International Journal of Advanced Engineering Research and Science (IJAERS)
Peer-Reviewed Journal
ISSN: 2349-6495(P) | 2456-1908(O)
Vol-9, Issue-8; Aug, 2022
Journal Home Page Available: https://ijaers.com/
Article DOI: https://dx.doi.org/10.22161/ijaers.98.5

The Social Role of Flexible Architecture

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Received: 30 Jun 2022,

Received in revised form: 23 Jul 2022,

Accepted: 29 July 2022,

Available online: 06 Aug 2022

***Keywords*— Social Role, shelters, UPIK.**

Abstract*–The present work focused on case studies about flexible architecture. As case studies, trailers and ephemeral structures of different profiles and applications were analyzed. Throughout the study, it is demonstrated that flexible structures can be solutions that are inserted as alternatives to the reality of homeless people and, thus, flexible architecture can have as a focus on shelter, whether for people in a state of vulnerability on the streets or to care for the homeless after natural disasters, which are increasingly frequent in different parts of the world, including Brazil.*

I. INTRODUCTION

Temporary shelters, mostly in community places, are generally proposed as an alternative to the loss of homes due to natural disasters, which are in a public context, without the minimum privacy and guarantee of individuality, and the collective begins to live.

In addition to the families facing the pain of losing their home, the feeling of insecurity of living in the temporary shelter, there is the doubt of when there will be a home again as a private and inviolable space.

It is also important to think that temporary shelters are given, summarily, in spaces of the public sphere and, therefore, they end up affecting the mental health of those who live there, as they create obstacles for the singularities of the subjects who live in the place (VALENCIO, 2012). .

The disparity of a community life is perceived, the lack of a particularized space is a block in a search for the subject's identity and a prediction of a better future.

In this context, flexible structures can be solutions that are inserted as alternatives to such a reality.which focuses on shelter, whether for people in a state of vulnerability on the streets or to care for the homeless after natural disasters, increasingly frequent in different parts of the world, including Brazil.

To this end, we raised some existing proposals to make a case study of each of the proposals presented hereinafter.

II. UPIK – A TRAVELING OFFICE OF ARCHITECTURE

The architecture firm UPIK (Figure 1), created in São Paulo, adapted a trailer structure with the central objective of democratizing access to the Architecture service, considered elitist, creating consultancies with little time at affordable prices, parking at several strategic points in the city that reach their target audience such as contemporary fairs and streets close to stores in the decoration and furniture sector.

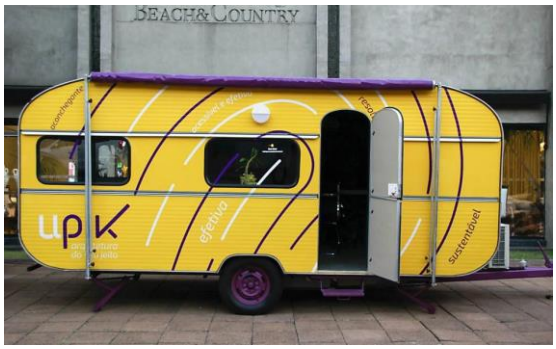

Fig.1 - Refurbished UPIK trailer

Source: Folha Uol (2015)

According to Márcia Monteiro (2018) in an interview with the author of this research via email, the co-founder of the trailer reports that the logistics of everyday work have

never been simple. Initially there was a need to change your car for a 4x4 model that adapts to load the trailer structure, which weighs more than 1,000 kg.

Bought in a bad state of repair, it was completely renovated in a specialized store in the city of Itu, also in the interior of São Paulo, and the architect managed to adapt the 10m² to receive the office with a basic structure to accommodate three people working and a bathroom.

Among the positive aspects, Márcia Monteiro points out that the daily interaction with several different people on the streets where the trailer was parked generated very important connections for her business, which is currently undergoing a reformulation in the operating model with online service only due to the large flow in this niche.

Fig.2 - UPIK trailer internally

Source: Hometeka website (2016)

From the analysis of the UPIK case, it can be seen that itinerant architecture plays an important role in disseminating the object it proposes, in this case: to popularize the architectural service, generally considered noble and costly, restricting architectural activity, whether small or large size to the middle and high income classes.

We consider here the difficulties of the project that leaves the comfort line of common architecture offices, placing as negative points: the high investment in renovation of the trailer and the difficulty of locomotion due to the weight (another investment, a car that could support).

In this sense, the UPIK is believed to be an example of flexible architecture as a bridge for the dissemination of an idea, reaching a much larger number of people, in a shorter time, compared to an idea that is dependent on a series of factors such as: plastered space or displacement of people. It is the strengthening of a chain from an element that transits until reaching its objective, as it clearly happened with the São Paulo office.

III. L'AUVENT – EDUARD BÖHTLINGK

To compete in the Temporary Living competition in 1985, Dutch architect Eduard Böhtlingk designed "L'Auvent", a flexible trailer measuring 2x4.50m in its ordinary state that unfolds into a temporary accommodation with at least triple its original size.

The work, a temporary holiday home to adapt to different places, won the Audience Award at the Design Rotterdam Prize in 1966 and was made by the company specializing in awnings De Markies.

Fig.3 - Trailer designed by Böhtlingk with sides being mounted

Source: Gadgetsin website (2016)

Böhtlingk developed the idea from a question: "How do you define living space in today's mobile world?"9. Following the concept, the architect designed a structure of side awnings that unfold like the bellows of an accordion, creating two new compartments, estimated to accommodate up to six people comfortably.

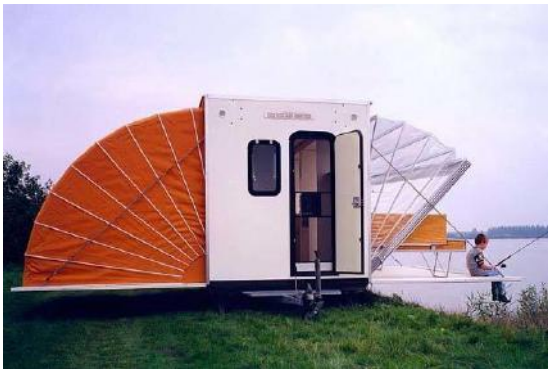

Fig.4 - Trailer mounted being used in camping

Source: Gadgetsin website (2016)

The space, divided into three distinct parts, consists of a plywood and steel structure, with a kitchen, bathroom, living room with terrace and bedrooms.

The side awnings have different functions, one of them has the clear objective of providing a direct connection with nature, bringing direct lighting through the transparency of the material, while the other extreme seeks privacy.

IV. 3-IN-1 FOLDABLE SHELTER DEPLOYMENT – SHARKCAGE

Following the goal of easy mobility, both in cities and on roads, the development of the 3-in-1 Foldable Shelter Deployment was based on studies of cargo shelters manufactured with a focus on military use for communications headquarters, medical triage and disaster aid.

These shelters are built from expandable containers that triple their mobile size, so, despite being heavy, they are reasonably sized to be moved on roads and meet the expectation of space when stopped at the desired point, with the space tripled.

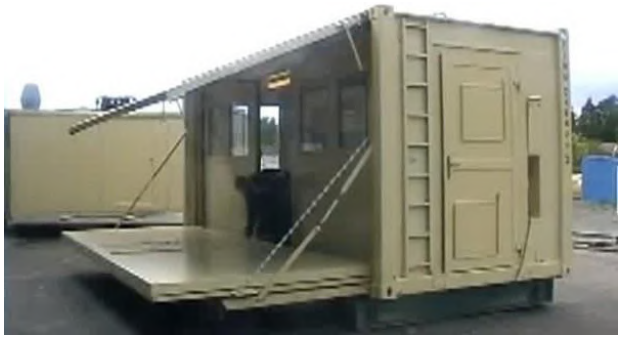

Fig.5 - Foldable structure being assembled

Source: Print Screen saved by the author from the video on Youtube (2011)

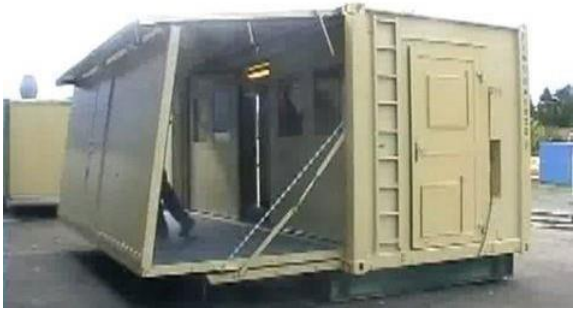

Fig.6 – 3-in-1 Fordable in phase of assembly from one side

Source: Print Screen saved by the author from the video on Youtube (2011)

One of these models, the 3-IN-1 Foldable Shelter Deployment (figure 8) was developed by Sharkcage10, a brand specializing in military logistics equipment working in direct collaboration with the United States Armed Forces and the North Atlantic Treaty Organization - NATO since 1998

The company, in turn, argues that the products are developed to interface between storage, transport and operation, giving those who use them the necessary flexibility to reduce loading time.

However, it is still noted that the time of assembly and expansion of the container in the chosen location is not as satisfactory as the company sells, as well as the material weight ratio for the assembly speed.

In the search, the exact value of the product is not found on its website or catalogues. As a positive point, the internal dimension of the expanded container is quite satisfactory for its purpose.

Fig.7 – Fully assembled Foldable frame with both sides open

Source: Uniteam website (2018)

The model brings to the study in question the contribution of understanding that the same itinerant structure can bring the necessary flexibility for its use, even with a structure in extremely heavy material which, in this case, perfectly meets what is proposed as a structure for military use.

V. CARDBORIGAMI - PAPER HOUSE

With a flexible architecture focused on shelter for people in situations of social vulnerability, Cardborigami12 was designed by architect Tina Hovsepian as an alternative structure to minimize the vulnerability of these people who live on the margins.

The structure can be assembled by anyone in a maximum of 30 seconds, serving as protection against the weather.

Fig.8: Sketches, perspective design and assembled structure of Cardborigami

Source: Gazeta do Povo website (2015)

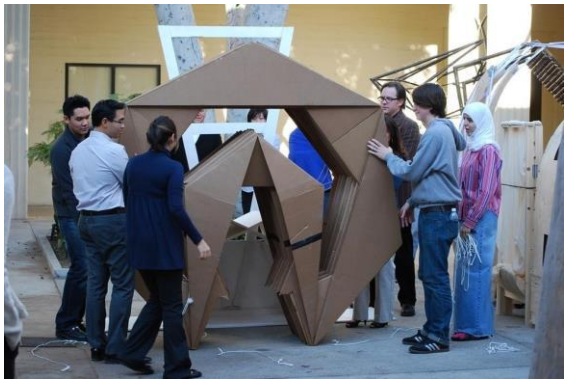

Fig.9 – Professionals closing Cardborigami

Source: Cardborigami official website

With recycled paper material, the structure can easily be reused after the end of its useful life and, created as a portable and temporary shelter, the action aims to include these citizens in housing and social reintegration programs, in addition to creating jobs from of manufacturing the products, which are sold online and at fairs in the area.

In addition, the mission of the NGO that leads the movement, namesake to the product, is to provide the step-by-step process for the manufacture of the shelter for the greatest number of people around the world.

RD-SHELTER - PAUL GRAY

Developed by the Scottish design agency Suisse: the RD-Shelter follows the humanitarian line of the previous one, but with a specific focus on sheltering people displaced by war or natural disasters.

> Natural disasters kill thousands of people a year. Usually the biggest killer is not the event itself, but the hours after the event. It is often the lack of adequate shelter – a basic human need for survival combined with the destruction of infrastructure and services and the lack of provisions, that make the 48 hours post-disaster a critical zone for victims; a determining factor between survival or death. (FULCHER, Merlin, 2017).

The prototype was created by Paul Gray, director of the agency, who defends the shelter as the most basic item in the face of a tragedy, as essential “as air, water and food”, believing that the shelter brings safety and minimal comfort to those who use it (TUCKER, 2016).

With that in mind, it was designed with the intention of, as its name says in literal translation - Shelter - shelter people after a natural disaster or other occurrence that has the need to provide a minimum comfort structure.

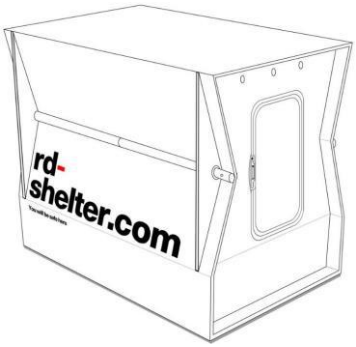

Fig.10 - Perspective drawing - rd-Shelter

Source: Dezeen website (2016).

In the model developed and named as a quick-deployment shelter, corrugated polycarbonate, a material also known as corrugated plastic, is used, creating a small opaque structure that is windproof, waterproof and capable of housing at least two adults and a child, considering an ordinary small family.

In addition, the prototype has the ability to store basic items at the base of the structure, such as food and medicine.

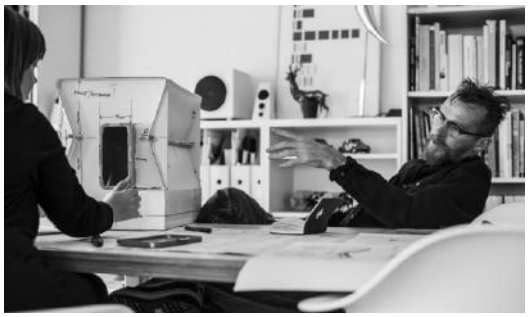

Fig.11 – Paul Gray Creative Pool Prototype Presentation

Source: Creative Pool Website (2016).

The material used, the polywave plastic, also known as Coroplast, which was given the same name as one of the brands that develops it, a fact that is widespread especially

in Latin America where it has been gradually implemented, brings to the project several positive points such as: lightness – it has hollow structure, waterproof, good corrosion resistance, long life and, from an aesthetic point of view, a wide variety of colors.

It is worth mentioning that the Coroplast company started its activities in 1973, in Montreal and inaugurated its factory in Granby, Quebec, in 1975 and began its activities by supplying plastic widely to the signage market, as was the example of the Olympic Games in Montreal, in 1976. In 1985, the factory opened in Dallas, Texas, and in 2014 Coroplast became part of the Inteplast Group, one of North America's leading plastic manufacturers. Today it is the leading manufacturer of corrugated plastic sheets for the North American signage, packaging and industrial markets.

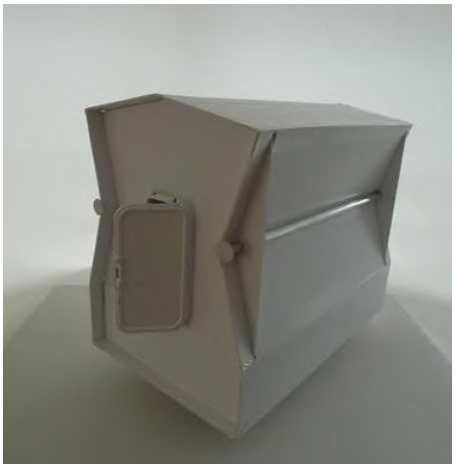

Fig.12 - rd-Shelter Prototype

Source: The Architectural Review website (2017).

Corrugated plastic is obtained by extrusion of polypropylene and appears in the 70s as a new option for various purposes such as packaging and construction. A sheet with a honeycomb structure, polywave plastic does not allow the formation of mold or other foreign bodies and has an alternative for recycling (MURARO et al., 2006).

It is noted that Paul Gray's project has a lot of relevance for application in countries with frequent natural disasters to care for people in need of basic care through the shelter. It is apparently easy to transport and reasonably easy to assemble/disassemble.

Bringing it to the Brazilian reality, it could also be shared with the same use after natural disasters, as well as for use, in a palliative way as an alternative for temporary shelter to the reality of homeless people who are in a state of social vulnerability. Allied to this, after meeting their basic needs for shelter from the elements and basic comfort, it is necessary to provide health care and forward actions that take them out of the risky situation that is living on the street with multidisciplinary teams.

The use of polywave plastic explains the importance of a light, resistant material that is an alternative to other materials, commonly used for temporary shelters such as canvas or plastics in general, as well as in civil construction, showing a good option for various uses such as facades and closures.

VI. FINAL CONSIDERATIONS

The study of the cases demonstrated throughout the present work presented the proposal of some of the flexible architectural structures that can meet urgent demands.

It is valid to consider that adjustments are necessary for its implementation in Brazil, considering the country's reality and the urgent demands it has, such as the current housing deficit, as well as the natural disasters it suffers.

In this sense, flexible architecture presents itself as an important way to think about more urgent situations that require practical and immediate responses.

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