

'EVENSHELTER'



EVENPRODUCTS

water for life

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Shelter Development Background

The current conflicts in the Greater Darfur Region, Sudan, has created hundreds of thousands of IDPs migrating to safer places for re-settlement. This trend has continued and there is little sign of letting up. Some IDPs re-settled in smaller clusters of several dozen families with neighbouring host communities but the majority moved to larger camps, attracted by the services and provisions managed by relief agencies.

Whilst relief agencies provide services in their respective fields of specialities, such as water and sanitation, medical treatment, food and non-food items distributions, etc., there are very few agencies which have provided adequate shelters or shelter materials in a timely manner as part of their first interventions, despite the fact that most agencies recognise that IDPs are at their most vulnerable state when they first arrive at camps after an exhaustive long journey and that the first interventions cannot be considered complete without effective shelters.

The most common scenario when IDPs arrive at a camp is that they begin to frantically scrounge for what they can find and cut to make shelters. In established camps or places, which have little vegetation, all usable materials would have been depleted long ago and IDPs will have to venture miles away from the camp, risking attacks in the process. For the fortunate families, who have come with some shelter materials, or able to afford them, they are relatively more able to build their own shelters, but at the expense of irreversible depletion of local indigenous forests. Many less able/disadvantaged groups, especially the aged and widows, are often subject to the full blast of the blazing sun, the shivering cold nights, the health damaging chilling rains, and the indignation and sense of insecurity of sleeping in the open. Their so called "shelters", after they have settled for weeks, comprise of merely small domes made from some bend thin twigs and branches, with long blades of grass and/or some pathetic looking old opened-up plastic shopping bags patched together hang on them, in their futile attempts to put up some shades from the sun.

Depletion of indigenous forests is another area, which is being ignored. Much of the timber used for construction of homes in camps, field compounds for relief agencies and latrines came from Sudan's natural forests. Amongst the trees used were Ebony and similar hardwoods, which takes many decades to grow to their present size. Once fell, these trees and forests are unlikely to re-generate naturally. It is unfortunate that the needs of the IDPs and also that of the relief agencies have exasperated the degradation of Sudan's forests.

In the past decade or so, many large agencies have embarked on researches on appropriate shelters for different climatic regions and some agencies have come up with their own designs and some have included shelters as their emergency stock items.

Some relief equipment suppliers have also come up with their propriety designs of shelters. Despite all that, and the unquestionable need for shelters, there simply has been far too little done in the provision of shelters in Darfur. The reasons for this are many and often inter-related: costs, logistical difficulties, appropriateness of designs, inexperience of field operatives to identify real needs, etc. It is however the author's view that an appropriate shelter has yet to be developed primarily for the Darfur Region, but also appropriate for similar climatic and geographical regions.

By combining the use of a successfully developed long life sun-reflective UV-resistant woven HDPE tarpaulin (well used by many UN agencies and NGOs), and bamboo from China, which is low cost, light, strong, long lasting, natural and sustainable, it is hoped that the 'Evenshelter' being developed can help to address some of the problems raised.

Main Features

1. The ridged and high wall shelter design is similar to the traditional design of huts in Sudan. This would enhance acceptance and make erection easier.
2. The covered area is 16m², which meets the Sphere recommendation of 3.5m² for an average household of 4.5 persons.
3. Shelter suitable for warm, hot, dry or wet climates
4. All components are packed in one kit form
5. No tools are required for erection, except for digging the 50cm deep holes in the ground. Such digging tools are very common in Sudan.
6. No proprietary items included in the kit, hence duplicable locally provided similar poles are available.
7. The covered area is a square with no columns in the middle. This maximises and un-hinders the use of space.
8. The clearance from the high wall is 1.75m. There is no restricted and unusable space.
9. Improvements such as adding insulation layers to the roof and wall can be easily made without having to change the basic design.
10. The shelter kit can be used in modular form. Two kits can be erected one in front of the other to become a shelter of 4m wide x 8m long. There will however be some surplus tarpaulin.
11. The triangular openings at the ridge provide ventilation. These can be partially or totally closed by closing the triangular ventilation flaps secured to the trusses at the front and the back.
12. A sunshade netting is incorporated primarily to provide backing for loose insulation materials to the roof as well as to the sides. The netting can be use

independently to provide extra shaded areas should it be unnecessary to be used as backing.

13. A setting out loop is included. There is no need for measuring equipment for setting out.
14. The woven HDPE reinforced tarpaulin has a tested life of 5 years. If shade from the sun, which IDPs often do with a woven grass mat placed on the roof, the life of the tarpaulin can be much prolonged.
15. Bamboo is an enduring material. It has been treated for borers. It does not rot under damp condition.
16. The kit comes complete with pictorial erection instructions.
17. The shelter is easily removable and re-assembled. Extra cable ties are provided for re-assembly once. In absence of cable ties, natural strings such as cotton strings and jute strings can be used. A rubber coated nylon string extracted from used tyres commonly found in Sudan (known as "Garang" and is peeled off from the reinforcement layers of truck tyres) is an excellent alternative material for tying of the bamboo frame.
18. The design fully utilizes the standard tarpaulin roll of 60m long x 4m wide with no waste when the roof and wall sheets are pre-cut from the rolls. 5 rolls of tarpaulin are sufficient for 24 shelters.

Design and Construction (see attached drawings)

1. There are 8 columns of $\Phi 55$ -70 (small end). Two lines of 3 columns of 2.1m are spaced at 1.9m centers to support the 4m longitudinal beams at the sides. 2 columns of 2.6m are spaced at 3.8m to support the 4m central beam. The beams and columns are connected by cable ties threaded through the holes drilled. 40cm of the lower ends of the columns are sunk to the ground to act as anchorage. The central columns and side columns are spaced 1.9m at right angle to each other; forming a square of 3.8m. Assuming level ground, the central columns stand 2.1m tall from ground level and side columns 1.7m
2. 3 pairs of $\Phi 40$ cross trusses of 2m long span between the central and side beams, forming the ridge with the centre beam.
3. 2 horizontal bracings of $\Phi 30$ mm x 3.9m long are tied at the front and back onto the side beams and centre column.
4. 4 pairs of 2 diagonal bracing of $\Phi 22$ mm x 2.65m long bamboo spaced equally are tied diagonally to the side and centre beam. These bracings also provide backing for the roof netting and the roof cover.
5. Similarly, 7 pairs of diagonal bracings are tied between the columns with the exception of the door opening.

6. A sun-shade netting of 4m wide x 7.6 m long is placed on the roof and covering 2 opposite side walls, and is tied to the end trusses and the corner columns.
7. A sun-shade netting of 2m high x 4m long is tied to the end wall along the corner and centre column.
8. A sun-shade netting of 2m x 2m is tied to half of the front along the centre and corner beam.
9. Similarly, the tarpaulin roof/wall cover sheet and wall sheet are laid and tied.
10. The 4 pieces of triangular shaped flaps are tied at the top eyelets to the end trusses at the ventilation openings. These flaps control the opening/closing of the ventilation openings.
11. The 2m x 2m door sheet is tied loosely to the tie bar above the door opening to allow sliding of the door sheet to close or open. The left edge of the door sheet can be tied securely to the front left column (optional, depending on the preference of the occupants).



























