KAIRA LOORO | ARCHITECTURE COMPETITION
Emergency Operations Center

The project was born with the aim of responding to the health emergency in Sub-Saharan Africa. There are many countries that are experiencing war or lack of health facilities. The project has modular elements which, being replicable, allow communities to face such emergency situations, with full respect of the principles of sustainability, bio-architecture and innovation. A versatile, self-built structure, made with local materials, with purely African characters, which will integrate into the context allowing the local population to identify with it. The structure will initially have an outpatient / hospital function, then, once the emergency is over, it will become a school in order to counter the lack of educational facilities. The "new" hospital will present itself as a village capable of assisting the population and will have: 12 hospital beds divided into 2 wards (1 for men and 1 for women), 2 operating rooms, 1 clinics for health care and 1 for psychological assistance. The structure has 2 guarded entrances and 1 exclusive entrance for emergencies, which is connected with the surgical room providing immediate help.

The Design Idea

The concept behind the project stems from an analysis of African architecture: spontaneous architecture that reflects the social structure of the population in spaces. According to tradition, the built environment is designed following practical principles that differ according to the culture of origin. In Southern Africa, villages have a symmetrical arrangement, the most common being the circle arrangement of round houses around a central space. In Central African culture there are: axial, horseshoe-shaped, square-shaped arrangements. All of them present a common element: the "fence". This is capable of outlining a circumscribed, closed, introverted space. The project aims to resume these distribution schemes and rework them according to the function of the new construction. The new structure is made up of 3 modules, repeated and rotated (for a total of 6 modules) in order to create a large internal courtyard serving the hospital and patients, all circumscribed around the perimeter by a fence. The 3 modules have a hierarchy that reflects the functions they will have: volume A (17 m x 7 m) will be the volume assigned to outpatient / administrative functions, volume B (11 m x 7 m) for hospitalization, volume C (7 m x 7 m) will be the storage for medical material. Above the buildings, as a roof, a reciprocal structure with hexagonal mesh will be created. This structure, built using beams or rods that structurally interact through constraints of simple support and with natural materials such as wood, will give the possibility to cover the wide internal courtyard area, ensuring its livability even on the hottest days. Particular attention was paid to the internal environmental conditions of architecture. The volumes will have openings which, through cross ventilation, will allow perfect cooling of the rooms, extracting the hot air from above and introducing fresh air from below. This system exploits the movements of the air that are created allowing it to be recycled, in compliance with the principles of bioarchitecture. Through the roof, natural light filters from every corner of the building, ensuring optimal lighting during the different hours of the day. The large cover serves as protection against strong solar radiation of those latitudes: light, but not heat, penetrates between buildings. These measures allow for a perfect internal micro climate, a highly efficient passive system.

Use of Materials

In full respect of the principles of bioarchitecture, the project will create a relationship with the surrounding environment, made with natural materials, recycled and recyclable, not harmful to health and produced on-site. The buildings will have a direct foundation on isolated plinths, made with perpendicularly crossed wooden planks between them, stiffened in the nodes by concrete blocks (the plinths). This solution will allow for a structure that will not be attached directly to the ground and which can hardly be affected by rising damp. The walls will be built with a wooden frame and buffered with the "adobe" or mud bricks technique, without the use of complex equipment or technological inputs. This construction technique offers advantages in arid and dry climates because it is cool during the day and warmer at night as adobe stores and releases heat very slowly. The roof will be in polycarbonate and will allow the building's interior to be bright and will guarantee a healthy environment. The dome that will dominate the village will be a completely reciprocal structure made with wood found on-site.

Mounting/Construction Process

For the construction of an emergency architecture, the team adopted a wood structural system to be found on site, suitable for a clean and fast construction. The structure is modular and made from standard timber sections bolted together: the columns (modulate by two timber sections) are bolted to the base beam and support the wood structure of the roof above. Since the parts of the structure are of equal size for beams and columns, the mounting process becomes serialized and easy to assemble. The timber frame facade is closed by adobe walls to stiffen the structure. Adobe is a clay brick modeled in a mold and dried for a few days outdoors and the production of bricks in small production units is fast and cheap. The bricks are arranged in a row and overlapped with mud and straw mortar and finally the wall is covered with clay plaster and linseed oil for its water-repellent properties. Doors and windows are designed with local wood and self-built as the locals like.