Sunshine Action Building Project

Design Process

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RESEARCH

Before the research stage there were three directions that we wanted to explore: 1. a small portable structure which can carried by one person and can provide better thermal and water insulation than regular tents; 2. a cabin house with basic necessaties that can accommodate people in a more long-term way; 3. temporary housing that help transition people from homelessness to permanent housing. A number of case studies were looked into.

Case study 1. Cardborigami designed by Tina Hovsepian, 2013, Los Angeles.

Cardborigami, which was then developed into an NGO, aims at providing portable alternatives to transitional shelters for the homeless, reintegrating the homeless into the society in a supportive and positive way, as well as raising awareness among the public. The design is claimed to have a certain level of durability and weather-resistency. The site is limited to private and secure properties of partner organizations.

Case study 2. Modular collapsible housing by Gaston Saboulard & Federico Ortiz, 2016, Spain (unbuilt)

The structure can be folded and extended, and can accommodate 2 people.

Case study 3. Collapsible urban shelters designed by Chat Travieso, 2013, Brooklyn.

The materials include steel, wood, aluminum, masonite, plastic, foam, canvas and found cart. However, the foldable shelters are not meant to be living spaces, but are rather 'playful urban interventions that encourage people to question the role of public and private spaces in a city'.

Case study 4. Mobile habitat designed by duffy london, 2016, UK

The flat-packed, multi-use mobile habitat consist of a set of walls, floor, legs, roof, hatches and hinges, and can be assembled using a screwdriver within an hour.

Case study 5. Future Shack, Bus Shelter House & Park Bench House by Sean Godsell Architects, 2004, Australia

The architect has produced a series of prototypical housing proposals. Future Shack is a mass produced relocatable house which uses shipping containers as a base module and can be stockpiled for re-use. Bus shelter house and park bench house are smaller-scale projects that can be integrated into existing infrastructure.

Case study 6. A series of projects by MADWORKSHOP Homeless studio, 2016, Los Angeles

Homeless Studio at USC aims at exploring architect's role in solving homelessness, focusing specifically on the area of transitional housing as well as temporary, modular and expandable solutions. Students at USC have explored a series of solutions. One design approach can be using reclaimed materials (the 3rd picture). Students used what they could find on streets, including scavenged shipping palettes, Ikea shelves, and pieces of plywood in their construction.

Case study 7. ROOM-ROOM mobile home designed by Encore Eeureux, 2011, Beijing

The structure is integrated into a bike and can be easily pulled and moved, and there're multiple modes including transporting and staying. These homes are 'nifty miniature mobiles homes' that are only meant to be used in emergency situations, for example in the Sichuan earthquake in 2008.

Case study 8. 'Pocket House' designed by Luna Perschl, 2014, Vienna (unbuilt).

'Pocket house' is a modular system designed to relieve housing shortages. The material is primarily wood. Individual structures can serve as housing units or libraries, and they can also be assembled to form larger community centers.

Case study 9. No Home Address (NoHA) Small House Design by Richard Perkin, 2016, South Africa

The design uses a set of bespoke brackets to simplify the construction for DIY assembly, and incorprates a garden in the apex of the roof, a solar-powered water generator, composting systems for organic wasted to provide compost for the garden, as well as recycling greywater recycling system. The architect's ambition is to ' provide a completely self-sufficient, mobile, off-grid solution'.

Case study 10. 'Egg House' by Dai Haifei, 2010, Beijing

Haifei studied architecture and was forced to live on streets because of the pressure of renting rates in Beijing. This makeshift mini-home was handcrafted and consisted completely of bamboo, wood chippings and grass seed that Dai Haifei expects to bloom and flourish in the spring. However, building regulations and site ownership should be checked before locating the structure on streets.

Case study 11. Casita by boxabl.com, Las Vegas

A number of companies worldwide (for example www.tenfold engineering.com; www.winghouses.com; www.madihome.com; www.excaliburshelters.com) have explored foldable modular housing that can be shipped by truck and assembled on site. Most of them are still at experimental stage and can be as expensive as traditional housing. Boxabl aims at bringing down the cost of home-ownership and increasing quality and sustainability of structurs. The cost is about 50,000 dollars per house.

Case study 12. Clean Hub by John Dwyer, 2007, Milleapolis

The designer has realised that one of the biggest obstacles to emergency-shelter design is 'finding the right balance between providing a temporary shelter like a tent and working to rebuild permanent homes'. His trick is to design a transportable, sustainable structure that can support a sizable community and requires little maintenance. Intended more as a base from which to distribute necessities rather than a residential unit, the Clean Hub can provide enough energy, water and sanitation for up to 150 people.

The Clean Hub is designed to be a self-sustained, portable machine built into a recycled shipping container. It rolls a power station and water-purification plant into one unit. The structure includes a V-shaped roof that collects rainwater, 16 solar panels that generate electricity, and an underground reverse-osmosis filtration system which recycles and stores water. When in use, the Hub produces enough compost to sustain a small vegetable garden.

Case study 13. SoloHaus by SHC Partnership, 2020, London

The Salvation Army, Citizen UK and Hill Group (an engineering firm) have partnered to provice 200 fully equipped modular homes to organisations that relieve homelessness. The groupthinks modular housing is a more effective alternative to temporary accommodation. The electricity cost is only 5 pounds/ week. SoloHaus homes are designed by Hill Group and manufactured by Volumetric Modular Ltd, with steel frame structures and top-quality acoustic and thermal insulation materials. The partnership is actively seeking support from the government and requesting local authorities and land-owners to provide sites for their homes.

Case study 14. Tiny-House Village by Michael Lehrer and Nerin Kadribegovic, 2020, Los Angeles

This project transformed Alexandria Park to transitional housing for local homeless residents. Vibrant colours are painted on the exteriors to make the village palatable to local home owners and destigmatize the project. The buildings are made from insulated plastic and feature four windows and a pitched roof, a heater, an AC, lights, outlets, and two fold-down beds.

The village is managed by Hope of the Valley, an organisation found in 2009 and now operating 13 Shelters, 2 Access Centers and a Job Center. The villages mark a shift in L.A.'s strategy, which transformed from declareing tiny homes insufficient for housing to investing in emergency shelters.

Criticism over this project never ceases. The complaints from homeless residents include: 1. very limited private belongings are allowed to bring in the houses; 2. there would be chaotic and regular 'cleanup' or 'sweep' by service agencies and government departments; 3. lots of residents are forced out of the project for all kinds of reasons; 4. a number of residents have chosen to live back on streets because this village 'feels like prison'; 5. Residents have to deal with hostility from local home owners.

Doubts from the sides of policy makers include: 1. Each tiny home costs $3,300 to operate each month, more than the monthly mortgage payment on a median-priced L.A. County home; 2. Investment in emergency shelters might supplant investment in emergency housing, and residents have no nowhere to go afterwards; 3. Temporary shelters may turn living on streets illegel: "We need housing, not handcuffs, even if the handcuffs are preceded by an 'offer' of a shelter bed."

DESIGN ITERATIONS

With the increase of depth of research we have come to a strong realisation that the housing problem of the homeless has a broad socio-economic background and the solution is by no means simply building more and more.

The primary goal being relieving homelessness for good, divergent approaches have been debated over for years. Some argue that we should focus only on permanent supportive housing that gets people off the street forever, and the investment into temporary shelters at some point may supplant permanent solutions and can hinder exiting prople to permanent housing as quickly as possible. As an evidence, a 2020 analysis in a program called A Bridge Home in LA shows that only 15% residents in transitional housing are later placed in permanent housing, and 33% have returned to living on streets. As stated by National Alliance to End Homelessness, it's all about 'housing', not 'fixing' or 'healing'. Others argue that all options are needed in the face of homelessness which is a real-life issue that anyone knows is problematic but has never been fully tackled. With the acknowdgement of existing problems and the complexity of tackling them, efforts should also go into transitioning people through difficult phrases and acting positively in helping people rebuild their lives, be valued members of communities and gain the confidence to find work and housing. Temporary shelters can be one of the approaches.

As an NGO we keep thinking about what our role is the tackling of homelessness issue. From the government side, increasing policies and funds have gone into relieving housing crisis. From the organisation-side, leading charities including Crisis, Shelter, and St Mungo's have been working on providing services for the homeless for decades. However, there's still an increasing number of rough sleepers in the UK who can't access accommodation for a variety of reasons that are maybe impossible to fully explore. Maybe it's our chance to work with other organisations to pick up the difference between what local authorities are prepared to fund and what is needed within a community, and to identify other meaningful areas that other organisations haven't involved.

Building design is a complicate process. Regulation research and structural, engineering and material design should go hand in hand to inform next steps of iterations until the final product.

Maps: areas in London most populated with homeless people

We hope to grant a high level of flexibility of where homeless people want to live. The central community space should be located in areas that are most densly populated with homeless people (which in London are reported to be Westminster, Camden and Newham). Individual rough sleepers can then choose to stay on the provided site which should be secure and restricted, and can choose to move the detachable parts of the structure to where they want to live. Basic necessaties including water, food, bathroom and kitchen and commuity services are provided in the central structure, and detachable residential parts can be detached and moved to other sites.

An example of site is a car park belonging to a construction site near Camden town.

Maps: Camden Town

Maps: A car park near Camden Town

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ZSL LONDON ZOO
Did you know?

Our initial exploration went into shelters that are foldable, collapsible or portable for individual rough sleepers. As further research was carried out, the problems and difficulties of this approahc gradually emerged:

- Rough sleeping and begging are illegal in England according to Vagrancy Act 1824. The primary goal being exiting people to permanent housing as quickly as possible, providing tent-like shelters may not be legally justifiable for an organisation.

- Rough sleeping can be dangerous and traumatising , and giving out tents may do more harm than good, potentially leading to criminal offence, sexual abuse, establishment of homelessness, etc.

- Camping tents are designed to be lightweight and durable. Proposals such as origami shelters, folable cardboard structures and cart shelters may of more research potential but less practical use.

Leaning towards a type of transitional housing in between of portable and permanent structures, we started looking into the possibility of helping establish a sizable and flexible community with central community space providing daily necessaties and detachable mobile houses scattering around.

Left: a homeless person's mattress in northern London.
Right: photoshoped foldable origami shelter

Left: a homeless person's tent near UCL.
Right: photoshoped A-frame shelter

Sketch: approach of a detachable structure

RESEARCH INTO SELF-SUSTAINABLE SYSTEMS: MOVING CART HOUSE

Video: Went homeless. Done Guerrilla Grazing by choice ever since.
https://www.youtube.com/watch?v=U54HRmglYEA

This structure is designed by Aaron Fletcher who has grazed his sheep and lived off the land as a traveling shepherd for 12 years. With a tiny metal cart home pulled by his sheep he has a bed, a refrigerator/evaporative cooler, a shower (he uses a pesticide sprayer to pump up the water pressure), power (solar panel), sun oven, a mailbox stove for heat, bicycle tire wheels and a corrugated plastic roof. The structure is highly mobile so Aaron can move around with his sheep. The insulation and waterproof materials are also carefully designed.

This is, however, a case of willingly homeless person, which means his lifestyle may not be accepted and copied by everybody. But the way he designed the self-sustainble system and the facilities he has recommanded are of good refenece value.

Overall structure

The house is generally pulled by sheep

Sleeping mode when mat is put down and day mode when mat is folded up

Mini fridge made of wool and storage space

Solo Stove (https://www.solostove.com/) and power bank (charged weekly)

Solar-powered oven that almost heats as quickly as traditional ovens

Pesticide sprayer to pump up mist and setting up nozzle to take shower. Waterproof fabric is flipped inward to protect the interior from humidity.

Waterproof sheet & insulation material

PORTABLE CART HOUSES - 1

The first iteration of this design features in its high compactivity in minimum space. Not only can the box be expanded into a quater circle space it also integrates all necessities including toilets, shower and cooking.

When folded, personal belongings are securely stored in the box. The structure can be dragged vertically or horizontally.

By unlocking and expanding the structure people can sit, read or work. The mattress can be put down to let sunlight enter through the window.

Portable toilet can be used (rubbish bad is used to collect. Odor control can be a challenge).

The 'floor' is also foldale. Underneath it is steel mesh wire so water can go through. People can clean themselves by using water tank and camping shower. This function can be used when the sturcture is on grass. Waterproof fabric can be used to protect the interior from humidity.

Put down the mattress and people can sleep.

Overall appearance from outside. The mechanism of collapsible shed can reference case study 2 (steel frame+waterproof paper). Can also use Tarpaulin+frame.

Front section: folded

Front section: expanded, activity mode

Front secton: expanded, sleep mode

Left section: folded

Left section: expanded, activity mode

Left section: expanded, sleep mode

PORTABLE CART HOUSES - 2

The feasibility of including all necessary functions is limited in real life. Considering the difficulty of incorporating all the functions in one space, public toilets, shower, laundry and water supply can be provided in other seperate pods or community centres. The portable cart will only include basic functions. The management of public pods can be challenging.

FARMER'S MARKET - ROOF FOR THE HOMELESS

By redesigning market spaces (for example the famous Camden Market), the second floors of vendors can potentially be used to supply accommodation during the nights. The surplus of food during daytime can also be efficiently distributed to those who need it. The sturctures come in boxes in order to be easily transported. When unused the vendor space can be used to store. When needed the structure can be unfolded into vendor space + homeless shelter.

The modular structures can be arrayed together.

entrance
window
foldable rods
solar panel

CONTAINER HOUSE

Projects like Solohaus are demanding, which require cooperation with professional container house construction companies and planning permissions from the government. However, we are still potentially capable of building housing that meets a lower design standard but can still provide a decent level of comfort (see case study 6 & 12). By using recycled shipping containers or other reclaimed materials, some creative solutions can be explored.

REFURBISHING EXISTING SPACES

There exists a considerable number of empty of unused office / residential spaces in London. Charities such as Habitat for Humanity (https://www.habitat.org/) have been renovating empty properties to provide affordable housing for the homeless. These projects may get around with the trouble of planning permissions and can provide housing more effectively.

Picture source

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