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CAPSULE: LIQUID ARCHITECTURE FOR A LIQUID SOCIETY

Rody Carvalho de Azevedo Santana
NEPAUR/ UNIFACS, Salvador - Bahia
http://lattes.cnpq.br/9657532652324562

Abstract: Based on theoretical assumptions about contemporary society, on subsequent analyzes and experiences related to liquid architecture, this article seeks to respond to expectations and materialization of concepts and ideas; to propose a critical and reflective architecture of contemporaneity, its forms, languages, demands and perspectives. The material result is the design of a module (capsule) with different and adaptable functions, format and dimensions that facilitate its transport, assembly and installation. The module's main function is to meet the needs of temporary housing, emergency shelter, overnight or short-term rest in airports, bus stations, shopping malls, festivals, tourist spaces, congresses and events in general. The combinations between the capsules and the composition of their parts and structures make their use diversified.

Keywords: Liquid architecture; Capsule; Liquid modernity; compact architecture.

INTRODUCTION

Based on the challenge of thinking about an architecture in accordance with the paradigms and requirements of today's society, this article describes and discusses the liquid society and its resonances in architecture, through the design of a buildable, mixed-use and adaptable capsule, designed to meet to the needs of staying for short periods of time.

Its conception, based especially on the ideas about contemporary society by the Polish sociologist Zygmunt Bauman and on subsequent analyzes and experiences, related to the proposal of a liquid architecture, aims to correspond to the alternatives of an architecture that is a reflection and reflection of contemporaneity.

In addition to the work of the Polish author, the composition of virtual liquid forms and spaces, studied by Marcos Novak, in infographic programs focused on architectural planning based on prototyping and new techniques, is a reference for this work.

The experiences of the NOX group were also observed, which invests in the search for a physically buildable liquid architecture, exploring the interactivity of users with the work, as well as the concepts and experiences carried out by Solà-Morales in the attempts to apply a liquid architecture.

ASSUMPTIONS

Changes are present in society, being part of nature and the human condition itself. Faced with all the ontological determinants, the natural and social demands of change and transformation, there is no choice but to react critically, promoting the necessary adaptations in favour of the collectivity. Adaptation, in this sense, is a condition that goes beyond acceptance, flexibility and transformation, as it presupposes adequacy and active interaction with the environment and its conditions.

Adaptability is directly related to the way in which changes are incorporated. Seeing them as a possibility of distancing oneself from one's comfort zone to dare, question and challenge one's own limits, enables the development of human beings in the social context, creating the necessary answers and solutions.

The great revolutions that defined the new paradigms of the modern world shaped behaviours, established ways of being and thinking, imposing the most diverse challenges. The transition caused interruption, discomfort, surprise and anomie in the passage to modernity, reverberating in contemporaneity. However, the historical distance already makes it possible to observe, plan and take actions.

Once such a reality is installed, it is not enough to transcend it or deny its imperatives. It is necessary to seek alternatives that correspond to the new models, transforming

them according to emerging needs. Thus, it is necessary to explore the natural adaptability capacities, fulfilling the role of a modifying agent.

LIQUID MODERNITY

The transition to modernity, its characteristics, meanings and contradictions are treated by Bauman (2001) in his work "Liquid Modernity". According to him, modernity is liquid because it is an era with the main particularities of fluids: inconstancy and mobility. Liquids move easily, fill voids with fluidity, compose living beings, contour and penetrate spaces and things.

Unlike previous models, liquid modernity does not rely on predetermined and solidified structures, it does not rely on paradigms, remote ideological traditions; on the contrary, few things are predefined or predictable. In liquid modernity, accommodation is replaced by change and action, the individual passes from the passive to the active state, which questions and reflects on the actions and whys of things, in opposition to the solid, or even concrete, society, without resilience and inadaptable to the new ways.

In Bauman's analysis, as time is scarce and instantaneous, the installed models need to be used and consumed quickly, even before another model is established. In a world of constant and rapid transformation, whoever is inserted in it must follow and adapt at an equivalent speed so as not to be consumed by it.

Guided by the principle of flexibility, strategies and plans can only be short-term. Society is, therefore, sustained by uncertainties about the future and long-term planning and lack of guarantee in relationships and projects. The possibility of change and suddenness creates a feeling of insecurity, that is, instability is the principle that guides the new times.

Consequently, contemporary society has production and consumption as main symbols, not as means, but as ends to be reached more urgently. Individualism has a unique position within the system in which it is inserted, that is, that of unbridled consumption and immediate satisfaction. The ideal society, from this perspective, is one that offers everything needed to lead a rewarding life and in a more instantaneous way. These characteristics currently assume an even greater dimension, driven by new informational technological instruments and media resources.

The present work, guided by such premises and conclusions, considers that not knowing, or even denying the advantages of this new reality, would be to simplify a complex context full of angles to be observed and analysed; it would be to try to homogenize the heterogeneous and to despise man's ability to reason and freely choose his paths. The human condition of adapting, acting and, if necessary, transforming the current reality must be admitted.

THE LIQUID ARCHITECTURE

The concept of liquid architecture is explored in some studies of contemporary architects, but not always from a projection corresponding to the theories of a liquid society, as portrayed by Bauman. With regard to the composition of forms and virtual liquid spaces, it is worth mentioning the results obtained by Marcos Novak, whose training is closely linked to the development of communication and information technologies and, based on these, develops infographic programs aimed at architectural planning. Cyberspace, within these new concepts, will serve as a laboratory for research and experimentation in architecture, or this "trans architecture".

Therefore, the architecture proposed by Marcos Novak is configured much more

by a plastic virtuality, despite the concept of Aversion suggested by him, where the information and the virtual aspect come to the natural world. It is verified, therefore, that such a proposition suggested by Novak inspires, but does not solve the real problems and needs and use of space in a direct and concrete way.

Also in this field, the NOX group invests in the search for a physically buildable liquid architecture, exploring the interactivity of users with the work, concepts and experiences. The group, directed by Dutch architect Lars Spuybroek, is dedicated to various interior projects, objects, multimedia installations, videos and texts. This heterogeneous and hybrid production has been driven by a growing concern about the possibilities of creation in the field of architecture and its intersection with other languages.

Another highlight in the attempt to apply and function a liquid architecture is found in Solà-Morales (1999). Morales goes beyond the formal and symbolic aspect and sheds light on issues concerning the appropriation of spaces. From this perspective, liquid architecture does not dematerialize itself, but maintains itself as a phenomenological existence, seeking to detach itself from traditional forms of design, based on stability, permanence and constancy.

Therefore, the studies and experiences of the NOX group and the Solà-Morales conceptions guide and prove to be more congruent with the project proposal presented in this article because it is different from a perspective, simply, chemical-literal, or that is closed in a virtuality. Thus, it is considered the possibilities of a solution that contemplates the demands of a liquid society, attentive to the constraints of time and the human appropriation of spaces, but which also values form as a fundamental factor in contemplating such needs.

METHODOLOGY

A five-step methodology was chosen to be adopted in the architectural design of the capsule:

- Theoretical study for foundation: bibliographic review of authors such as Zygmunt Bauman, Marcos Novak and the NOX group;
- Research of reference projects: bibliographic research on topics such as emergency shelters, compact houses and liquid architecture;
- Conception: Studies through sketches and digital geometric model until reaching the format and final result;
- Design, dimensioning and detailing: Finished in AutoCAD®, Revit® and SketchUp® and rendered in Lumion®;
- Prototype manufacturing: making a 1:10 scale model, using 3D printing and laser cutting and scanning.

MULTIFUNCTIONAL CAPSULE PROJECT

The Multifunctional Capsule is a mobile unit that can be assembled and dismantled and that, fitting with other Capsules of equivalent format, like pieces of a puzzle, allows the creation of other modules and a diversity of compositions for internal use and external installations.

In its simplest format, as used for emergency shelters, it basically presents the structure and closing plates with circulation space and bed. But for other uses and greater comfort, it can be equipped with a luggage rack, air conditioning, television, solar panel and other accessories. (See Figure 1).

The project's concept is adaptability:

> "Adaptability is an individual's ability to adapt according to needs, situations and circumstances. It is the ability to live in conditions different from those to which you are naturally accustomed. Some people have
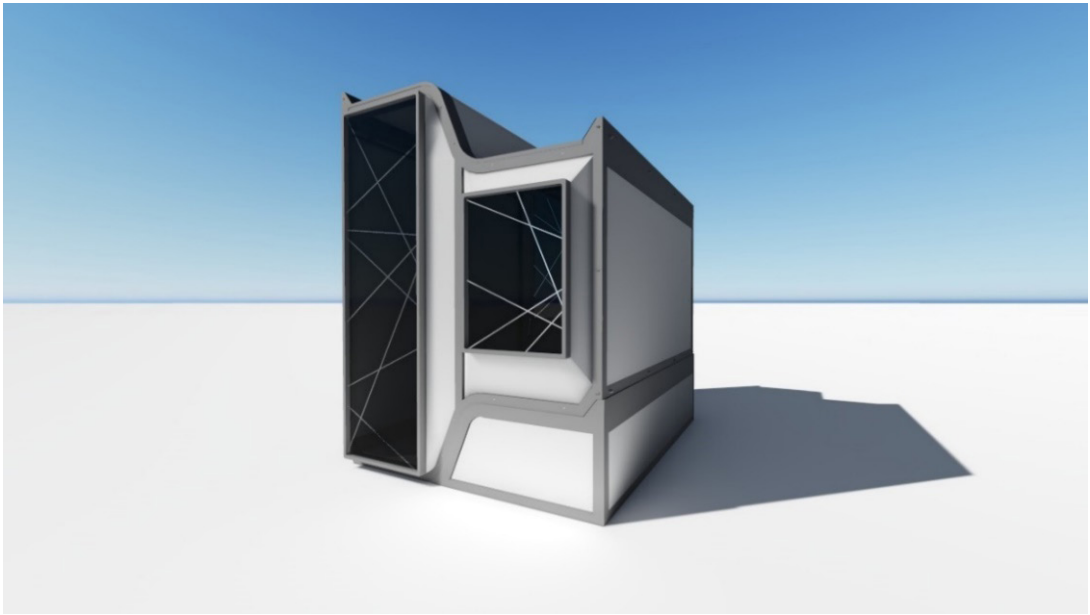
Figure 1: Individual Module.

this more latent behaviour, others have some difficulty dealing with changes, but everyone can and must develop and strengthen this ability." (Goleman,1995).

Corresponding to expectations and attempts to materialize concepts and ideas, the challenge of thinking about an architecture that is a reflection and reflection of contemporaneity, of its forms, languages, demands and perspectives, is established. From the subsequent analyses related to the proposal of a liquid architecture, the present project considers an environment that, without giving up comfort conditions and complying with current regulations, has dimensions that facilitate its transport, assembly and installation. (See Figure 2).

The individual modules can be coupled together through their side faces, removing the movable closing plates from the corresponding face, thus creating cabins in Double Capsule format or Double Capsule format. (See Figure 3).

Its structure, resistance calculation and format were designed to allow the overlap

between them, reducing the occupation of spaces where they are installed: emergency shelters, night shelters, airports, bus stations, shopping malls, malss, festivals, tourist spaces, congresses, events in general, or even creating modules for particular use in the Family Capsule format. It is also proposed the Bathroom Capsule, the Capsule for people with disabilities, the Bathroom Capsule for people with disabilities and the Services Capsule equipped with bathroom and kitchen. (See Figure 4).

In the latter case, as well as the Bathroom Capsule, the same external shape is maintained, but with the necessary internal adaptations, being able to be coupled to the Individual Capsule and creating a completer and more independent format (See Figures 5 and 6).

Its main function is to meet overnight or short-term stay needs, but its adaptability allows for other diverse possibilities of use.

The parts of the basic structure are designed to facilitate assembly and disassembly through fitting elements and a locking system,
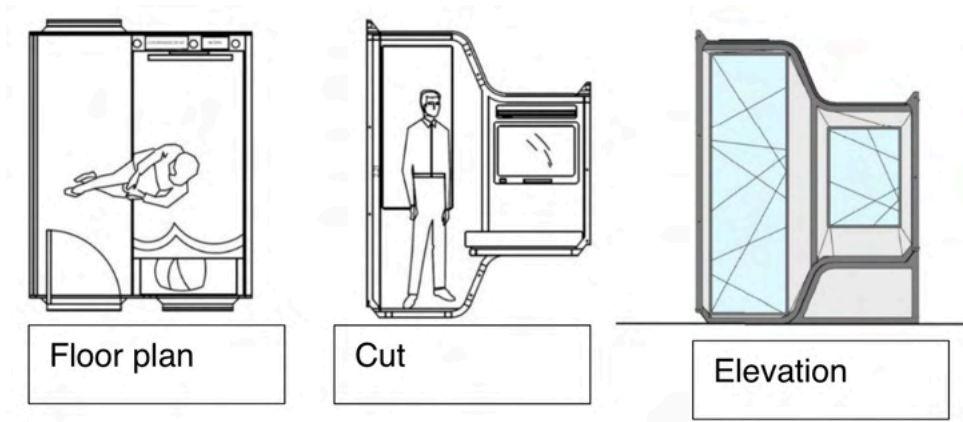
Figure 2: Floor Plan, Section and Elevation of the Individual Module.
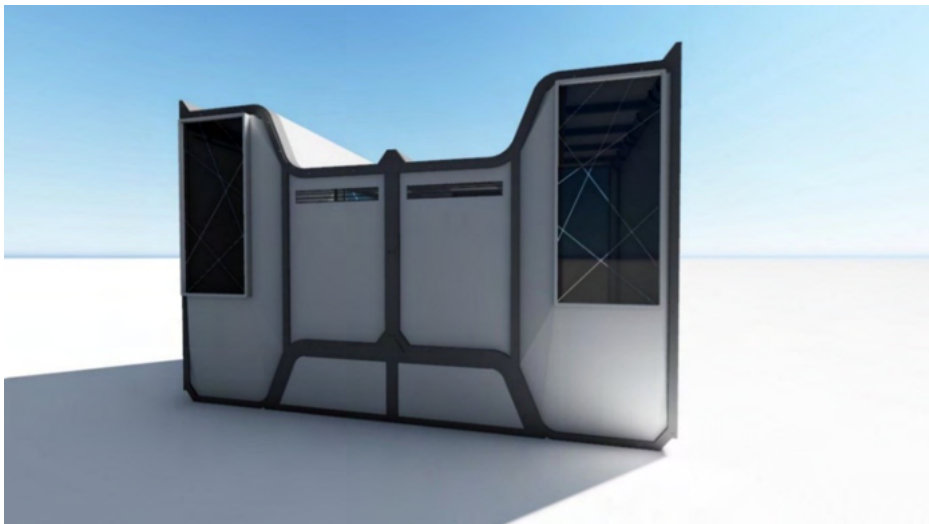
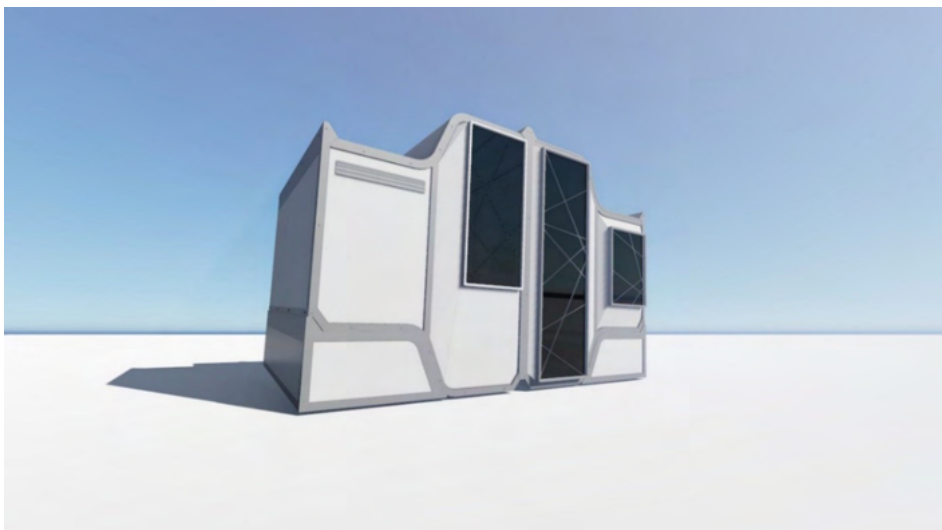

Figure 3: Double Capsule.

Figure 4: Capsule Service.

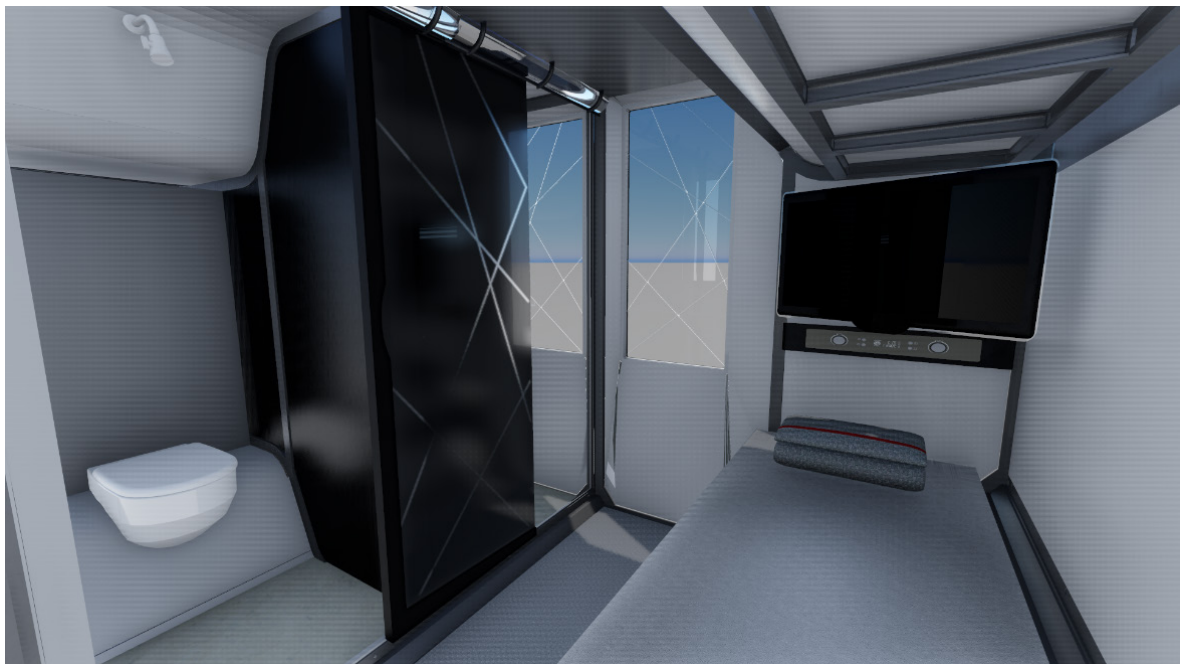Figure 5: Internal perspective 1: Service capsule.

Figure 6: Internal perspective 2- Service capsule.

eliminating the need for screws and tools and requiring little effort (See Figure 7). Added to the benefits of use, its transport can be done with the Capsule assembled or disassembled, in passenger cars, trucks or containers. It is possible to capture energy by photovoltaic panels or supply from the available electrical network. The water receiver of the reservoir also has the function of capturing rainwater. It has an independent sewer with an optional valve for disposal in a common network. As a result, its infrastructure allows for self-sufficiency with temporary or permanent installation.

As a development of the proposal, the present work presents three reference simulations of implantation of the Capsules in different spaces and conditions, serving as a guide to the parameters and indications of installation in similar conditions (See Figures 8, 9 and 10),

PROTOTYPES

Finally, the digital geometric models were made in Revit® and SketchUp®, and the prototypes were made at a 1:10 scale resulting from this experimentation (See Figure 11). The manufacturing techniques used were: 3d printing and laser cutting, to test and adjust the execution of fittings and assembly. The materials used in the manufacture of the prototype were: 1, 2 and 3 mm acrylic, prime, nitrocellulose paint, varnish, solvent, laser-cut PVC and polystyrene.

RESULTS

The study resulted in the design of modules adaptable to conditions and to different needs, with a view to the demand of social technopolitics in contemporary times, especially in large metropolises, with provision for use as emergency shelters in situations of migration, wars and catastrophes, night shelters, use in airports, bus stations, shopping malls, festivals, tourist spaces, congresses and events in general.

The simple composition, including the use of ecologically sustainable materials, contemplates social purposes and more emergency needs, as well as the thermal and acoustic insulation components, complementary parts and attachments,
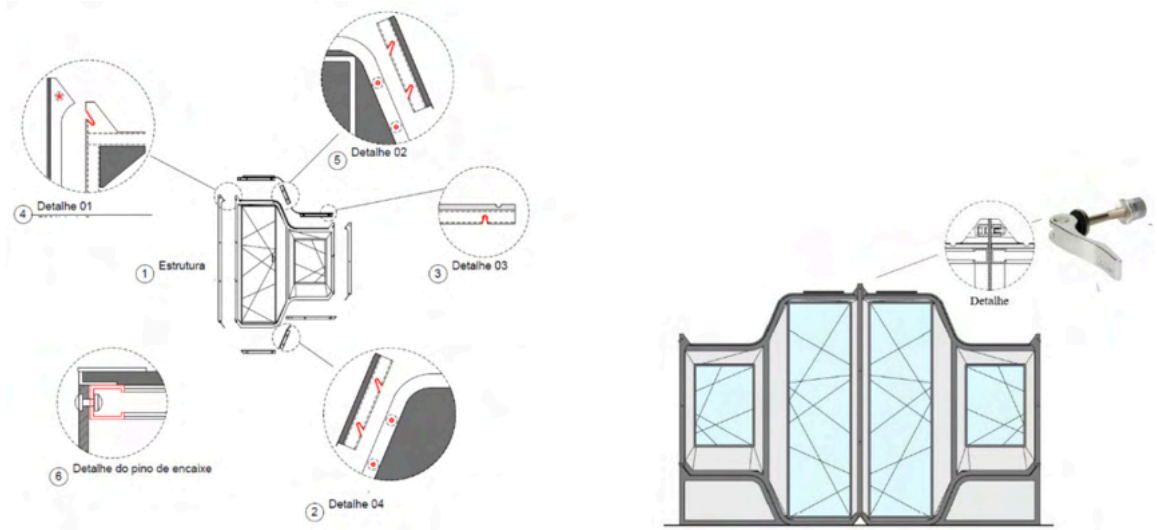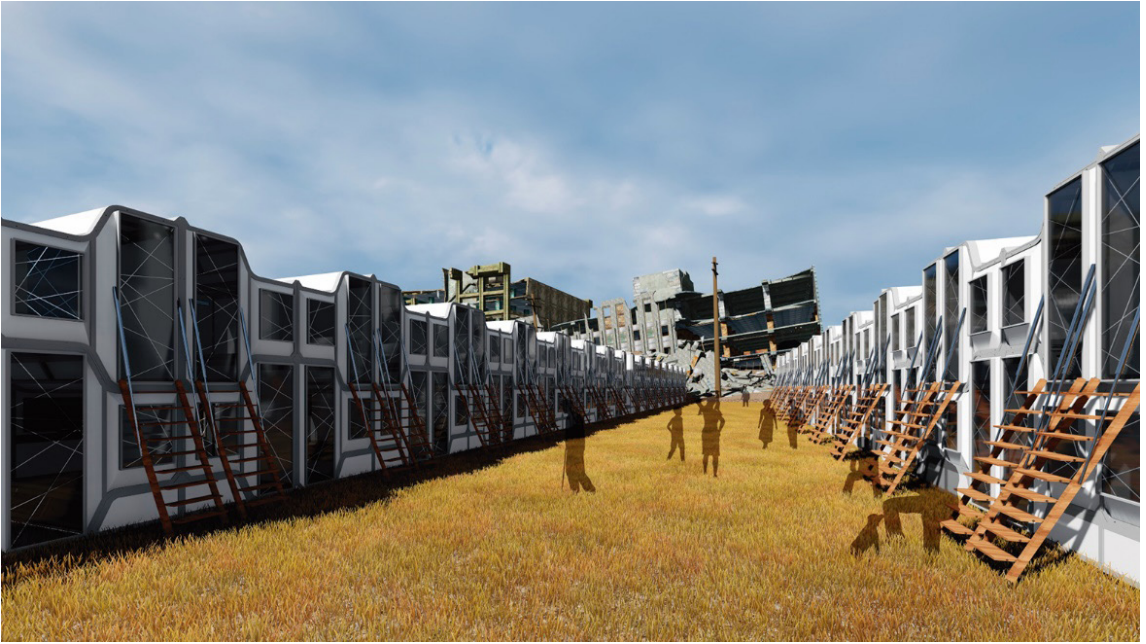

Figure 7: mounting system.

Figure 8: Case study: Emergency shelter for disasters.

Figure 9: Case Study: Rest in Airports and Malls.

Figure 10: Case study: Implementation in festivals and events.

Figure 11: Prototype manufacturing.

allowing for longer use and greater comfort. Its mountable and dismountable composition reduces the volume of the set and facilitates its transport.

The analysis built by theorists in the field of contemporary architecture points, directly or indirectly, to the need to adapt new technologies in different areas to the demands of a society in constant transformation, driven by diverse market interests, but lacking adequate conditions. and basic infrastructure.

This way, the module uses advanced technologies in the intervention of space, presenting a compact and functional form, with uses ranging from leisure to the solution of contemporary social problems, reconciling architectural and urban proposals.

CONCLUSIONS

All details referring to the assembly and transport system, as well as the electrical and hydraulic systems, were designed and tested based on studies and prototypes. Taking into consideration the care required for implementation and foreseeing its installation in a large number of modules, especially in closed areas such as shopping malls and highways, guidelines for assembly and use of the modules were developed.

Installations in the internal areas of buildings, residential roofs, floors of buildings such as airports, shopping malls, convention centers, among others, must be monitored by a specialized professional so that the necessary resistance checks and load calculations are carried out.

It is necessary to maintain a minimum distance between the Capsules and other buildings. The structure and material of the capsules receive fire-retardant treatments, but safety elements, such as the installation of fire extinguishers, minimum distance from escape areas and other equipment must comply with safety standards and relevant legislation.

For Deployments of public or institutional scope, when considering the number of units installed, it is necessary to offer the minimum percentage of PCD Capsules and PCD Bathroom Capsules and/or PCD changing rooms.

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