrap for insulation and the inner being made of plastic sacking.

analysis.

This is a good and adaptable shelter. The occupants liked the quantity of internal space in comparison to other tents with the same floor plan. There were also some cases of IDPs using several shelters to make community centre or mosques. However It is let down by a few detailed design issues:

- zips for doors which do not last
- weakly welded joints. The structural design uses the welded joints and the skin of the shelter for lateral stability. The effective lack of diagonal elements means that these welds took most of the wind load.
- two sizes of spanner are required for tightening bolts

8.6.2 canvas ridge tents



Canvas ridge tents, (left IOM, Right World Vision), Maslack camp, Herat

quantities

Large numbers of canvas tents have been procured for Afghanistan. UNHCR alone has 27,000 available.

description

There are several different designs of canvas tents with or without a flysheet in Maslack camp alone. These are summarised in the table below

	flysheet	inner tent	polyester wadding	Desouti lining	insulation	tent poles
German Agro Action		x			None	bamboo
IOM	x	X	X	x	100g polyester wadding stitched between inner tent and desouti lining.	galvanised
UNHCR	x	X			None	galvanised
UNICEF		X			None	galvanised - three verticals with reduced diameter
World Vision		X			None	Galvanised

table of the most common shelter types in Maslack camp, March 2002

It should be noted that the qualities of the canvas were variable between agencies– in terms of weight and density of the weave.

weight

70-100 kg

lead time

individual suppliers in Pakistan can fabricate up to 1000 tents per day. The lead-time varies between immediate and 2 weeks for production. In addition many agencies and suppliers carry limited stocks

analysis

Heavy but standard tents. Tried and tested, but have the limitations of canvas rotting, the spikes on the poles snapping and the ropes decaying. These problems are exacerbated by the variation of specifications between agencies and manufacturers.

8.66.3 high walled centre pole tents

quantities

rare in IDP camps around Herat, although these had been the UNHCR standard shelter specification.

description

this is a 4mx4m family tent with walls up to 2m high

weight approx

120kg

lead time

The lead-time varies between immediate and 2 weeks for production of substantial quantities in Pakistan

analysis

These tents have the advantages of plenty of headroom and a lot of useable internal space. Unfortunately, having tall flat walls put a lot of additional stress on the structure in windy environments such as Herat.

8.6.4 low walled centre pole tents



centre pole tent at manufacturer's showroom in Karachi, march 2002

source

several of these were made available in Herat by the Turkish red cross. Only one example was seen in Maslack camp. 200 of these tents were in warehouses in Herat in early April 2000.

analysis

this is an old and tested design of a simple tent. It has the weight advantage of only having one pole, but has the disadvantage of having a reduced amount of headroom.

9 manufacturers

9.1 introduction

Ten factories belonging to five major tent manufacturers were visited in Lahore and Karachi, Pakistan. Some of the factories visited manufactured tents starting with spun cotton and raw materials, others purchase components independently, whilst others subcontract manufacture to other companies.

During the visits, some factories were in full production, others were empty, or working on small-scale orders. This made some comparisons difficult to make. The factory workers are generally on daily wages or piecework wages, allowing manufacturers to assemble a large workforce when large orders come in. Similarly due to the warm climate, sewing can be done outside and even on roofs of buildings when large orders come in.

Annex D contains an overview of the fabrication process.

9.2 worker conditions

It is noted that child labour appears to occur in the major tent manufacturers. Children of estimated age 10-12 were seen manufacturing school tents in one factory. This should be of concern to purchasing agencies. Safety of employees is also questionable in some circumstances with no ear protection being used and limited welding masks being available in noisy working environments.

9.3 procurement

Many tents have been specified in the past through agencies choosing a basic model. From this base, additional design details, such as brass or galvanised eyelets, are selected and a final cost is arrived at. Some of these design details are listed in appendix c.

In the past large block orders have caused raw cotton and thread prices to rise. Large orders (10,000 or more tents) might be phased over months to prevent cotton prices from suddenly rising, although this is difficult to reconcile with the demands of an emergency.

9.4 conclusion

Significant production capacity exists and appears to be growing. The largest manufacturers claim to be able to produce between 800 and 2000 tents per day depending on quality.

10 other shelter materials

10.1 blankets and quilts



blankets for resale in Herat market. Iranian ones are the most expensive

overview

blankets in the Afghanistan IDP camps are of varying type and quality.

description

blankets seen in Maslack camp were

- Iranian wool blankets
- Pakistani or Afghan blankets.
- High tech blankets with either recycled material or polyester wadding as a filler

analysis

IDPs prefer the Iranian wool blankets as they know them. Blankets were used both as ad hoc flooring and covering. In the absence of sufficiently insulating flooring or mattresses being packaged with tents, blankets should be distributed as part of a shelter package. It is also interesting to note that some families were using blankets on top of their tents as wind breaks (see section 8.4.2)

10.2 mattresses



mattresses and blankets inside an IDP's tent, Maslack camp, Afghanistan

overview

mattresses were distributed in Maslack camp. The majority appeared to come from Iran.

Description

both foam filled and natural fibre filled versions were distributed

analysis

mattresses are a critical part of a flooring strategy for shelters, as heat loss through conduction to the ground can be life threatening. In the absence of sufficiently insulating flooring coming with tents, mattresses should be distributed as part of a shelter package.

10.3 plastic sheeting

overview

various qualities of plastic sheeting were visible in Herat, some of which was donated by agencies.

analysis

plastic sheeting was commonly used in the roofing of self-built shelters. It was also available for resale in small quantities in the market.

10.4 clothing

overview

from surveys carried out, it appears that most IDPs only had one set of clothes. Some clothes had been distributed, although in the camps it was difficult to identify which clothes had been donated to IDPs.

It is unclear how many more clothes were distributed by other agencies. Certainly in winter warm clothes are an essential part of maintaining the health of the population.

10.5 stoves



rectangular stove in IDP tent, Herat province, march 2002

quantities

At least 20,000 stoves were distributed by agencies in Herat. In addition many IDPs already had their own stoves.

description

There are several stove varieties available to IDPs in Afghanistan, the most successful of which is pictured above.

analysis

Due to scarcity of fuel supply available to IDPs, the primary purpose of stoves is for cooking.

As a result, small, multipurpose stoves tend to be better suited to use in Afghan IDP temporary settlements. These small stoves increase the amount of heat given to the cooking pot by bringing it closer to the centre of the fire.

The locally procurable rectangular stoves used by IDPs were deemed to be a successful solution due to their flexibility. An example is pictured above.

For more details please see the report entitled

"analysis of heating and cooking fuels and stoves in refugee, IDP and local settlements, Kabul, Herat, Afghanistan march 2002."

available at www.shelterproject.org

11 conclusions

11.1 introduction

This report describes a field survey of IDP camps around Herat and Kabul, in order to provide a background for shelter equipment development for future cold climate emergency provision. It also investigates manufacture and procurement of shelters in Pakistan, to identify practicable areas for improvement.

11.2 shelter in the field



different tents in one manufacturer's showground are procured by agencies for family shelter, Karachi



different shelters and adaptations to shelters in Maslack camp, Herat, March 2002

In the field, variable shelter solutions employed for same caseload. Deployment is based upon what the agencies in that location have in stock or can be supplied in the required time frame. The variation of shelter in the field can thus be traced back to the time of procurement and to the manufacturers who produce tents according to varying agency specifications.

The constraint of manufacture and transportation cost is critical for shelter procurement. Transportation costs can be more than the initial procurement costs, especially when airlifts are involved. This certainly affects the shelters available in the field and effects the purchasing of different agencies.

11.3 shelter manufacture

The manufacturing capacity as seen in Pakistan appears to be sufficiently large to cope with demand. In addition capacity appears to be growing. The field survey team visited several new factories and factories under construction. In the case of large orders, many factories will subcontract to smaller factories or hire additional machines and staff to use in existing industrial spaces.

Manufacturers are uneager to invest in technological advances such as machines capable of making rip-stop canvas. Instead new production capacity focuses on higher volume of output.

Polyester wadding appears to be a new innovation for insulating canvas tents, with IOM and UNICEF producing versions with the polyester wadding stitched between the inner tent and the desouti lining. Although the fire retardant and thermal performance of this polyester wadding is not as high as more high-tech insulation materials, it does represent an improvement upon the non-insulated shelters used in cold climates. However heat loss through infiltration (leaky doors and joins) does remain a problem.

11.4 lessons learned

There are several tent designs readily procurable. In addition to the actual shape of the tent, there are serious issues such as whether the tent has a flysheet and whether it has a cotton lining. Furthermore, the design details noted in appendix c all have significant effects on the durability and performance of shelters. Different agencies all have very differing s

11.5 further work required

There is a strong case for agencies to improve and make consistent their winterisation strategies for shelter in cold climates. These strategies should include not just the shelter system, but also blankets, mattresses, stoves and clothing. This means that there is a need to define a complete location-specific winterised shelter package rather than just a tent and quantifying their relative importance.

Currently, the relationships between the tent and other non-food items are not clearly defined between agencies. This has resulted in a varied shelter response for IDPs in Afghanistan despite suffering from similar problems.

There is also a case for supporting interagency discussion over tent specifications. This would require separate agencies to openly discuss their shelter procurement specifications and programme design.

The issue of flooring in emergency shelters is not yet resolved and appears to be carried out in an ad hoc manner. A wide range of flooring solutions was observed in Herat. These solutions ranged from nothing to plastic sheets, mattresses, blankets, traditional rugs, cotton sacks and bits of old canvas. There is clearly a need for a more coordinated approach to flooring, particularly as direct heat loss through the floor is such a major concern in cold climates.

To conclude, there is a strong case for using insulated and demountable liners with shelter systems. These are likely to insulate against both heat loss from infiltration and from material conduction. The demountable nature of these liners means that occupants may be able to take them down if it gets warm and there is potential for reuse during later reconstruction phases. Currently, prototype liners are pre-positioned in Kabul awaiting field tests in winter 2002. These tests will greatly advance the knowledge of how to most efficiently provide emergency shelter in cold climates.

annex a glossary and abbreviations

this annex is split into two sections – a glossary (a1) and a list of agencies and abbreviations (a2)

annex a1 glossary

bukhari – stove.

Kuchi tent – traditional tent made from dark wool and wood, used by nomadic people of Afghanistan

supplied shelter systems – tents and other self contained transportable shelters.

shelter type – typology or form of shelter

temporary settlement – an area of habitation for forced migrants

Yurt - traditional domed shelter most common in Mongolia

annex a2 agencies and abbreviations

AREA – Agency for Rehabilitation and Energy Awareness In Afghanistan.

DACAAR - The Danish Committee for Aid to Afghan Refugees

DFID - department for international development

EPSRC - The Engineering and Physical Sciences Research Council, UK

HRS - Herat Rehabilitation Service

ICRC - International Committee of the Red Cross, Geneva

IDP – Internally Displaced Person

IRC - International Rescue committee.

MDM - Medecins Du Monde

MSF - Medecins Sans Frontiers

SFL - Shelter for Life

UNHCR – United Nations High Commissioner for Refugees

UNICEF - United Nations Children's Fund

WFP - World Food Programme

annex b map of the region



annex c notes on tent design details

This appendix contains notes on the basic tent design details. It is intended to expand this at a later date with the specifications from the different agencies. Each of these bits of detailed design will have an effect on the durability of the shelter as well as on the cost and weight for transportation.

- **Eyelets:** brass are preferable to galvanised eyelets
- **Rope** what kind of rope does it use – all but black rope will degrade with sunlight over several months
- **fixings** the detail with which the tent is fixed to the guy ropes has strength issues – is it stitched through a
- **pegs** whether the cross section of the tent pegs is T shaped, V shaped or round. Also are the tent pegs galvanised or just sprayed with an anti-rust coat
- **canvas quality** indicators of the canvas quality are the number of threads per inch, whether it is made of cotton or polycotton and whether it has many imperfections.
- **canvas weight** the weight of the canvas is a rough indicator of durability but heavier fabrics also have cost and transportation issues
- **rot proofing** the chemical and the concentration of the chemical used in rot proofing.
- **waterproofing** – whether and how the material has been water proofed. Standard procedure is to use paraffin wax. This has the disadvantages of flammability and it evaporates with time
- **door detailing** how doors are closed has an effect on durability.
- **poles – material** whether the poles are bamboo, aluminium, or galvanised or sprayed steel has an effect on whether they rust and on their durability.
- **poles - spikes.** How the spike at is fixed at the end of the poles has an effect on the strength of the pole
- **splash screen** at base for trenching
- **stitching** – the thread quality and the stitch length have an effect on the strength of the sewn joints

annex d fabrication process,

This annex gives a brief overview of the processes involved in making a tent. These processes are listed below and expanded in the following subsections:

- the cotton yarn is spun . d1
- the yarn is woven to make canvas - d2
- the canvas is rot proofed and dried . d3
- the cotton is waterproofed . d4
- the poles and fittings are fabricated . d5
- the tents are sewn together . d6
- the tents are assembled and packed . d7

d1 cotton spun



spinning cotton yarn, Lahore, 2002

The first stage in making a tent is to spin the yarn so that canvas of the required weight can be made. Of the five manufacturers visited, three wove own canvas on site, whilst the other two bought it from outside

d2 thread woven to make canvas



loom for weaving canvas, Lahore, 2002.

The canvas is woven from the thread. It is usually checked for quality at this stage.

d3 canvas rot proofed and dried

(left) The canvas is rolled through a bath of rot proofer / dye. (right) The canvas is dried on heated drums, Lahore, march 2002

The canvas is rot proofed by dipping it in a rot proofing solution. The concentration is varied depending on the agencies requirements. A copper based solution is generally used, giving the canvas a green tint. This treatment can wash out with time. The canvas is then dried by passing it through large heated rollers

d4 canvas waterproofed

The fabric is waterproofed using paraffin wax, Lahore, March 2002

The canvas is coated in hot paraffin wax for waterproofing. The wax generally comes from China and Korea. It is commented that the paraffin wax evaporates off the tents in the field over time.

d5 poles and fittings fabricated

Making tent poles, Lahore, march 2002.

Depending on the manufacturer, poles and other fittings, such as rivets and pegs are either fabricated or bought in. they are then either anodized or sprayed for rust proofing.

d6 **tents sewn together**



The canvas is sewing by machine, Lahore, March 2002.

The treated canvas is machine sewn into tents.

d7 **tents assembled and packed**



The tents are packed ready for distribution, Lahore, March 2002

The tents are assembled and packed awaiting transportation.

annex d mission itinerary and people met

Peshawar 08/03/02
Kabul 10/03/02

Ghulam Destagier ICRC winterisation project engineer and architect, Kabul
 Peter Banks, IOM, Programme manager Kabul
 Josefa Ojona, UNHCR Assistant chief of mission, Kabul
 Farheed, CARE programme manager, Kabul
 Wardagiya, IRC, Kabul
 Douglas Osmond, Senior purchasing officer, STS, Kabul
 Ingrid, ICRC. FRC cooperation, Kabul

Herat 12/03/02

Hubert, IOM camp manager, Maslack
 Marc Petzoldt IOM operations officer, Maslack
 Cael Coleman, Shelter For Life, programme manager, Herat
 Thomas Davin, Unicef Emergency Officer, Herat
 Gary Bruce, Simon Brudett, Feed the children, Herat
 Danny Gill, IOM
 Dr. David, Mediciens Du Monde, Doctor, Maslack camp
 Christophe Coeckelbergh, ICRC, Head of Sub delegation, Herat
 Mohammad Ali, ICRC, engineer, Herat
 Pierre Cortesi, ICRC, watsan engineer, Herat
 Dr. Adle IRC, Herat.
 Dusco UNHCR assistant programme officer, Herat.

Kabul 30/03/02

Andy Bastable, OXFAM
 Aminul Haq Mayel, Deputy managing director, AREA
 Peshawar 02/04/02
 Sayed Farid, ICRC Logistics Peshawar
 Habib-Urahman qaderdan Alternative technology coordinator, AREA

Islamabad 04/04/02

Sasa Loncaric, IOM procurement officer, Islamabad

Lahore 05/04/02

Naxir Peracha, chairman shahpur textile mill
 Tariq Rashid Muggo, Chief executive officer Shaikh combined industries
 Furqan Sarwar and Farhan Sarwar, H.Sheikh Noor-ud-Din and sons

Karachi 06/04/02

Khubab Ahmed, partner National tent house
 Naveed Ahmad Managing director H. Nizam Din and sons.

Peshawar 07/04/02

annex e distribution list

Open Document, produced by shelterproject.org in association with the University of Cambridge, June 2002. Available online at www.shelterproject.org