

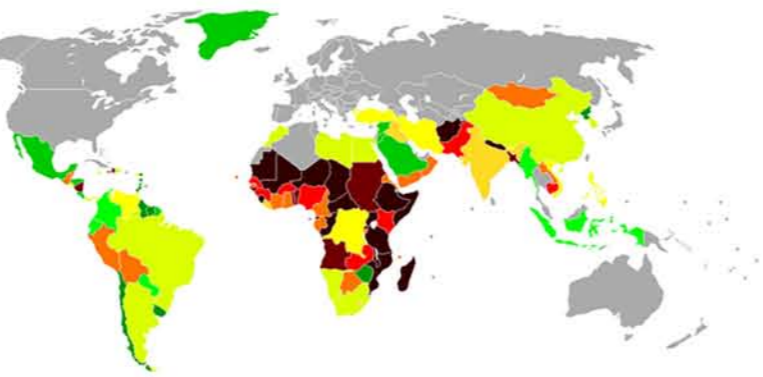
The Need

According to the United Nations agency UN-HABITAT, 327 million people live in slums in commonwealth countries. In the western culture we take basic tasks of life for granted. Drinking water comes straight from the tap; hot showers are taken for luxurious periods of time; sanitary waste systems are assumed; fridge-freezers and good cooking elements go hand in hand; a comfortable bed in a controlled micro-climate is a must and electricity is available at the flick of a switch. Life is different however for those who are living in 'developing world' conditions. Life expectancy for many of those living in slums is incredibly low. Many factors contribute to this, especially hygiene and shelter from the elements.

There is a need for dwelling places that families can live in without fear of their home being washed/blown away in the next monsoon season; where sanitary and hygiene conditions aren't a threat to health; and a place to sleep comfortably when the external temperature dramatically drops at night. We hope to answer that need with inflatable concrete.

Design Response

The need is clear to provide suitable shelter that could be called 'home.' Our response is to design a building that could accommodate services, provide basic sanitation and allow for the occupants to live comfortably all year round. It should have the ability to be erected in an efficient and cost effective manner and as a result be contextually viable.



Map showing the percentage of each country's urban population living in slums (according to UN-Habitat definition): <10%; 10-20%; 20-30%; 30-40%; 40-50%; 50-60%; 60-70%; 70-80%; 80-90%; >90%

Economically Viable

Over Half the World Could Benefit!

Our Solution: Inflatable Concrete

Concrete as we know it could never be inflated. As a result, we have developed a hybrid concrete based on the principal of plaster-paris bandaging.

Plaster of paris bandaging consists of a cotton bandage that has been impregnated with plaster of paris which hardens after it has been made wet. The plaster, in this case, is held together by means of a simple fabric mesh. Our intention is to do exactly this with concrete, but on a much grander scale. In order for the concrete not to simply slide off the fabric mesh, we have developed a very fine grid-work which does not allow fine particles such as aggregates and cement to pass through. Essentially, the fabric is made up of small pockets of concrete which appear to blend seamlessly together.

The mesh itself is made up of geotextile fabric rather than cotton (as seen with plaster of paris). This type of fabric is strong and flexible and will support the weight of aggregate and cement while still retaining flexibility. In addition to this, it is not only inexpensive and widely available, but will also further strengthen the finished concrete formwork.



Plaster of paris bandaging

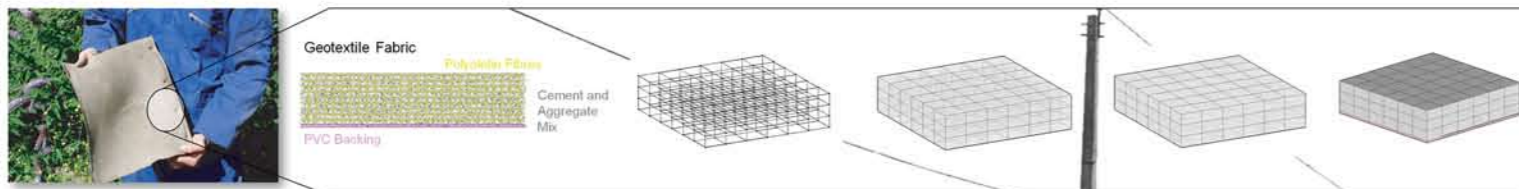


A 'simple' mesh of cotton



Slums: A growing crisis

Minimum Embodied Energy



Seeing the Problem

View of typical slum community

Construction Process



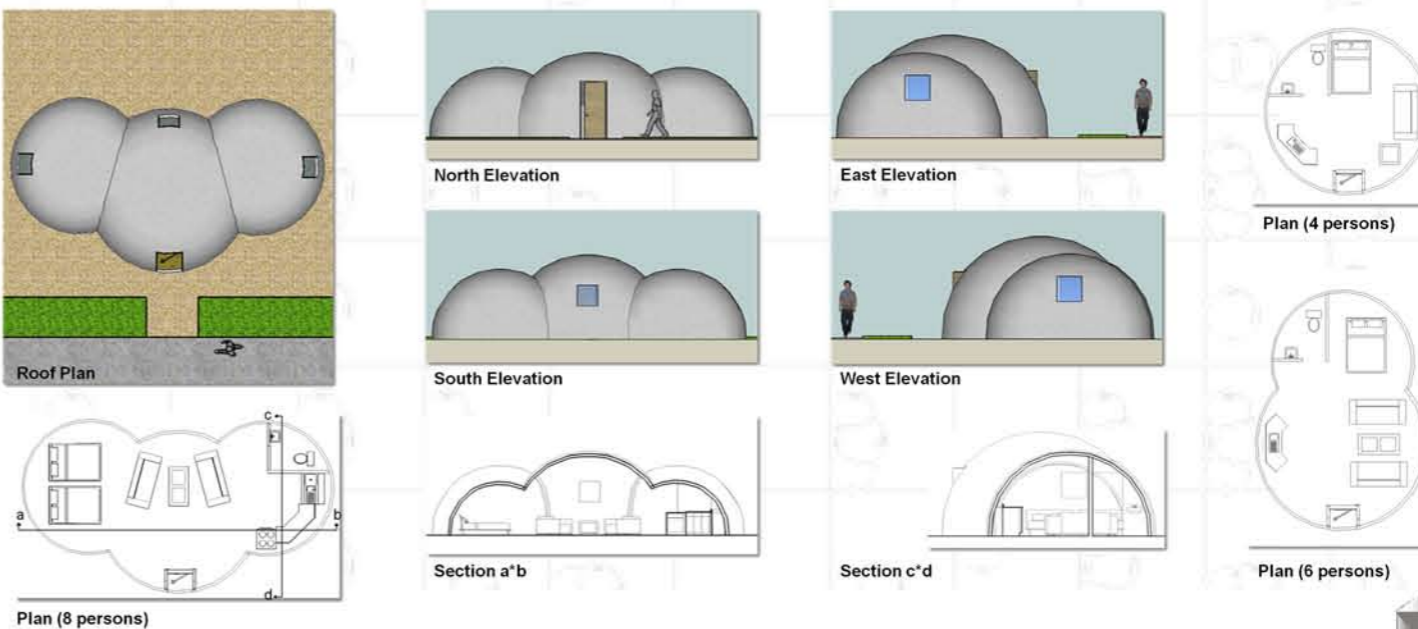
1. Prepare the inflatable
2. Layout the dry fabric concrete mesh
3. Hydrate the fabric concrete mesh
4. Begin to inflate
5. Once fully inflated, allow the structure to cure for twelve hours

Inflatable concrete is intended to answer the crisis of slums and substandard housing worldwide. Not only must it be cheap and strong, but it must also be easy to erect and simple to understand. The process therefore, is very simple. Firstly, the inflatable 'unit' is delivered on site in its packaged form by means of plane or truck. It is then unfolded into place and hydrated using a hose. Finally, the structure is erected by inflating the inflatable via a small battery powered fan or foot pump and allowed to set and cure for twelve hours. Rather than setting up the inflatable and concrete fabric separately, as the illustrations may suggest, the inflatable is actually attached to the concrete fabric and retained as a waterproof PVC membrane once the structure has been erected. repeat. The only restraint on this technology is therefore the shape of the inflatable (or balloon).

Design Proposal



Exterior Perspective West Interior Perspective East Interior Perspective



Creating a Solution



View of Design Proposal

Contextually adaptable

- The slums today**
1. Typical community slum, some consisting of millions of people.
 2. Further detail of a large slum showing scale, materials and living conditions.
- Setting the scene**
3. The slums are deconstructed in stages leaving vast areas of land. The risk of causing homelessness is dramatically reduced due to the construction process of the concrete pods being incredibly fast, thus efficient. Families need only to wait overnight before they can move into their new, permanent home.
- Design Proposal**
4. The new community comprising of single, double and triple dome pods depending on family demand.
 5. Electricity and hot water produced via the solar panels and photovoltaic cells, taking advantage of the suns awesome power.
 6. Central Services area including washing facilities.
 7. Storage tower for the communities water supply.