

Transitional Shelter Prototypes

Draft
November 2009



“A compilation of concept transitional shelter prototype designs that meet the Transitional Shelter Standards, which have been developed by shelter manufacturers in collaboration with the humanitarian community.”

Draft

shelter centre

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November 2009

Project booklets

Shelter Centre's work with transitional shelter comprises three complementary booklets:



Transitional Shelter Guidelines

A handbook of practical guidelines that can be used in the field to facilitate the implementation of more effective transitional shelter programmes. Includes sector consensus on planning and implementation best practices.

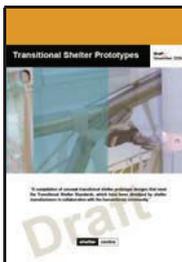
www.sheltercentre.org/tsg/TSG



Transitional Shelter Standards

Common standards and indicators, consistent with Transitional Shelter Guidelines, for both locally produced and stockpiled, airlifted family transitional shelters, developed and agreed upon by a multi-agency Project Consortium.

www.sheltercentre.org/tss/Shelter+Standards



Transitional Shelter Prototypes

Prototypes that meet the Transitional Shelter Standards, including only examples of stockpiled, airlifted family transitional shelters. Includes designs by participating private manufacturers.

www.sheltercentre.org/tsp/Shelter+Prototypes

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1 Transitional Shelter Prototypes project

1.1 Introduction

1. This booklet displays a compilation of concept Transitional Shelter Prototype designs submitted by manufacturers working within Transitional Shelter Standards.
2. This booklet is intended to inform humanitarian agencies and shelter manufacturers of the progress made in developing stockpilable transitional shelters for use after conflict and natural disasters, and to invite comments from practitioners of transitional shelter.
3. A revised draft of the booklet is published every six months to coincide with the twice-yearly project meetings, which take place in conjunction with the sector forum, Shelter Meeting (SM). The project is a dynamic process, as the humanitarian community and manufacturers move forward together in a collaborative space. Each revision of the booklet represents those steps forward.
4. It is recommended that this booklet be read in conjunction with the Transitional Shelter Standards booklet, which provides the reader with an account of past decisions and amendments made at previous project meetings. The Transitional Shelter Standards booklet may be downloaded from: www.sheltercentre.org/tss/Shelter+Standards.

1.2 Project overview

5. Since transitional shelter was introduced by Shelter Centre in 2005, following the South Asia Tsunami, millions of people affected by both conflicts and disasters have been accommodated using this approach. Transitional shelter is:

“shelter which provides a habitable covered living space and a secure, healthy living environment, with privacy and dignity, to those within it, during the period between a conflict or natural disaster and the achievement of a durable solution”
(Corseilis and Vitale, 2005).

6. The approach involves building and upgrading a shelter incrementally, from plastic sheeting to sustainable local materials. Assistance to displaced and non-displaced populations is often delayed as housing, land and property rights cannot be resolved quickly. Transitional shelter can be relocated and can therefore be supportive immediately and continuously until reconstruction is complete.

7. The need to support transitional shelter was identified at the Shelter Meeting sector forum. The Transitional Shelter Standards and Prototypes project is one of ten deliverables, identified and prioritised by participants of the twice-yearly Shelter Meeting, that are funded by DFID 2006-2011. USAID has provided additional funding for the Transitional Shelter Standards and Prototypes project.

8. Until that point, the transitional shelter approach had used only locally available materials. The opportunity was identified to support transitional shelter through the development of stockpilable transitional shelters, as additional support in programmes. The transitional shelter approach recognises that reconstruction lasts 2 to 5 years, but that a tent only lasts around 1 year.

9. The project process is dynamic and collaborative. The humanitarian community have agreed a set of Transitional Shelter Standards; indicators and requirements for stockpilable transitional shelter. Manufacturers and suppliers have agreed to create prototypes of transitional shelter that aim to meet the Standards.

10. The Transitional Shelter Prototypes project should result in a range of innovative prototype transitional shelter solutions that reflect the Transitional Shelter Standards under development by the Consortium. The process of developing standards and indicators must involve physical testing, and the conclusions gained as a result of the physical testing will be integrated into the Transitional Shelter Standards as amendments.

11. The currently agreed Transitional Shelter Standards booklet may be freely downloaded from: www.sheltercentre.org/tss/Shelter+Standards.

1.2.1 Objectives

12. The objectives of the project are to:

- bring together the humanitarian community of experienced donors, UN bodies and implementing agencies, who constitute a global transitional shelter capacity and are interested in its development;
- build confidence within the humanitarian community that shelter manufacturers can produce credible transitional shelters;

- build confidence amongst shelter manufacturers that humanitarian agencies want to be able to use transitional shelter after conflicts and natural disasters; and to
- engage manufacturers to develop prototypes, in parallel with the development of Standards, to help verify Standards' appropriateness through physical testing.

1.2.2 Deliverables

13. The project will run until September 2011 and has the following deliverables:

1. finalised Transitional Shelter Standards, tested through prototyping and agreed by both the manufacturers and humanitarian communities;
2. a variety of working Transitional Shelter Prototypes, developed over time by shelter manufacturers, via a process of feedback and revision;
3. a practical and affordable test regime for accreditation;
4. feasible, credible Transitional Shelters, demonstrated through achieving an understanding within the humanitarian community and amongst shelter manufacturers, of the challenges of stockpiled Transitional Shelter; and
5. approaches to cold climate Transitional Shelters, demonstrated through achieving an understanding within the humanitarian community and amongst shelter manufacturers, of the challenges of cold climate Transitional Shelter.

1.3 Project process

14. The Transitional Shelter Prototypes project is a continual process to develop credible examples of transitional shelters, through a process of development, feedback and revision. The project provides a collaborative space between the humanitarian community and shelter manufacturers and suppliers. Both parties can provide feedback on the suitability of the Transitional Shelter Standards, so it is a dynamic process. This allows them to move forward together at a pace that is mutually agreed.

1.3.1 Project Consortium of humanitarian actors

15. The review of the Transitional Shelter Prototypes project is being undertaken by a project Consortium of leading international organisations. Consortium members are encouraged to attend the twice-yearly project meetings in order to provide feedback on the transitional shelter prototypes that are presented, and to provide guidance for the project as a whole. In addition to a number of independent groups and individuals, the project Consortium currently includes:

| | |
|----------------------------|------------------------------------|
| Cordaid | Medair International |
| Save the Children | SDC/HA |
| UN-Habitat | USAID/OFDA |
| UN/OCHA | Habitat for Humanity International |
| DFID | Trócaire |
| CRS | Muslim Aid |
| RICS | JICA |
| Oxfam GB | German Red Cross |
| NRC | Netherlands Red Cross |
| RedR | British Red Cross |
| Practical Action | Canadian Red Cross |
| World Vision International | Switzerland Red Cross |
| MSF-Int | AMURT International |
| CARE International | Vrije University, Brussels |
| CHF International | Caritas Austria |
| IOM | CAFOD |
| COHRE | ECHO |
| ODI | |

16. In addition to these organisations, the project benefits from contributions and feedback from a number of independent shelter specialists and consultants.

17. The project is also observed by the IFRC and UNHCR.

18. Organisations wishing to join the project Consortium of humanitarian actors should email: prototypes@sheltercentre.org. There is also the opportunity for organisations to join at the twice-yearly project meeting.

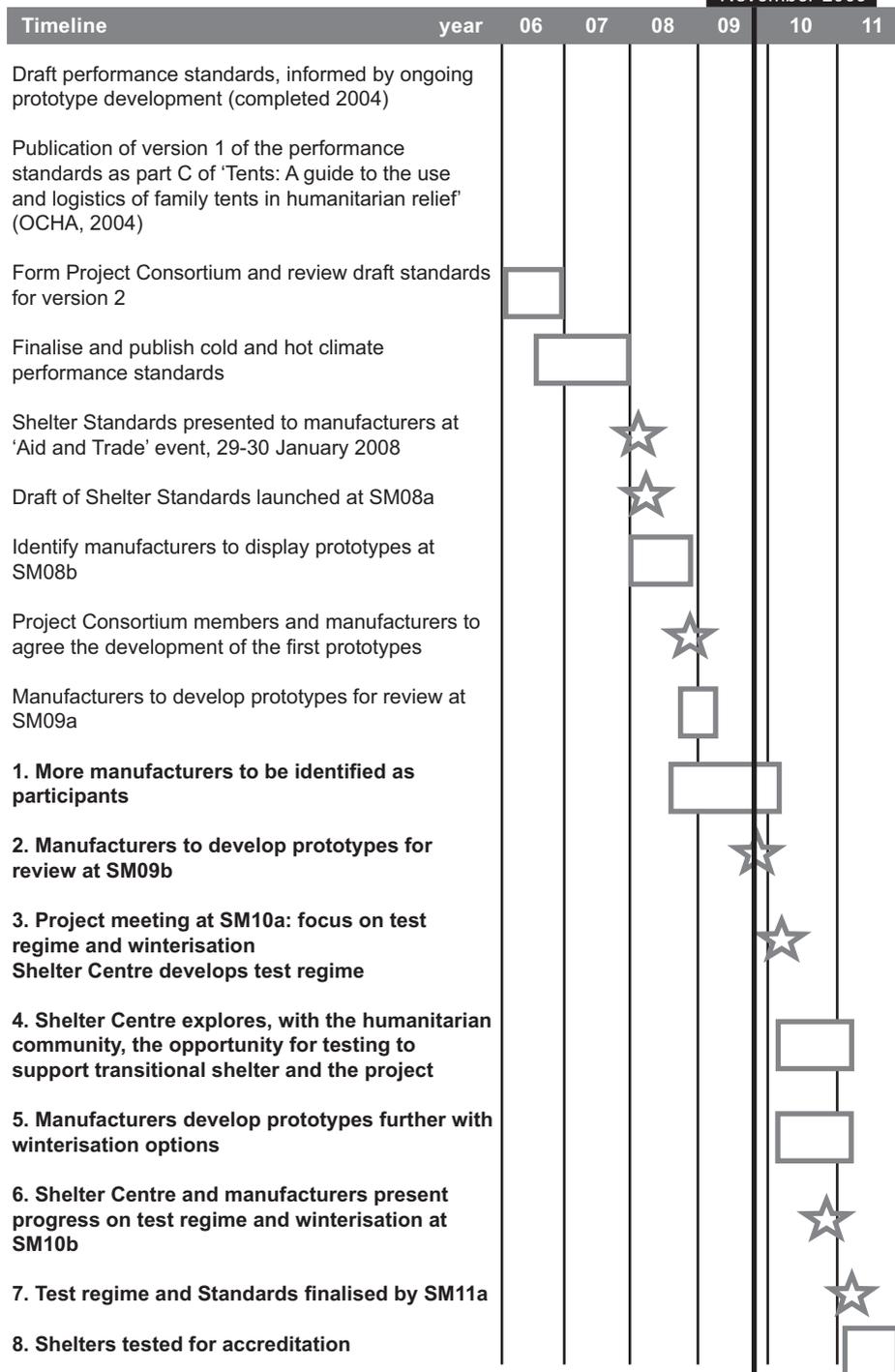
19. The Transitional Shelter and Prototypes project is due to finish in September 2011. In the remaining time of the project, there will be three project meetings at which the participating manufacturers will be presenting prototypes; in May 2010, November 2010 and May 2011. There may also be additional meetings for the project Consortium, when required.

20. At each project meeting, proposals are made about the coming six months of the project, and about the project as a whole. Proposals and feedback are also provided, regarding the suitability of the Transitional Shelter Standards. These are discussed in plenary and agreements are made to implement changes and refinements. Following the meeting plenary, the participating manufacturers are invited to present their current prototypes, via 5-minute presentations, materials on exhibition tables and physical prototypes on display.

21. To see a draft proposed agenda for the project meeting on 12th November 2009, please refer to appendix D.

22. At the project meeting in November 2009, the project Consortium of humanitarian agencies will be asked to clearly define the next steps and timeline for the project. The following proposed timeline for the remaining eighteen months of the project will be presented by Shelter Centre at SM09b for review by the project consortium. Key milestones are indicated by a star. 

1. More manufacturers to be identified as participants
-  2. Manufacturers to develop prototypes for review at SM09b
-  3. Project meeting at SM10a: focus on test regime and winterisation
4. Shelter Centre explores, with the humanitarian community, the opportunity for testing to support transitional shelter and the project
5. Manufacturers develop prototypes further with winterisation options
-  6. Shelter Centre and manufacturers present progress on test regime and winterisation at SM10b
-  7. Test regime and Standards finalised by SM11a
8. Shelters tested for accreditation



1.4 Progress update

23. Since the last project meeting in May 2009, Shelter Centre has welcomed four additional manufacturers to participate in the Transitional Shelter Standards and Prototypes project. There are now eight shelter manufacturers participating in the project to develop Transitional Shelter Prototypes.

- Alpinter Relief Supplies
- Evenproducts Limited
- H. Sheikh Noor-ud-Din & Sons
- Kay Tent Industries
- MADDEL International
- Nunatak Systems
- World Shelters
- Worldwide Shelters

24. Shelter Centre has begun scoping for the next revision of the Transitional Shelter Standards. This revision will incorporate changes agreed by the Standards Consortium and participating manufacturers. The revision will also aim to make the Standards applicable to both stockpiled and locally built transitional shelters.

2 Latest prototypes and concepts

25. This section displays the latest Transitional Shelter Prototype designs and concepts that have been developed by manufacturers participating in the project.

2.1 What is in the booklet?

26. The concept designs of transitional shelters displayed in this section are representative of prototypes in development by participating manufacturers. Transitional shelter prototypes are intended as testing platforms for the Transitional Shelter Standards. They are not intended as definitive designs for transitional shelters.

27. Shelter Centre requested that the manufacturers submit technical diagrams, photos and accompanying text for the booklet, in order to explain their design.

28. In terms of quality, it was requested that diagrams be approx. 300dpi, and photos approx 600dpi. In terms of quantity, it was requested that the content from each manufacturer fill no more than 4 pages of A5.

29. The style and format of the materials submitted by the manufacturers varied widely. Shelter Centre has endeavoured to include the materials in a manner that represents the manufacturers' designs equitably.

30. Shelter Centre also supplied the manufacturers with a "Quantifiable Standards Checklist" to complete and return. This checklist is a summary of some of the requirements within the Standards, which can be quantified easily without the need for a testing regime.

31. Manufacturers were required to complete and submit this checklist as a condition of their inclusion in the booklet. These checklists are presented in the booklet in order to allow for direct comparison between designs.

32. To download the Transitional Shelter Standards booklet which contains a list of the requirements in full, please visit:

www.sheltercentre.org/tss/Shelter+Standards.

33. Each manufacturer's design information is presented in the following structure.

- I. Prototype design
- II. Required standards checklist
- III. Organisation details

34. To see an example prototype designed by Shelter Centre, go to Appendix A.

2.2 Designs presented

35. The following sections list the prototype designs from various manufacturers. They have been arranged in alphabetical order.

- Evenproducts Limited
- H. Sheikh Noor-ud-Din & Sons
- Maddel International
- Nunatak Systems
- World Shelters
- Worldwide Shelters

36. NB: Shelter Centre has made every effort to ensure that the information presented in this section is done so in a consistent fashion. In order to achieve this, Shelter Centre provided the manufacturers with specifications and templates for submitting their materials (see section 2.1).

Shelter Centre retains editorial rights for each document.

2.3 Evenproducts Limited

The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.3.1 Prototype design

Introduction

Evenproducts works alongside agencies and NGOs in the design and improvement of a range of emergency equipment items. We have been doing just this in the improvement of Transitional Shelters since 2004, driven by an initial need for a different type of shelter for Darfur. Our most recent Evenshelter Mark III design reflects this history together with the information that has been provided as part of the Transitional Shelter Project.

We work with our partners, Evensoft, who provide valuable design input generated from first-hand involvement in emergency situations, coupled with a keen understanding of engineering and manufacturing.

Evenshelter concept

Our aim has been, an Evenshelter which is low cost, light, strong, simple to erect, adaptable and long-lasting. The Evenshelter design looks very similar to the Shelter Centre's, testament to the cross-agency input that Evenproducts had also sought in the last 5 years of Evenshelter development.

Evenshelter utilises commonly-used components wherever possible, with thought to future repair and replacement. In particular this is reflected in the use of UNHCR specification sheeting and an aluminium-angle frame.

Evenshelter Mark III offers flexible accommodation for a family of five, with a door at both ends, open/close windows, front-vestibule, floor and double-skinned walls.

Evenshelter mark III detail

Detail relating to the Standards is listed on the checklist, and not repeated here.

Packaging

This will continue to be revisited throughout the design life of the Evenshelter because design developments can result in a need to re-think packaging approaches. All packaging will be robust to protect the Evenshelter in transit and storage.

Usable area

The Evenshelter frame design lends itself to the application of removable internal walls to allow heat retention or provide privacy. The details of

this feature are not available just yet. The external vestibule provides a covered area for cooking and/or shade for other external activity. We had considered the merits of removable side-panels but believe that this would add more transport weight for a feature that may be constructed on site (grass, mat panels).

Evenshelter incorporates two different securing options; anchors for the upright frame components (see drawing detail), and wall skirting (not shown in the drawing) which can be buried for extra stability.

Windows and doors

Windows are constructed in the side walls, and in the gable-apices for active ventilation. They can be opened or closed to control temperature and/or privacy. There is a door at each end of the Evenshelter, they are diametrically opposed and can be opened or closed. Mechanism for securing the doors in a closed-position is under development, possibly involving ties.

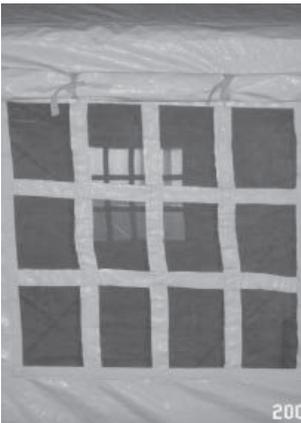
Vestibule



Internal Gable and roof



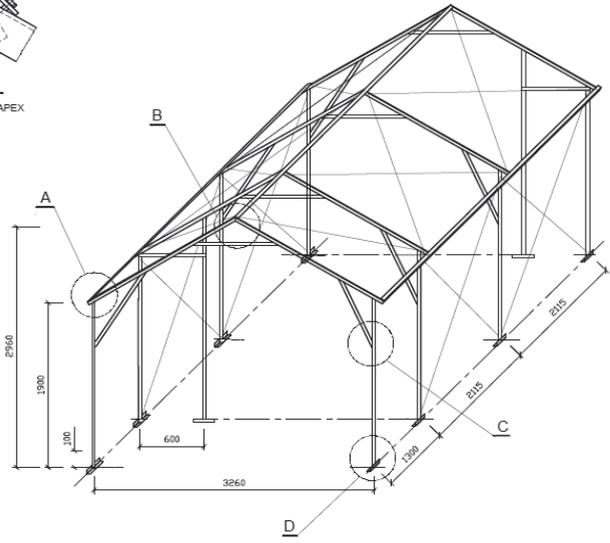
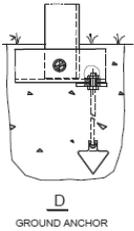
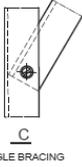
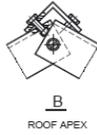
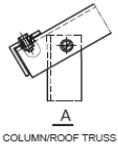
External side



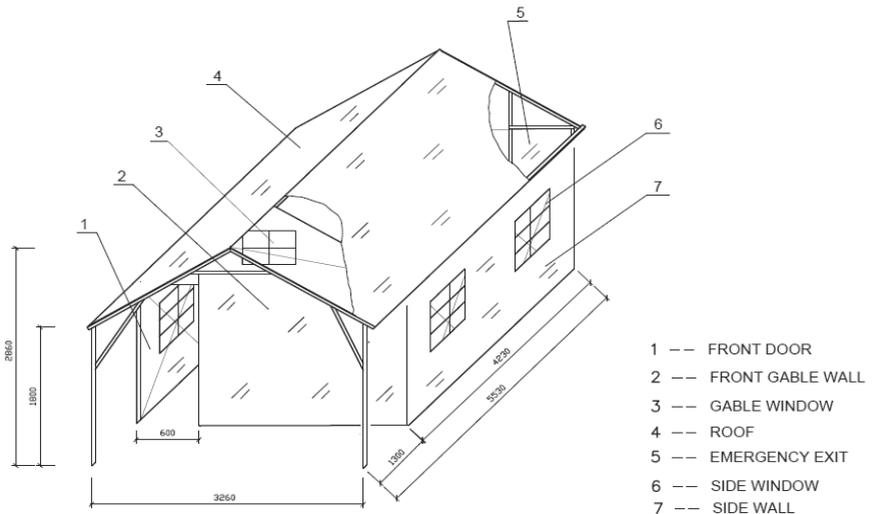
Internal central apex joint



Transitional Shelter Prototypes Project



STRUCTURAL FRAME DRAWING



GENERAL ARRANGEMENT DRAWING

2.3.2 Required standards checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/No |
|------------------------------|---|---|----------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | Current weights is 75kg | ✓ |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | Two packages; one aluminium frame and the other the cover and other components. | ✓ |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | 0.25 m ³ | ? |
| 4 | Longest dimension of packed shelter is no more than 200cm. | Longest dimension 1.92m | ✓ |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | We meet this | ✓ |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | Vertical packaging is not ideal for transport; we recommend horizontal packaging for stability. | ? |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | Total covered area is 17.96 m ² | ✓ |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | Minimum height is 1.9m | ✓ |
| 32 | The inner liner has integrated storage pockets. | Intention is to incorporate pockets but design not finalised. Is there a weight target for this? | ? |
| 33 | There are no guy ropes or other trip hazards around the shelter. | Ground anchors will be used under frame columns (see drawing detail) and cover will have 25mm skirting for burial (not shown on drawing). | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | Windows area is greater than 1.4m ² | ? |

Transitional Shelter Prototypes Project

| | | | |
|------------------------|--|--|---|
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | Door can be opened/closed, fixing method under development. Windows can be opened/closed as required. | ? |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | We meet this. | ✓ |
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | We meet this. | ✓ |
| Vector control | | | |
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | There is a pan-shaped floor covering as part of the inner liner. Vertical edge is 10cm. | ✓ |
| Environmental toxicity | | | |
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | Standard materials are used (UNHCR spec sheeting etc.). A risk assessment will accompany final design. | ? |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | Standard materials are used (UNHCR spec sheeting etc.). A risk assessment will accompany final design. | ? |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | Evenshelter is white. | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | We will meet this. | ? |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | We anticipate the strongest point for supporting loads will be the gable ends. Detail on design not finalised yet. | ? |

2.3.3 Organisation details

Evenproducts Limited
The Oxstalls, Evesham
Worcestershire
WR11 4TU, UK

Web: <http://www.evenproducts.com>

“Evenproducts works alongside agencies and NGOs in the design and improvement of a range of emergency equipment items. We have been doing just this in the improvement of Transitional Shelters since 2004, driven by an initial need for a different type of shelter for Darfur.”

Point of Contact: Jenny Rohde - Business Manager, Aid
Tel: +44 1386 760 950
Fax: +44 1386 423 769
Email: jenny@evenproducts.com



2.4 H. Sheikh Noor-ud-Din & Sons

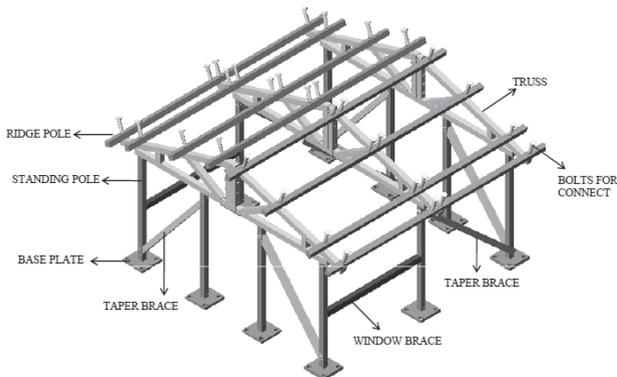
The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.4.1 Prototype design

Project introduction

Shelter, is a core issue in disasters, emergency situations as well as in rehabilitation activities. It requires huge capital involvement which is, once used, neither recyclable nor reusable.

Thus our R&D team has developed a new generation of shelter; TransHome®. It's convertible, reusable and transferable from one type to another i.e. from temporary to permanent or fabricated to constructed form by using locally available resources. So once installed, this TransHome® frame can be used with canvas, grass, cement, plastic sheets, wood or any other locally available resource.

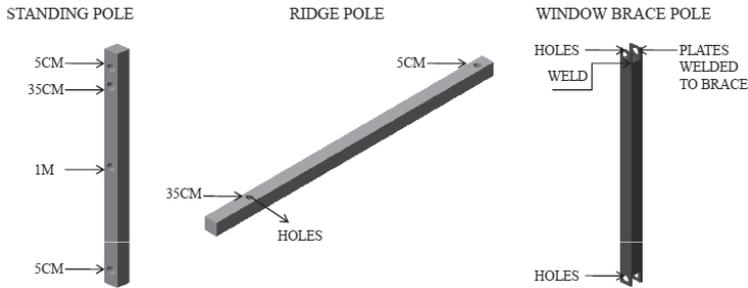


Frame details

- Bolt to connect trusses total 3 trusses ready after bolt to connect.
- Ridge pole connect on trusses total 16 poles connect on trusses with bolts.
- Truss male stub insert in standing pole and connect with bolts total 10 poles connect with trusses.
- Standing pole lower side insert in base plate and connect with bolt 10 base plates connect with pole.
- Window brace connect with bolts between standing poles in centre.
- Taper brace connect with bolts between standing pole. Upper side brace connect with standing poles

- Upper side & brace lower side connect with other standing poles lower side.
- All pipes use 19sg all pipe size 1" x 1" all stub use ¾"
- Frame wieght 90 kg.

Types of pipes



Standing pole

- Size 2m.
- Four holes in this pole.
- First and second hole in boths sides 5cm.
- Third hole in centre.
- Fourth hole in 35cm.
- Number of poles 10 in frame.

Ridge pole

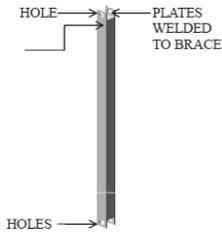
- Size 2.45M.
- Two holes in this pole.
- First hole on 5cm.
- Second hole on 35cm.
- Number of poles 16 in frame.
- Ridge pole connect with truss

Window brace

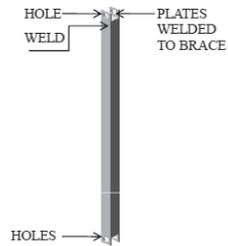
- Size 2m.
- Two holes in both corner.
- Both sides plates welded to brace.
- Number of poles 2 in frame.

Transitional Shelter Prototypes Project

FRONT TAPER BRACE POLE



SIDE TAPER BRACE POLE

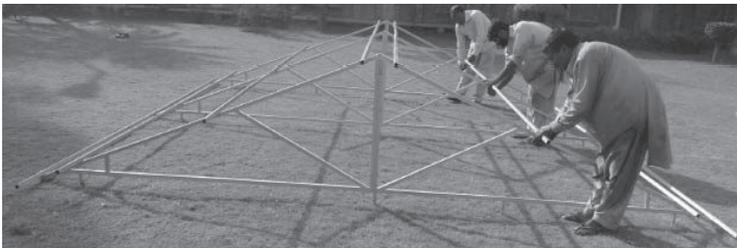


Front taper brace pole

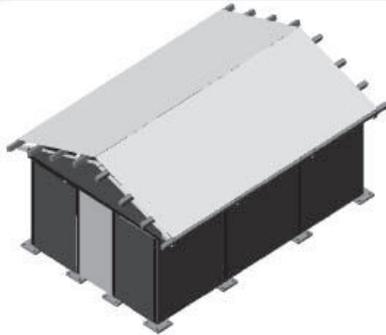
- 2 Front taper brace in this tent.
- Size 2.2M.
- Two holes in this pole.
- Holes in both sides 5cm distance.
- Both sides plates welded to brace.

Side taper brace pole

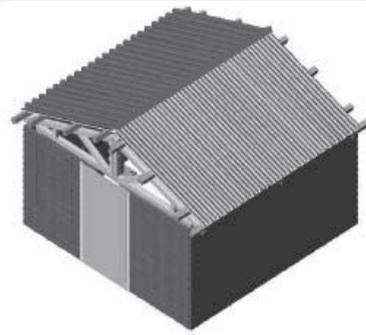
- 4 Side taper brace in this tent.
- Size 2.8M.
- Two holes in both corners.
- Holes in both sides 5cm distance.
- Both side plates welded to brace.



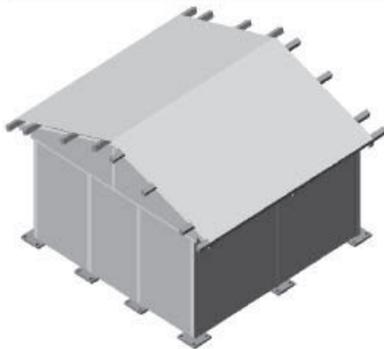
Walls With Fiber Sheet & Roof With Canvas



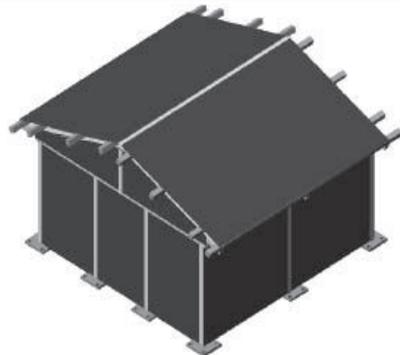
Walls With Bricks & Roof With SGI Sheet



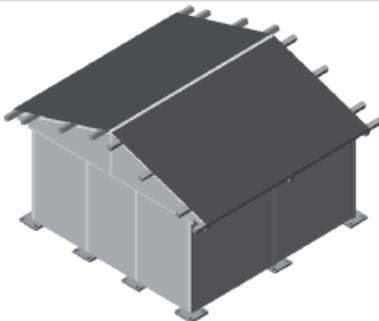
Walls & Roof With PE Sheet



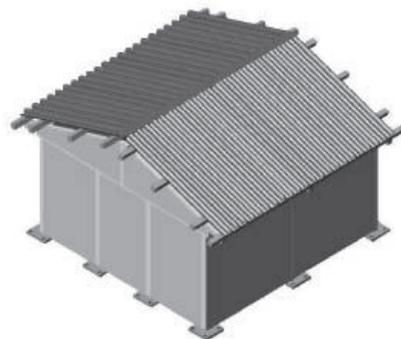
Walls & Roof With Canvas



Walls With PE Sheet & Roof With Canvas



Walls With PE Sheer & Roof With SGI Sheet



2.4.2 Required standards checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/No |
|-------------------------------------|---|----------------------------|-----------------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | yes | ✓ |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | yes | ✓ |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | yes | ✓ |
| 4 | Longest dimension of packed shelter is no more than 200cm. | no (280cm) | ? |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | no | ? |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | no | ? |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | yes | ✓ |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | yes | ✓ |
| 32 | The inner liner has integrated storage pockets. | yes | ✓ |
| 33 | There are no guy ropes or other trip hazards around the shelter. | yes | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | yes | ✓ |
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | yes | ✓ |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | yes | ✓ |
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | yes | ✓ |
| Vector control | | | |
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | yes | ✓ |

| Environmental toxicity | | | |
|------------------------|--|-----|---|
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | yes | ✓ |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | yes | ✓ |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | yes | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | yes | ✓ |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | yes | ✓ |

2.4.3 Organisation details

H. Sheikh Noor-ud-Din & Sons
 4 K.M., Kahna Kacha Road
 Lahore, Pakistan

Web: <http://www.dinsons.com>

“Based in UAE, H. Sheikh Noor-ud-Din Sons, a pioneering company specialize in relief supplies and logistics in emergencies. We are proud of our 20 years cooperation with the humanitarian community in supporting fast, reliable and professional response to those most in need following a disaster.”

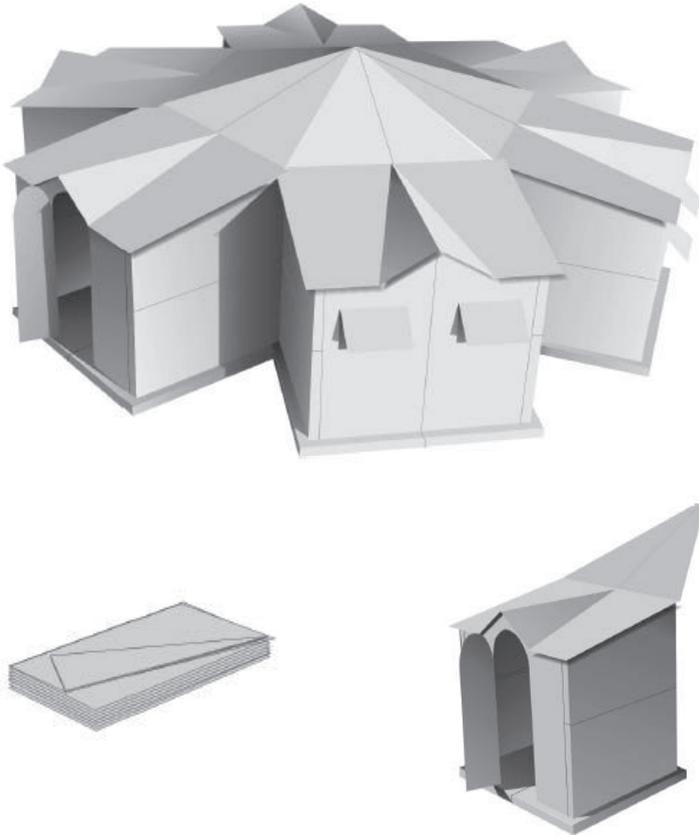
Point of Contact: Tania Mansoor – Business Development Manager
 Tel: +92 423 111 131313
 Fax: +92 213 520 6977
 Email: tania.mansoor@nrs-international.com



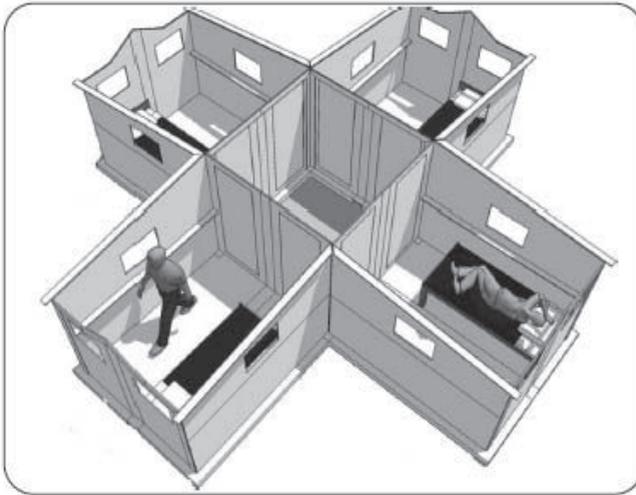
2.5 MADDEL International

The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.5.1 Prototype design



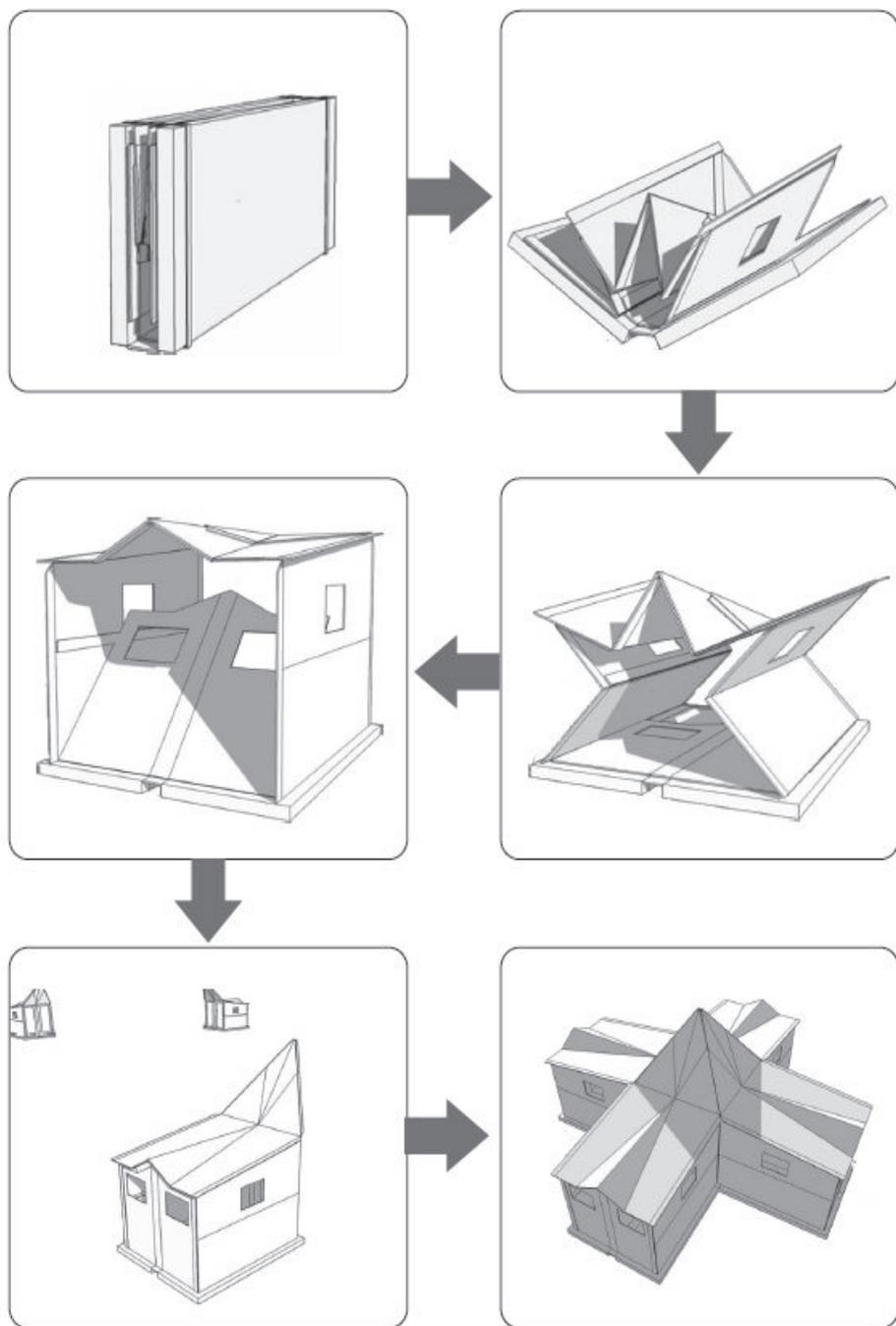
Above:
Preliminary concept drawings for the MADDEL transitional shelter. Shelter module is shown in the flat pack, unfolded and cluster states.



Prototype illustration: internal layout of a 4-module cluster

Emergency Response Transitional Shelter. Features of which include:

- Flat-pack delivery format. Estimated weight of a module is 80kg.
- A module can be erected by unskilled labour in 25 minutes.
- No tools or proprietary equipment required.
- Modules are linked and grouped to provide families and extended family with privacy and yet supporting extended families and communal activities. One unit accommodates two sleeping mats and adequate space for two adults, in compliance with Transitional Shelter Standards May 2009 document.
- Potable water storage can possibly be incorporated into a floor panel, subject to weight limitations. MADDEL is working with polypropylene engineers to determine the most appropriate solution for water storage.
- Polypropylene is chemical resistant and can be easily cleaned to support an hygienic clinic.
- The unit can be collapsed, relocated and re-erected multiple times without losing structural integrity.
- The material can be readily acclimatised, is repairable and reusable.



2.5.2 Required standards checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/ No |
|------------------------------|---|---|-----------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | Mass of package is 78kg. | ✓ |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | The shelter is complete in one pack and not required to be broken down. One flat pack – one shelter unit. | ? |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | Packed volume 0.37m ³ | ✓ |
| 4 | Longest dimension of packed shelter is no more than 200cm. | Longest dimension is 228cm | ? |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | 5 shelters will fit on a 120 x 80cm pallet | ✓ |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | Yes | ✓ |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | Shelter modules can be arranged in a variety of configurations suitable for 3 to 11 people | ? |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | Yes | ✓ |
| 32 | The inner liner has integrated storage pockets. | Integrated shelves – additional storage pockets can be fitted if required | ? |
| 33 | There are no guy ropes or other trip hazards around the shelter. | No guy ropes or trip hazards | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | Yes | ✓ |
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | Yes | ✓ |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | Yes | ✓ |

Transitional Shelter Prototypes Project

| | | | |
|------------------------|--|---|---|
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | Yes | ✓ |
| Vector control | | | |
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | Yes | ✓ |
| Environmental toxicity | | | |
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | Non toxic materials | ✓ |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | Non toxic materials | ✓ |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | Wide range of colours available – prototype is pale grey colour | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | Yes | ✓ |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | Yes | ✓ |

2.5.3 Organisation details

MADDEL International
3 Shallows Court
Eatons Hill, Queensland
4037, Australia

Web: <http://www.maddelinternational.com>

“MADDEL International is a company formed to meet humanitarian needs arising from disasters both natural and man-made. Rather than just supply a product, MADDEL aims to provide communities with means to assist them in rebuilding their lives and taking back some of that which the disaster took away.”

Point of Contact: Alan McGaw - Chairman
Tel: +61 7 3325 2014
Fax: +61 7 3325 2014
Email: alan@maddelinternational.com



2.6 Nunatak Systems

The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.6.1 Prototype design

The transitional shelter

- meets the Shelter Standards Draft
- exceeds strength requirements
- based on durable, sustainable and light weight aluminium frame
- house form socially accepted
- fast to assemble with a minimum of instructions
- easy to stockpile and transport



Features

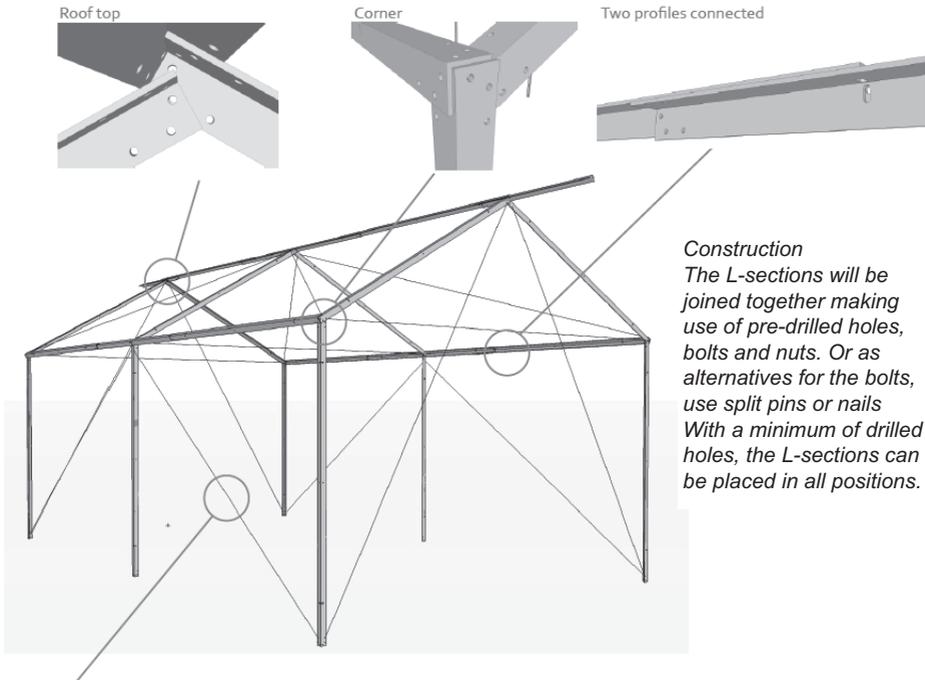
- internal floor space of 17.5 m².
- internal height of 270 cm
- 100% of floor space has a minimum internal height of 180 cm
- the strong frame can hold hammocs or other items hanging from roof or walls
- inner tent with full bathtub floor
- fitted with hanging walk-through mesh doors and mesh windows to keep insects out
- well ventilated through full flow roof vent
- fitted with door frames and door panels for easy access and secure closing of the tent
- 4 windows for extra light and venting
- room dividers possible

| | | Weight: | Pack size: |
|--------|--|----------------|--------------------------------|
| Pack 1 | Aluminium profiles & door frames | 39 kg | 200 x 16 x 12 cm & door frames |
| Pack 2 | Inner tent, floor, flysheet, accessories | 40 kg | 80 x 60 x 30 cm |

4 tents (pack 1 & 2) can be packed on 1 standard pallet of 120 x 80 cm

Aluminium frame

A strong, durable, sustainable, lightweight and easy to assemble aluminium frame forms the basis of the new Transitional Shelter. Only 21 identical profiles, 36 bolts & nuts, 25 bracing cables and 2 hours of time builds the frame. First as the structure for an airliftable family tent of 18 m² floorspace, the frame can later be used to build a house, shop or school.



Bracing

To prevent deforming and for internal strength under wind and snow load, the construction is braced with 3mm galvanized steel cables, in total 15 in 4 lengths.

As an alternative the steel cables can be replaced with polyester packing tape of 16mm width.

Pro's of polyester packing tape:

- weight reduction of 3.5 kg
- tear strength 450kg
- saves US\$ 80 in cost

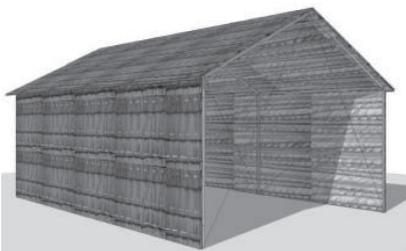
Con's of polyester packing tape:

- unknown life span
- can be easily damaged with sharp object

| Basic configuration: | Weights: |
|--|--------------------|
| 21x L-profiles, size 40x40x4, length 2000mm | profiles 36,0 kg |
| 50x Bow shackles | accessories 6,5 kg |
| 36x M6 bolts, self-locking nuts | |
| 2x Tool set | |
| 25x Steel cables, 3mm Ø, pre-fitted eye stiffeners | |
| 25x Steel cables, 3mm Ø, pre-fitted eye stiffeners | |
| 1x Clear instructions | |
| 25x Cable screw tensioners | |

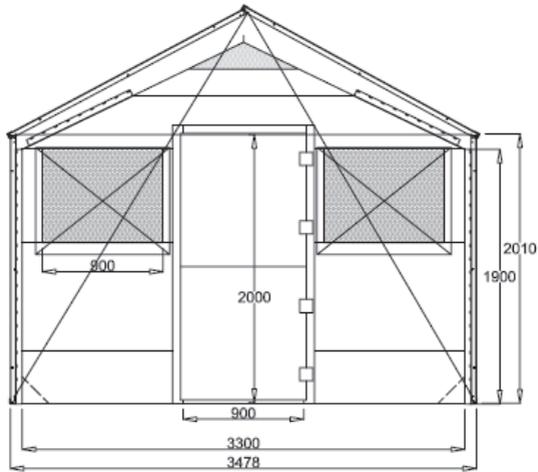
Re-useable structure

The aluminium structure will outlive the tent cover with years. Therefore the structure can over time be covered with local materials that in most cases perform better then our man-made materials. The sturdy frame can be used to build houses, work shops, storage or even schools. The basic frame configuration can be placed together to make a larger building, or the different components can be used to build a structure of own design. And if the L-profiles are no longer of use for a house or other building, they can be used to build storage racks, can become parts for transport trucks or make a nice frame to build a podium for the village playback show.



Semi-permanent house with wooden panels as wall and corrugated iron sheeting on the roof. The house is fitted with a solar panel for electricity.

FRONT AND BACK VIEW



Specifications

Frame

aluminium L-shaped profiles 2000 x 40 x 40 x 4
Total 28 lengths (22 minimum)

Tent

- laminated PE fabric 250 g/m² front and back panels
- PE fabric 350 g/m² floor and lower side walls
- poly-cotton roof and side walls
- door and door frame of PP channel board

Cover

- laminated PE fabric 250 g/m²

Packed weight

- aluminium frame / cables / accessories: 39 kg
 - tent and cover: 40 kg
- Total Weight: 79 kg

2.6.2 Required Standards Checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/No |
|------------------------------|---|--|----------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | 79 kg total weight | ✓ |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | Pack 1 (frame) 39 kg Pack 2 (tent) 40 kg | ✓ |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | Pack 1 (frame) 0,04 m ³ Pack 2 (tent) 0,14 m ³ > total 0,20 m ³ | ? |
| 4 | Longest dimension of packed shelter is no more than 200cm. | 200 cm | ✓ |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | OK | ✓ |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | OK | ✓ |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | 17,5 m ² > 3,5 m ² / person | ✓ |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | 100 % of covered area has 180 cm internal height or more. | ✓ |
| 32 | The inner liner has integrated storage pockets. | OK | ✓ |
| 33 | There are no guy ropes or other trip hazards around the shelter. | OK | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | top vents: 2x 0,3 m ² windows: 4x 0,6 m ² (< is 0,01 m ² correct?) | ? |
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | OK | ✓ |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | OK | ✓ |

| | | | |
|------------------------|--|----|---|
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | OK | ✓ |
| Vector control | | | |
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | OK | ✓ |
| Environmental toxicity | | | |
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | OK | ✓ |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | OK | ✓ |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | OK | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | OK | ✓ |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | OK | ✓ |

2.6.3 Organisation details

Nunatak Systems
 Schleusenbrücke 1, Hamburg
 20354, Germany

Web: <http://www.nunataksystems.eu>

“Nunatak Systems develops, designs and manufactures lightweight rapid deployable tent systems for rescue units, medical rapid response units, humanitarian organisations, scientific expeditions and the military.”

Point of Contact: Frank Merks – GmbH
 Tel: +49 7066 98-191
 Fax: +49 7066 980232
 Email: frank@nunataksystems.eu



2.7 World Shelters

The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.7.1 Prototype design



Benefits to aid recipients

- Rapidly deployable secure shelter
- Pleasant hard-panel living space
- Adaptable as core house using local materials

Benefits to shelter provider

- Compliance with draft standards
- Desired price point achievable
- Designed for easy transport
- Durable, re-usable, recyclable

Designed to Transitional Shelter Standard

- 18m² space with excellent clear height
- Fire retardant panels
- Strength exceeds requirements



Frameless hard-panel structures of precision diecut panels made from flame-retardant UVresistant corrugated polypropylene, configurable as needed. The initial TranShel exemplifies a design paradigm that can achieve diverse shelters appropriate for different climates and cultures.

TranShel and related structures are readily assembled, disassembled and are re-usable. Material has no offgassing and is recyclable.

World Shelters' TranShel: Status

WS created the TranShel design and prototype through to pre-production readiness in 10 weeks.

- CAD + CAE + CNC + low-cost tooling + global production sources = rapid design, engineering, prototype and production
- Frameless hard-shell structure of fire-retardant corrugated polypropylene can be any shape, size or strength to maximize benefits for low cost.
- Multiple models possible for different cultures or climates, e.g. round with conical roof and many windows, or fully winterized for cold and snow.

World Shelters' TranShel prototype meets load and strength specs, verified by licensed engineer's analysis, and below target price point.

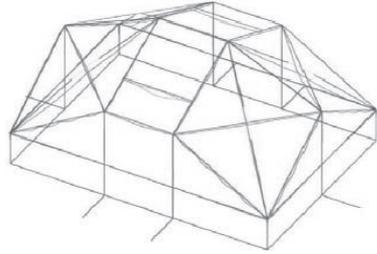
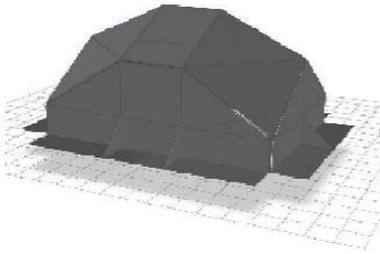
Manufacturing capacity defined in China, India, Chile, US. Manufacturing processes are simple and consistent. Ubiquitous global capacity.

Pricing model economy of scale at 1000 units.

Ready for field pilot, of a contextually adapted configuration.



Full Engineering Analysis Report available at World Shelters website
www.worldshelters.org



World Shelters and the TranShel support agencies' transitional shelter programming. World Shelters as an NGO is aligned with agencies' goals of rebuilding community and fostering economic development.

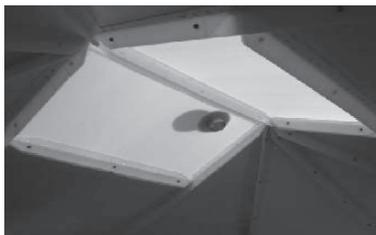
- Minimizing foreign expenditures and maximizing local expenditures benefits the local economy.
- WS can provide field support for transitional shelter projects boosting local productivity.

TranShel encourages local architecture.

- Panels provide ready attachments exterior and interior for using local materials.
- Physically extensible into permanent dwelling using local materials.

Transitional Shelter programming will require integrative cross-cutting methods to facilitate the transitional process.

- More complex community processes and extended time-frames.
- Capital inputs to fund local building adaptations.
- Demonstration of and support for replication of localizations, to spark local building initiatives.
- Program guidelines are important inputs to shelter design.



2.7.2 Required standards checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/No |
|------------------------------|---|--|----------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | a. TranShel Prototype displayed, including door frames, is 100kg. b. Options identified to reduce weight to conform with 80kg standard., e.g. 1. Reduce overall shelter size by 5% from 18.35m ² to 17.5m ² ; 2.Tri-wall beams can become Double-wall beams 3. Door frames can be designed to use corrugated poly instead of wood. | ? |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | Readily achievable; not demonstrated in the initial prototype | ? |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | Prototype 1 package was.8m ³ Options identified to reduce volume to approach .5m ³ standard. | ? |
| 4 | Longest dimension of packed shelter is no more than 200cm. | Yes. | ✓ |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | While there is one 120cm edge length for each packed shelter, other packaged shelter dimensions will ultimately result in three packed shelters onto a 120 x 80cm Euro pallet. | ? |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | Yes | ✓ |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | TranShel prototype 1 is 18m ² (= 3.6m ² per person). | ✓ |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | Yes. | ✓ |

Transitional Shelter Prototypes Project

| | | | |
|------------------------|--|------|---|
| 32 | The inner liner has integrated storage pockets. | Yes. | ✓ |
| 33 | There are no guy ropes or other trip hazards around the shelter. | Yes. | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | Yes. | ✓ |
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | Yes. | ✓ |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | Yes. | ✓ |
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | Yes. | ✓ |
| Vector control | | | |
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | Yes. | ✓ |
| Environmental toxicity | | | |
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | Yes. | ✓ |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | Yes. | ✓ |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | Yes. | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | Yes. | ✓ |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | Yes. | ✓ |

2.7.3 Organisation details

World Shelters
550 South G Street, Suite 3
Arcata, CA
95521, USA

“World Shelters is a non-profit, California based manufacturer and volunteer organization. Our innovative structures apply proven technologies to create temporary and transitional shelters for humanitarian relief.”

Web: <http://www.worldshelters.org>

Point of Contact: Bruce LeBel – Executive Director

Tel: +1 707 822 6600

Fax: +1 707 633 1737

Email: bruce.lebel@worldshelters.org



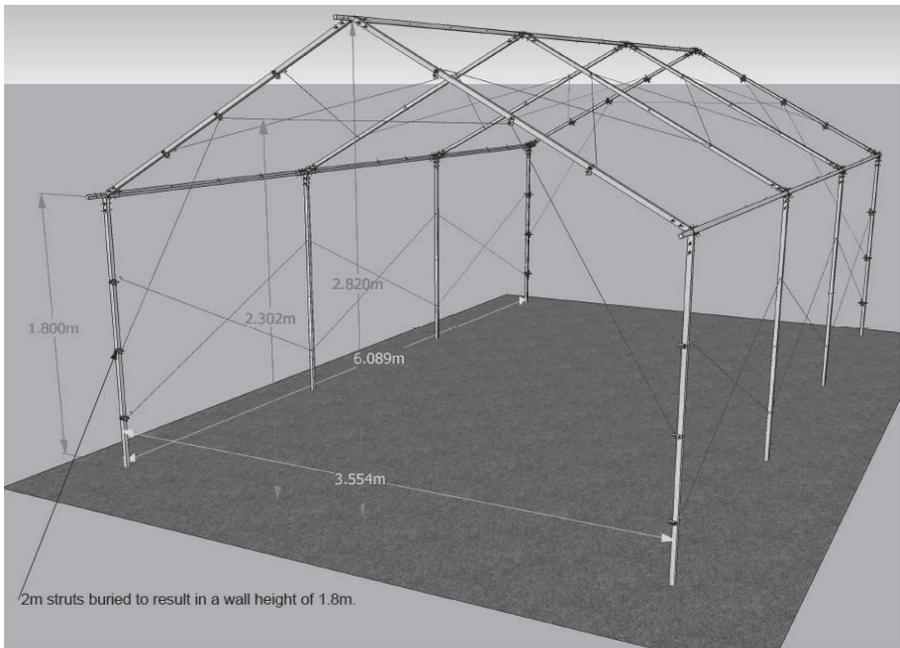
2.8 Worldwide Shelters

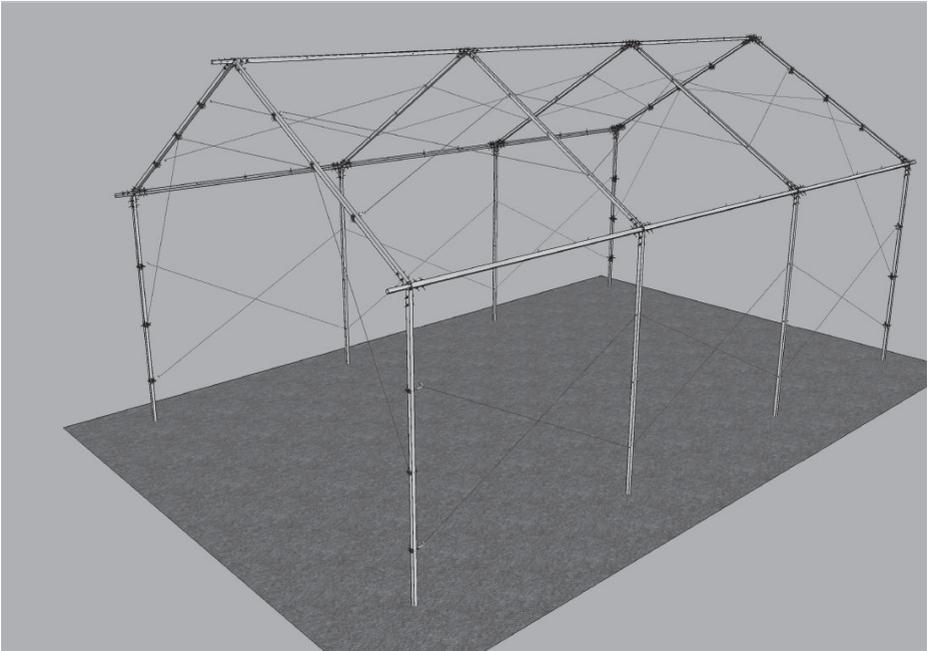
The following materials were provided by the manufacturer. Shelter Centre retains editorial rights for this material.

2.8.1 Prototype design

The design decisions were guided by the following thought processes. Our primary goal is to push the envelope within the TS Standards and our view is providing 'out of the box' innovation.

Structurally, as angle iron is more susceptible to twisting (when loaded) and as round tubing can spin, they both were eliminated from our prototype considerations. Square tubing was chosen over these properties as well as rectangular tubing due to the options available with equilateral sides. Additionally, a higher material efficiency was sought so the struts could connect at their ends, not after an overlap. This then created a need for a joint member. A simple solid aluminum joint was developed that only required a minimal amount of machining. From a manufacturing standpoint, welding and/or bending was not desired due to its potential to change the structural properties of the metal. As far as size, the maximum length of strut was used while still achieving the packaging requirements.



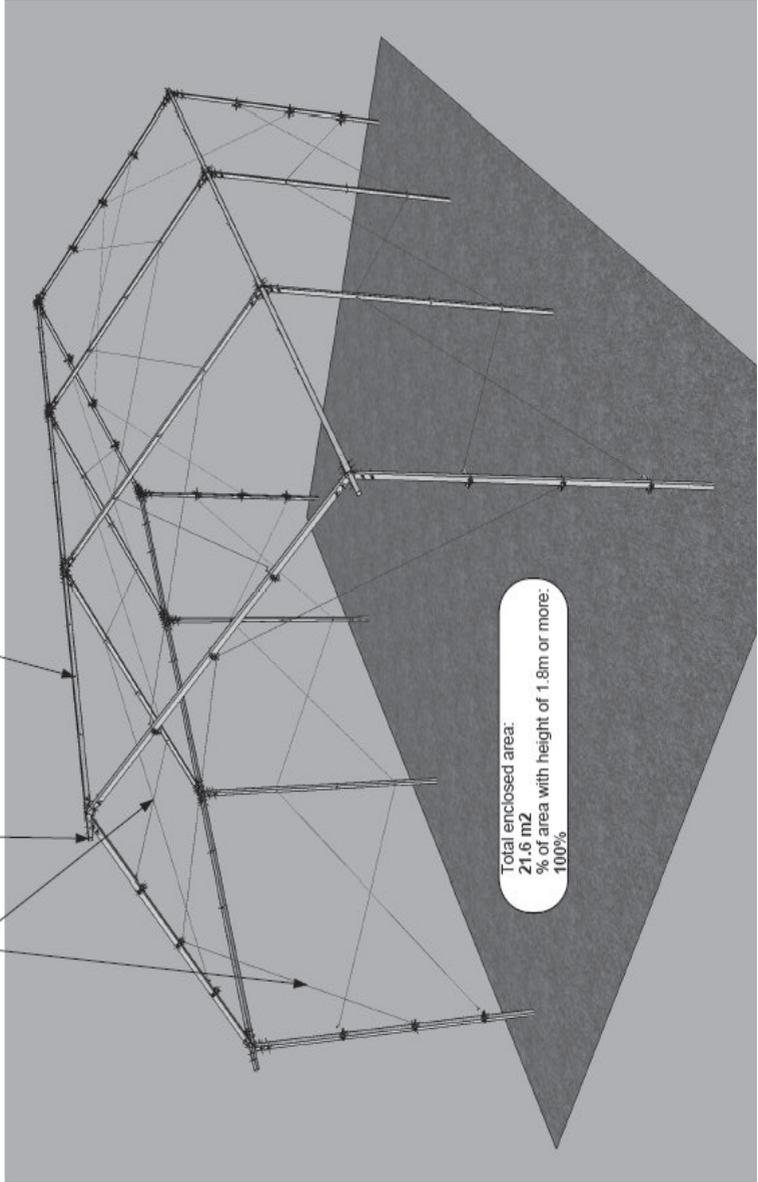


The goal of the WWS Transitional Shelter Initiative is to integrate Shelter Centre standards fully into our lightweight-transitional shelter that will provide sustainable, cost-effective housing solutions. As a not-for-profit/charitable shelter solutions provider, all of our transitional shelters provide significant long-term value and allow the humanitarian community to reduce the total cost of moving IDPs and refugees into emergency & semi-permanent housing.

Qty 12 identical joints-20 mm square Alum.
Additional joints can be fixed to bottom of the vertical struts to provide additional stabilization when the struts are buried.

3 mm galvanized steel cabling with turnbuckles on walls, roof, and end panels

Qty 25 identical struts-25mm square Alum. tubing, each 2m, with 7 holes for mountain to joints, connecting cabling, and hanging/attaching inner tent/personal items.



2.8.2 Required standards checklist

| Standard No. | Standard Description | Standard Fulfilment | Standard Met? Yes/No |
|-------------------------------------|---|--|-----------------------------|
| Total weight and packed size | | | |
| 1 | Complete package has a mass between 40kg and 80kg. | Frame parts= 39 kg (44 w/footers) | ? |
| 2 | Total shelter is in one package which can be broken down to smaller packages, suitable for transport for 2 people. | OK | ✓ |
| 3 | Complete shelter has packed volume between 0.3m ³ and 0.5m ³ . | TBD | ? |
| 4 | Longest dimension of packed shelter is no more than 200cm. | OK | ✓ |
| 5 | At least 4 packed shelters can fit onto a 120x80cm Euro pallet. | OK | ✓ |
| 6 | The packed shelters can be packed vertically onto a 120x80cm Euro pallet. | OK | ✓ |
| Useable area | | | |
| 27 | The shelter should be of sufficient size to house a family of 5, with between 3.5m ² and 4.5m ² of covered living area. | 21.6 m ² covered | ✓ |
| 28 | The standing height of the covered space is a minimum of 180cm over at least 60% of the covered floor area. | 100% of covered space is 1.8 m or more | ✓ |
| 32 | The inner liner has integrated storage pockets. | OK | ✓ |
| 33 | There are no guy ropes or other trip hazards around the shelter. | OK | ✓ |
| Ventilation | | | |
| 34 | Minimum ventilation shall be achieved through an unobstructed aperture with a total area equivalent to 0.01m ² . | OK | ✓ |
| 37 | All doors and openings are adjustable to control light and heat gain or loss. | OK | ✓ |
| Fire safety | | | |
| 42 | The shelter has two opposite doors to facilitate escape in case of fire. | OK | ✓ |
| 43 | It is possible to exit the shelter within 30 seconds when all doors are fully closed. | OK | ✓ |
| Vector control | | | |

| | | | |
|------------------------|--|---------|---|
| 46 | The shelter has a 10cm vertical edge around the base of entry points to impede the entry of insects. | OK | ✓ |
| Environmental toxicity | | | |
| 49 | The shelter does not involve materials that are toxic to humans, even when cut or modified for later re-use. | OK | ✓ |
| 51 | The shelter does not involve materials that are toxic by burning or burying, and shall not pollute the ground water table or enter the food chain. | OK | ✓ |
| Colour | | | |
| 52 | Military or camouflage colours are not to be used. | OK | ✓ |
| 58 | The shelter can be distributed as a complete package, ready to put up, with all components included and all required tools. | OK | ✓ |
| Buildability | | | |
| 63 | The frame is strong enough to support 6 to 8 30kg hanging live loads. | Testing | ? |

2.8.3 Organisation details

Worldwide Shelters
 2480 Georgia Ave.
 Glenwood, MD
 21738, USA

Web: <http://www.worldwideshelters.com>

“We are an internationally focused company committed to providing high-quality shelters to organizations, governments and individuals who support those afflicted by displacement. With representation and logistical support in Europe, the Middle East, Asia, Africa and the United States, we have the ability to respond quickly to your needs while providing superior service.”

Point of Contact: Ryan Hudock – President, Executive Director

Tel: +1 916 358 5598

Email: ryan.hudock@worldwideshelters.com



3 Information for manufacturers

37. Section 3 provides current participating manufacturers with an overview of their role and an update about interaction with Shelter Centre in the past six months. The section also provides interested manufacturers with information about how to join the project.

3.1 Role of participating manufacturers

38. It is important to secure the participation of manufacturers of materials and components, fabricators and suppliers, and international standards institutions in research and development of Transitional Shelter Prototypes because of their:

- role as producers and suppliers;
- expert knowledge of materials and processes;
- resources for fabrication and testing; and their
- continued investments in research and development.

39. Shelter manufacturers participate in the project by agreeing to at their own cost develop Transitional Shelter Prototypes that meet the Transitional Shelter Standards. For information on how to become a participating manufacturer, please see section 3.3.

40. At each twice-yearly project meeting, manufacturers have the opportunity to present their progress to the humanitarian community. The project Consortium and assembled humanitarian actors provide feedback on the designs and prototypes, with regards to their compliance to the Standards and appropriateness for transitional shelter operations. This feedback should then be incorporated into the manufacturers' designing and prototyping, in order to better meet the Standards and expectations of humanitarian agencies.

41. By the end of the project, the aim is to have a number of credible examples of stockpilable transitional shelters, which could be procured and used after conflicts and natural disasters. The participating humanitarian agencies are responsible for the development and agreement of the Transitional Shelter Standards and have identified the need for stockpilable transitional shelters for use in programmes. However, they are under no obligation to procure the shelters that are created as a result of the project.

42. The aforementioned process is beneficial because:
- there are no design specifications, thus allowing manufacturers to be innovative and not simply focus on price and quality;
 - the participation of multiple manufacturers results in a range of solutions and allows for testing via direct comparison; and because
 - the prototypes and Standards are continually revised, making them more appropriate over time.

3.2 Progress and interaction since May 2009

43. Shelter Centre is pleased to announce that since May 2009, four shelter manufacturers have formally expressed their interest in the project and will be participating as of the November 2009 project Meeting. They are:

- Alpinter Relief Supplies www.alpinter.com
- H. Sheikh Noor-ud-Din & Sons www.dinsons.com
- Kay Tent Industries www.priyankaindia.com
- MADDEL International www.maddelinternational.com

44. They join the following manufacturers as participants of the project:

- Evenproducts Limited www.evenproducts.com
- Nunatak Systems www.nunataksystems.eu
- World Shelters www.worldshelters.org
- Worldwide Shelters www.worldwideshelters.com

45. The project will run until September 2011, meaning that there are only three additional project meetings remaining, in May 2010, November 2010 and May 2011. Therefore, Shelter Centre will be accepting formal expressions of interest from shelter manufacturers only until May 2010. For information on how to become a participating manufacturer, please see section 3.3.

46. Bilateral teleconferences were held between Shelter Centre and the participating manufacturers, from August to November 2009, in order to answer questions and to confirm the details of what the manufacturers would be presenting at the project meeting on 12th November 2009.

47. A number of common questions arose during these teleconferences.
- How will prototypes be tested?
 - What can be presented at each project meeting?
 - What are the next steps of the project?
 - What can manufacturers expect from Shelter Centre?
 - What do humanitarian agencies want in terms of design?
 - How would stockpiled transitional shelter be implemented in programmes?
 - What is the impact of transitional shelter?
48. All of the participating manufacturers may benefit from answers to these common questions, so Shelter Centre has agreed to create an FAQ page on the project website. To view the project web page, please visit: <http://www.sheltercentre.org/tsp/Shelter+Prototypes>.

3.3

Steps to take to join the project

49. Shelter Centre is accepting expressions of interest from shelter manufacturers to join the project until May 2010.
50. Shelter manufacturers are invited to develop at their own cost prototypes of stockpiled transitional shelter, complying to draft Transitional Shelter Standards agreed by the humanitarian community, as part of a project to develop a new generation of humanitarian shelter.
51. To become a participating manufacturer, please follow these steps:
1. Review the project overview presented in the booklet in order to understand the project and how manufacturers are involved.
- ▼
2. Visit the Shelter Centre website to access the three interrelated project booklets and related content:
 - Transitional Shelter Guidelines:
<http://www.sheltercentre.org/tsg/TSG>
 - Transitional Shelter Standards:
<http://www.sheltercentre.org/tss/Shelter+Standards>
 - Transitional Shelter Prototypes:
<http://www.sheltercentre.org/tsp/Shelter+Prototypes>

3. Send Shelter Centre a formal letter of interest on letter headed paper, via email to prototypes@sheltercentre.org. Please refer to the 'Conditions of Participation' in section 3.4.

4. Shelter Centre will provide you with a full set of reference materials, which the other manufacturers involved in the project have also received. This is to ensure that no unfair advantage is given to any particular manufacturer.

5. Liaise with Shelter Centre to schedule a telephone conversation to discuss how to proceed prior to the next project meeting.

6. Attend project meetings in order to share progress and discuss prototypes that meet the Standards. The next project meeting is in May 2010 in Geneva.

7. Develop shelter prototypes according to Transitional Shelter Standards.

8. Display your prototypes at a project meeting in order to gain feedback from other participating manufacturers and project partners.

9. Modify your prototypes based on comments received from project participants.

10. Comment upon the suitability of the Standards, in terms of the technical criteria, and regarding affordable test regimes for meeting the Standards.

3.4 Conditions of participation

52. Manufacturers must understand the following conditions of participation:

- the project is not an opportunity for manufacturers to present existing shelters or tents, but instead manufacturers should develop new prototypes that they believe meet the Standards agreed;
- neither Shelter Centre nor the project Consortium of humanitarian actors commit to purchase any shelters resulting from the project;
- one of the objectives of the project is to build productive communications between shelter manufacturers and the humanitarian community, and for this reason the project maintains an informal nature. However, manufacturers are expected to follow any terms agreed by the project group of humanitarian actors;
- Shelter Centre reserves the right to deny any manufacturer or supplier from joining the project and may remove any manufacturer or supplier from the project without explanation or justification, including for misrepresenting the project or consortium members, such as by using the names or logos of participating members without the explicit permission of those members;
- the manufacturers will bear all of the costs associated with the research, development, fabrication, transport and exhibition of prototypes over the duration of their involvement in the project; and
- it is the role of the project Consortium to agree its requirements as Standards. However, manufacturers and suppliers may be offered the opportunity to comment upon these Standards at a later stage of the project.

3.5 Contact and questions

53. In all correspondence for the Transitional Shelter Standards and Prototypes project, please add prototypes@sheltercentre.org as a Cc in each email.
54. Unfortunately, Shelter Centre does not have the capacity to answer detailed questions concerning the project, unless a formal expression of interest has been received from the manufacturer. Please expect a delay in answering short emails concerning the project.
55. If manufacturers are accepted to join the project group, there will be further opportunities to ask questions.
56. Shelter Centre will not respond to unsolicited contact, related either to this project or to any other aspects of shelter.

Appendices

A Shelter Centre previous prototypes

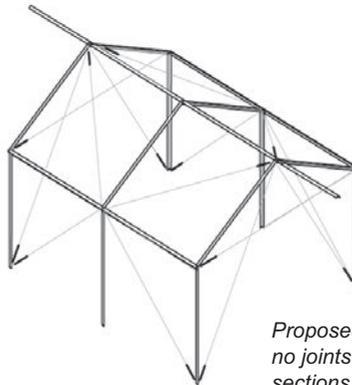
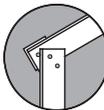
57. At the early stages of the Transitional Shelter Prototypes project, Shelter Centre undertook the design and production of transitional shelter prototypes, in order to demonstrate to both the humanitarian community and participating manufacturers that the Transitional Shelter Standards were both reasonable and achievable.

58. Appendix A presents diagrams and brief descriptions of these designs, in order to provide a useful technical background to the project.

A.1 Frame

59. The frame was the main structural element of the prototype. Emphasis was placed on enabling recipients to modify their shelter with more durable materials over time. The focus of this frame was to:

- I. explore a shelter system that does not comprise any separate joints, in order to minimise the number of components required; and to
- II. explore the use of equal angle aluminium and steel sections.



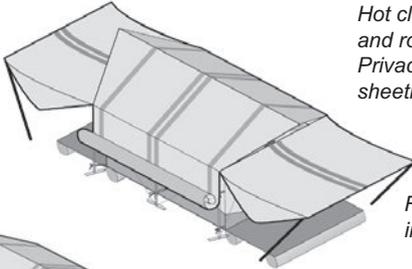
Proposed frame requires no joints - only equal angle sections, fasteners, tension cables and tensioners

A.2

Cover

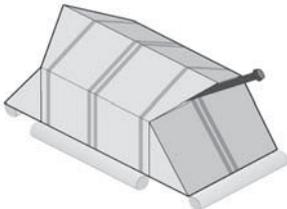
60. The cover provides protection from the elements as well as providing privacy. The focus for this cover proposal was to:

- i. design a covering, using UNHCR/MSF specification sheeting, which has good longevity and is widely available, facilitating repair;
- ii. optimise gable ends for ventilation to reduce the inside temperature of the shelter; and to
- iii. ensure simple, robust detailing to extend the life of the shelter.

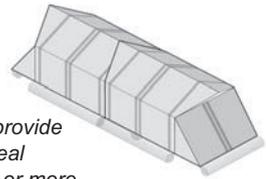


Hot climate deployment with open vestibules and rolled up outer walls to maximise ventilation. Privacy is retained through the use of plastic sheeting along the lower half of the inner liner

Folded sheeting act as integral ballast bags



Cold climate deployment with sealed doors and vestibule to minimise ventilation and retain heat generated by stove



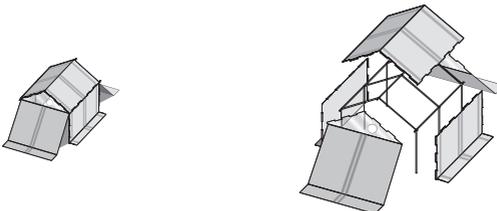
The gable ends provide an overlapping seal when joining two or more modules end to end

A.3

Previous cover proposal, November 2006

61. The following conclusions were reached about the previous cover design from November 2006:

- welded coverings may result in strengthening the joints through fabrication, rather than the weakening caused by stitching; and
- pocketed sod cloths may be more appropriate than simple sod cloths, holding rubble and retaining loose fill in windy conditions.



A.4 Liner

62. The liner provides an insulated air gap which insulates in cold weather and ventilates in hot weather. The liner also provides protection from insects and small animals without compromising ventilation. The focus for the liner proposal was to:

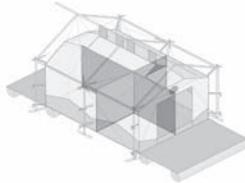
- i. design an integrated liner and tray, using 'ripstop' nylon, mosquito netting, and UNHCR/MSF specification sheeting, thus designing for where durability is required, and where materials can be lighter to enhance weight and air flow; and to
- ii. optimise the liner for manufacturing, thus reducing cost and lead times.

Folds in ground sheet act as integral ballast bags when filled with soil or other available aggregate



Integral flue plate for stove is held in place by cable tensioners

Tie points to frame are designed to fail before the connection to the liner fails



Raised door threshold inhibits reptiles and small rodents from entering the shelter

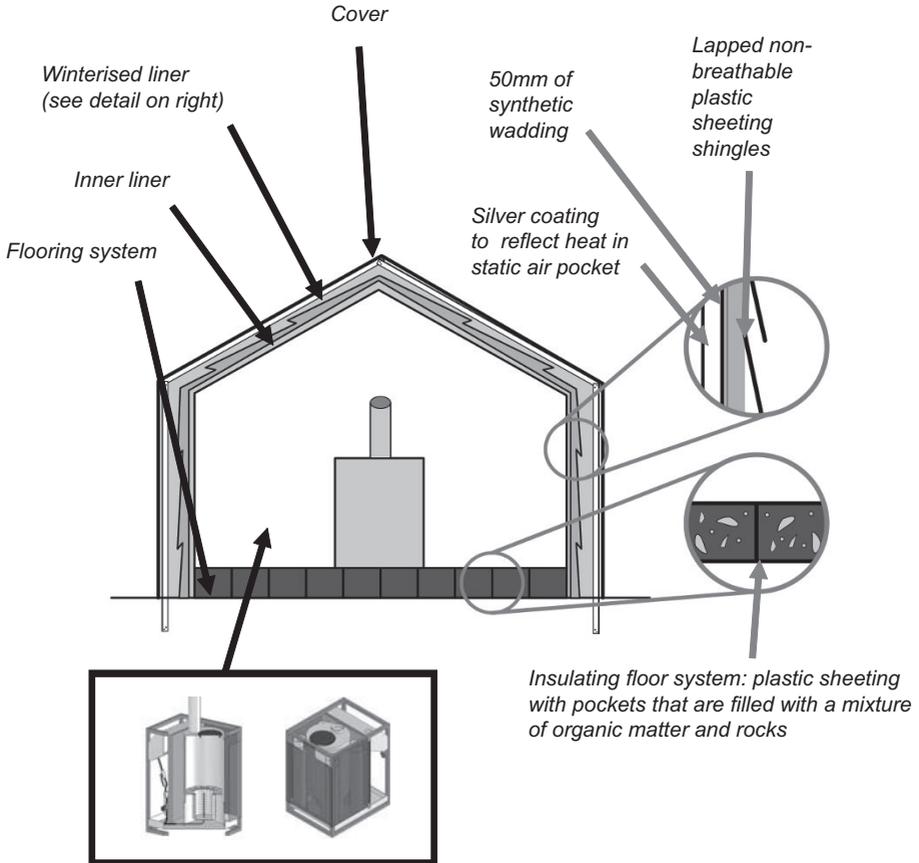
The privacy divider may be deployed along the tent in hot weather to increase ventilation, or deployed across the tent in colder weather to create a warm room



Liner prototype developed by Shelter Centre staff and volunteers over the summer of 2006

A.5 Winterisation options

63. Supported by DFID 2006 – 2011, the Consortium will develop and agree winterisation components for Transitional Shelter Standards. The winterised standards will involve physical testing, and the conclusions will be integrated as amendments.



A.6 Stove proposal

64. A fully functioning prototype diesel-kerosene tent heater for displaced families was developed by International Thermal Research in collaboration with Shelter Centre.
65. The 3 key developments for use in humanitarian emergencies are:
 - i. risk of explosion is greatly reduced by using a diaphragm fuel regulator, which prevents fuel spillage;
 - ii. the heater can be used more flexibly, day and night, as the burner is surrounded by a cage that can be filled with rocks, which will be heated and will continue to heat the tent once the burner is turned off; and
 - iii. the heater can also be used for cooking and heating water for drinks, washing and laundry.

B Acronyms and initialisations

| Acronyms and initialisations | |
|-------------------------------------|--|
| CAFOD | Catholic Agency for Overseas Development |
| COHRE | Centre On Housing Rights and Evictions |
| CRS | Catholic Relief Services |
| DFID | Department for International Development |
| DFID CHAD-OT | DFID Conflict and Humanitarian Affairs Department Operations Team |
| ECHO | European Commission Humanitarian aid Office |
| ICRC | International Committee of the Red Cross |
| IFRC | International Federation of Red Cross and Red Crescent Societies |
| IOM | International Organization for Migration |
| JICA | Japanese International Co-operation Agency |
| MSF-B | Médecins Sans Frontières – Belgium |
| MSF-Int | Médecins Sans Frontières – International |
| NRC | Norwegian Refugee Council |
| OCHA | Office for the Coordination of Humanitarian Affairs |
| ODI | Overseas Development Institute |
| RedR | Registered Engineers for Disaster Relief |
| RICS | Royal Institution of Chartered Surveyors |
| SDC/HA | Swiss Agency for Development and Cooperation/Swiss Humanitarian Aid Unit |
| UN-Habitat | United Nations Human Settlements Programme |
| UNDP | United Nations Development Programme |
| UNEP | United Nations Environment Programme |
| UNHCR | United Nations High Commissioner for Refugees |
| UN/OCHA | United Nations Office for the Coordination of Humanitarian Affairs |
| USAID | United States Agency for International Development |
| USAID/OFDA | USAID Office of Foreign Disaster Assistance |

C Selected bibliography

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D Meeting agenda: 12th November 2009

66. Transitional Shelter Standards and Prototypes Meeting November 2009 Proposed agenda:

| Time | Shelter Meeting 09b, Day 1, Thursday 12th November |
|-------|--|
| 16:00 | Plenary Transitional Shelter Standards and Prototypes 1 Project update 2 Invitation to join project Consortium 3 Next Steps: what do you want? <i>Shelter Centre and Project Consortium</i> |

67. At 16:30, Day 1 of the Shelter Meeting will formally close. Shelter Meeting is a sector forum for humanitarian actors to provide updates and discuss progress in shelter and reconstruction.

68. Shelter manufacturers are not eligible to attend the proceedings of the Shelter Meeting, because the presence of commercial actors can compromise impartiality.

69. Manufacturers participating in the Transitional Shelter Standards and Prototypes project can, however, attend the separate Transitional Shelter Standards and Prototypes Project Meeting and are invited into the meeting at 16:30 in order to present their progress and provide feedback on the Standards.

| | |
|-------|---|
| 16:30 | Update Winter resistant transitional shelter <i>TU Eindhoven</i> |
| 16:40 | Plenary Proposals for changes to Transitional Shelter Standards <i>Shelter Centre, Project Consortium and Manufacturers</i> |
| 17:00 | Presentations 5 min each Transitional Shelter prototype concept designs 2 H. Sheikh Noor-ud-Din & Sons 3 Maddel International 4 Worldwide Shelters 5 Kay Tent Industries 6 Evenproducts 7 Nunatak Systems |
| 17:45 | Breakout Viewing design exhibitions and prototypes <i>Shelter Centre, Project Consortium and Manufacturers</i> |
| 18:45 | Close |

Project and booklet information

The Transitional Shelter Prototypes booklet is circulated periodically at the biannual Transitional Shelter Standards and Prototypes project meeting. The current draft was circulated at the project meeting on Thursday 12th November 2009.

For the humanitarian community:

This document is made available to members of the humanitarian community in order to elicit comments on the transitional shelter prototype concepts herein. The transitional shelter prototypes concepts have been designed by manufacturers to meet the Transitional Shelter Standards, which have been agreed by the Project Consortium. The designs are reviewed by the Project Consortium, which meets at the biannual meeting.

For further information, to provide feedback, or to join the Project Consortium, please email us at: prototypes@sheltercentre.org.

For interested manufacturers:

The Transitional Shelter Prototypes are not a mechanism by which to promote pre-existing designs, unless they already meet the Transitional Shelter Standards.

Manufacturers participating in the Transitional Shelter Standards and Prototypes projects are developing prototypes that aim to conform to the Standards, at their own cost. They are displaying prototypes at the project meeting held in conjunction with Shelter Meeting 09b (12-13th November 2009) in Geneva, at which this booklet was distributed.

To participate in the project, please refer to section 3 of this booklet and follow the instructions provided.

To download the current draft of this document, please visit the Transitional Shelter Prototypes project page at:

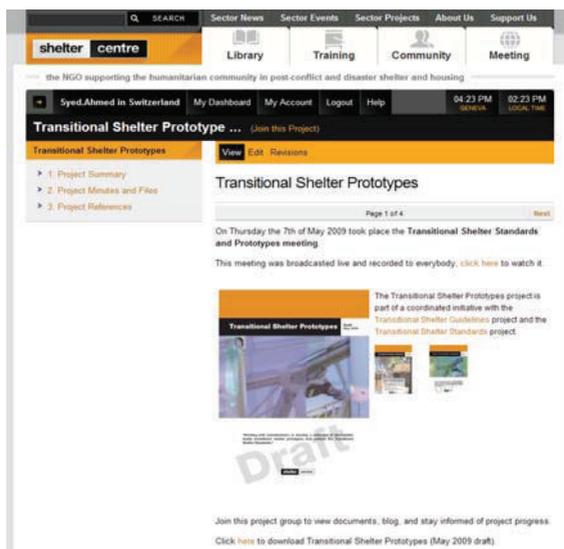
<http://www.sheltercentre.org/tsp/Shelter+Prototypes>

Online project review

All Shelter Centre projects are available for free viewing online at:

www.sheltercentre.org/projects

If you are a member of the Shelter Community, you may also leave discussion comments pertaining to each sector project. Eligible to join the Shelter Community include: employees of humanitarian and development NGOs, IOs, and UN bodies, independent humanitarian consultants, donors, and some government ministries. To apply for membership, visit www.sheltercentre.org/membership



The screenshot displays the Shelter Centre website interface. At the top, there is a navigation bar with a search function and links for Sector News, Sector Events, Sector Projects, About Us, and Support Us. Below this is a secondary navigation bar with icons for Library, Training, Community, and Meeting. The main header identifies the organization as 'shelter centre' and describes it as 'the NGO supporting the humanitarian community in post-conflict and disaster shelter and housing'. A user profile for 'Syed.Ahmed in Switzerland' is visible, along with a dashboard and account management section. The current page is titled 'Transitional Shelter Prototypes' and includes a 'Join this Project' button. A sidebar on the left lists navigation options: '1. Project Summary', '2. Project Minutes and Files', and '3. Project References'. The main content area features a 'View' button and a 'Revisions' link. A section titled 'Transitional Shelter Prototypes' indicates it is 'Page 1 of 4'. A text block mentions a meeting on Thursday, 7th May 2009, with a link to watch a recording. Below this is a thumbnail image of a document titled 'Transitional Shelter Prototypes' with a 'Draft' watermark. A final note at the bottom encourages users to join the project group and provides a link to download the 2009 draft.

For more information on the Transitional Shelter Prototypes project, visit www.sheltercentre.org/tsp/shelter+prototypes

Transitional Shelter Prototypes

The Transitional Shelter Prototypes booklet is circulated periodically at the biannual Transitional Shelter Standards and Prototypes project meeting. The current draft was circulated at the project meeting on Thursday 12th November 2009.

Manufacturers participating in the Transitional Shelter Standards and Prototypes projects are developing prototypes that aim to conform to the Standards, at their own cost. They are displaying prototypes at the project meeting held in conjunction with Shelter Meeting 09b (12-13th November 2009) in Geneva, at which this booklet was distributed.

The concept prototype designs of 6 shelter manufacturers appear in this booklet.

| | |
|----------------------|------------------------------|
| Evenproducts Limited | H. Sheikh Noor-ud-Din & Sons |
| MADDEL International | Nunatak Systems |
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