Aga Khan Award for Architecture

ARCHITECT'S RECORD

2010 AWARD CYCLE

I. IDENTIFICATION

Project Title: THE SALAM CENTRE FOR CARDIAC SURGERY- EMERGENCY ngo

Street Address: SOBA- Hilla

City: KHARTOUM Country: SUDAN

II. PERSONS RESPONSIBLE

A. Architect/Planner

Name: studio tamassociati

Mailing Address: Dorsoduro 2731

City: VENICE Postal Code: 30123

Country: ITALY Telephone: +39 041 5226974

Facsimile: +39 041 5226974 E-mail: raul.pantaleo@tamassociati.org

Principal Designer: Raul Pantaleo

B. Client

Name: EMERGENCY ngo- Life support for civilian war victims

Mailing Address: Via Gerolamo Vida, 11

City: MILAN Postal Code: 20127

Country: ITALY Telephone: +39 02 863161

Facsimile: +39 02 86316336 E-mail: pietro@emergency.it

C. Project Affiliates / Consultants

Please list those involved in the project and indicate their roles and areas of responsibility (e.g. engineers, contractors, economists, master craftsmen, other architects, clients, etc.). Please cite addresses and telephone numbers separately.

Name	Role
tamassociati- R. Pantaleo,M. Lepore,S. Sfriso, S. Crescini with P. Parrino, G. Strada	Design team
Pietro Parrino	Project manager
Rossella Miccio, Pietro Parrino	Program coordinators
Studio Pasqualini, Jean Paul Riviere with Nicola Zoppi	Mechanical/services engineering
Francesco Steffinlongo	Structural engineering
Franco Binetti	Operating Theatre design
Roberto Crestan with Alessandro Giacomello	Site engineer
Gino Strada, Emiliano Cinelli, Fabrizio Fasano, Andrea Cioffi	Feasability project:

III. TIMETABLE

(please specify year and month)

A. Commission: Design a Hospital for cardiac surgery

B. Design — Commencement: December 2004 — Completion: April 2007

C. Construction — Commencement: Febrauary 2005 — Completion: April 2007

D. Occupancy: 200 persons

Remarks, if any:
The hospital was built using local staff hired directly by Emergency, ngo for the general construction and subcontractors used for the finishes and the technical parts

IV. AREAS AND SURFACES

(please indicate in square metres)

A. Total Site Area: 40.000sqm

B. Ground Floor Area: 8.000sqm

C. Total Combined Floor Area: 12.000sqm
including basement(s),ground floor(s) and all upper floors)

Remarks, if any:
Only hospital excluding housing area

V. ECONOMICS

(please specify the amounts in local currencies and provide the equivalents in US dollars. Specify the dates and the rates of exchange in US dollars at the time.)

		Amount in Local Currency	Amount in US dollars	Exchange Rate	Date
A. Total Initial Budget		14.000.000€	20.844.593$	1,489	Sept 2009
B. Cost of Land		Khartoum State			Sept 2009
C. Analysis of Actual Costs					
1.	Infrastructure	500.000€	744.449$		
2.	Labour	3.000.000€	4.466.698$		
3.	Materials	6.400.000€	9.528.956$		
4.	Landscaping	500.000€	744.449$		
5.	Professional Fees	100.000€	148.889$		
6.	Other	3.500.000€	5.211.148$	Biomedical	
D. Total Actual Costs (without land)		14.000.000€	20.844.593$		Sept 2009
E. Actual Cost (per sq. meter)		950 €/sqm	1.414 $/smt	without biomedical	Sept 2009

Remarks, if any, on costs:

As with other EMERGENCY's programmes, the Salam Centre for Cardiac Surgery has been realised with the help of thousands volunteers who dedicated their time, skills and commitment, and thanks to the financial support of private citizens, companies, organizations and institutions who contributed to this project.

VI. PROJECT DESCRIPTION

THE SALAM CENTRE FOR CARDIAC SURGERY is run and managed by the Italian based humanitarian organisation EMERGENCY. The centre started its clinical activities in April 2007. Salam means peace in Arabic. The Centre offers free-of-charge assistance to patients affected by both congenital and acquired heart diseases. A network of paediatric centres will be built and run by EMERGENCY in the Sudan and neighbouring countries.
The Salam Centre for Cardiac Surgery is located in Soba, 20 kilometres south of Sudan's capital city, Khartoum.. The Centre covers an area of 12,000 sqm indoor, on a lot of land of roughly 40,000 sqm on the banks of the Blue Nile.
The Salam Centre structure includes different buildings: the HOSPITAL blocks; an administration area; a technical and service area; a GUEST-HOUSE for relatives of patients coming from outside Khartoum; a MEDITATION PAVILION for patients of all creeds and religions; a MEDICAL COMPOUND made of container-houses.
The design of the SALAM cardiac surgery centre followed three main guiding principles:
1-the idea of a "hollow" space and a pavilion-based system; 2-the search for an ethical language for this type of architecture. 3-the choice of the best possible technology given the context;

The "hollow" space> The hospital has been developed around an empty space, physically and ideally occupied by two enormous mango trees, located at the centre of the site (a plot of land on the banks of the Nile about 20 km from Khartoum). This is a symbolic space from which all the trajectories along which the building grew, were born. In line with traditional housing structures, the hospital is configured around a hollow space, creating angles, perspectives and sensations that are forever changing and are never monotonous. The hospital's courtyard is a world of its own; an ideal separation between the internal microcosm – bound, protected and protective- dominated by the symbolic figure of the trees, and the external macrocosm- hostile and scorched- that calls for protection. The hospital's buildings, that "embrace" the courtyard, have been designed in the form of a pavilion. Their reduced height inspires in patients and hospital staff a sense of "homeliness" that is also present in many details and that attempts to reduce the idea of being hospitalised. This is a philosophy that aims to create a cosy space where patients can feel as fully-fledged "subjects" with a right to an often missing respect, rather than mere "objects" of care. The design of the structure tries to mitigate the sensation of feeling lost and away from home so typical of hospitals; rather it tries to build a working and healing place where proximity between people and spaces is encouraged.

An ethical language> In designing the hospital it was important to imagine a "face" that could best represent the philosophy that underpins it. Every detail of the building, as mentioned above, is aimed at making patients and staff feel at home. Above all they are aimed at highlighting the fundamental values of caring and preserving life. The details of the building are therefore the "face" that represents these values. Residing in the hospital will make the patients, and other observers, of any sex, race, colour or belief come together under the common roof of fundamental values such as cohabitation and hospitability. It is difficult at this stage to gauge the social and cultural impacts of such a structure in the area of health care, both locally and at an international level. EMERGENCY's intention in developing a pilot "gem" project was not only that of responding to the urgent healthcare needs of the country and the area, but above all that of setting the precedent for a project that conceives free healthcare as a fundamental right even in "Third World" countries. The special care given to the details of the project both from an architectural and idealistic viewpoint responds to this overall intention.

VII. MATERIALS, STRUCTURE, AND CONSTRUCTION

The best possible technology> Temperatures often exceed 40°C in Sudan for long periods of time, often reaching and exceeding 50°C. It is this aspect of the Sudanese climate together with the presence of fine dust generated by the strong desert winds that has led to an in-depth study of the right type of insulation, cooling and filtering technologies. These technologies allow to reduce the energy consumption levels of the hospital while at the same time guaranteeing maximum levels of comfort. Based on the principle of passive mitigation, one of the first measures taken was that of building a highly performing wall made of two layers of bricks separated by an insulating air cavity, with small windows. These windows are closed by highly performing glass panels with low emissions. Shrubs and trees were also used to protect the buildings from the heat and to mitigate the effects of the harsh climate. Also important from a practical and aesthetic point of view was the use of traditionally crafted thatched roofs for paths and areas for rest. This was derived from a traditional technique for bed-making.
The use of the above-mentioned measures has greatly reduced the need to rely on energy-consuming cooling technologies. It has in fact meant a more efficient use of locally available resources such as Nile water and solar power. The latter, collected by 1000 sq meters of solar panels, is thus used more efficiently to cool the large quantities of air needed for the entire building. Having solved the complex cooling issue, the next important step was that of understanding how to best filter the large quantities of dust and sand in the air without having to rely on costly and complicated filtering devices. A simple, mechanical solution was found. The air is designed to pass through a series of tunnels- a labyrinth like structure- before reaching the air conditioners. By doing so, the impact of the air on the walls of the tunnel will allow the sand to sediment while at the same time cooling the air by reducing its speed. A fine spray of water at the end of the tunnels further eliminates the finer dust from the air and cools it down even more. The system needs very little maintenance work- limited to cleaning the tunnel-like structure- and allows the air to reach the conditioners filtered and 9°C cooler than when it enters the system. The technological solutions that were sought were thus context-specific.

Solar panel: free healthcare, free energy> The average temperature in the Sudan is 29°C, and in the hottest months it can reach 54°C. In order to cool down the hospital, a number of measures were taken during construction. In addition to this, air conditioners were installed after the building was constructed. In the first case, a series of insulating techniques were used. The external walls for example are 58cm thick and contain an insulating cavity that prevents the building from heating up. The use of traditional cooling systems would have implied high levels of electrical energy or fossil fuel consumption (the needs in terms of volumes of air to be cooled down are hefty: 28 000 m3).
In a country rich in oil resources, EMERGENCY ngo has sought out alternative sources of clean energy: the sun. Today a plant that contains 288 solar collecting items (for an equivalent of 900 m2, or the area of 10 houses) produces 3 600 KW- as much as burning 355 kg of gas – without producing one gram of CO_2. Each collecting item is made up of a number of copper tubes that contain water; these are themselves placed in insulated glass tubes that allow the water inside the copper tubes to heat up. The water transfers the accumulated heat to an insulated 50m3 tank that keeps the water at 80-90°C. The heat is then cooled down to 7°C in two "chilling" machines. Solar power thus allows to produce cold without discharging any particles in the atmosphere, and limiting the use of electric power to water circulation pumps. Two regular boilers have also been installed in case the solar power is not sufficient to run the two "chilling" machines. The cold water is used to lower the levels of heat in the rooms that need to be chilled for medical or other purposes. The machines used for this last part of the cooling circuit are called UATs (Units of Air Treatment). The UATs draw air from outside and "force" it into a 7°C tube that cools it down. A second system of tubes subsequently transports the cool air to various hospital rooms according to need.

VIII. PROJECT SIGNIFICANCE AND IMPACT

SUDAN PROGRAMME-The Salam Centre for Cardiac Surgery, Khartoum
http://salamcentre.emergency.it

Sudan is the biggest country in Africa with a population of approximately 38 million living on 2,500,000 km² of land. In UNPD Human Development Index Report 2009, Sudan is ranked 150 out of 182 countries. According to the World Health Organization data, the average life expectancy in Sudan is around 58 years and only 31% of the population has access to improved healthcare assistance. Infant and maternal mortality rates are very high. Besides the lack of basic healthcar Sudan and other African countries are facing an arising emergency: the 55th Session of the WHO Regional Committee for Africa highlighted that cardiovascular diseases, in particular congenital and acquired pathologies cause 10% of the deaths in Africa. Many acquired heart diseases originate from rheumatic fever, which predominantly affects children and adolescents and that is still widespread in Africa. Approximately 50% of those who have rheumatic fever develop an inflammation of the cardiac muscle, that can result in severe cardiac insufficiency. Studies have demonstrated that there is an incidence of 15-20 cases of rheumatic heart disease per 1,000 people in Africa. Two thirds of all patients are children between the ages of 5 and 15 years. According to the WHO approximately 300,000 deaths per year are the result of cardiovascular diseases in Africa.

To face these needs, EMERGENCY launched a Regional Network for Paediatrics and Cardiac Surgery. EMERGENCY's Salam Centre for Cardiac Surgery, in the suburbs of the Sudanese capital, Khartoum, started its clinical activities in April 2007. Salam means peace in Arabic. The Centre offers free-of-charge assistance to patients affected by both congenital and acquired heart diseases. A network of paediatric centres will be built and run by EMERGENCY in the Sudan and neighbouring countries. Each centre will be open 24 hours/day, and will offer free-of-charge healthcare to all children under the age of 14 as well as health and hygiene education to their families. The centres will host regular cardiac screening clinics for both adults and children: patients requiring further treatment will be transferred to the Salam Centre. Emergency estimates over 1,000 paediatric visits and 100 admissions per month in each Centre. The first Paediatric Centre was built in Bangui, Central African Republic, and started clinical activities in March 2009. The second Paediatric Centre is under construction in Nyala, South Darfur, Sudan. In December 2006, in anticipation of the opening of the Paediatric Centres, EMERGENCY's team of international staff began cardiac screenings in hospitals in Uganda and the Democratic Republic of Congo. In spring 2007, consultations began in Eritrea and the Central African Republic. So far, the Salam Centre has admitted patients coming from 16 different countries.

Data from March 2007 to September 2009:
Triage Consultations: 17,641
Specialist Cardiological Consultations 10,602
Total number of patients admitted: 2,210
Patient's distribution by countries: Sudan 1,991; Eritrea 62; Ethiopia 48; Central African Republic 29; Iraq 28; Nigeria 10; Somalia 10, Zambia 8; Democratic Republic of Congo 7; Sierra Leone 6; Rwanda 4; Kenya 3; Tanzania 1; Uganda 1; Chad 1, Giordan 1.
Number of Patients operated: 1,628
Interventional Cardiology Procedures: 146
Diagnostic Cath Lab Procedures: 506
Structure: 3 operating theatres, a sterilisation room; a 15-bed
intensive care unit (ICU), a 16-bed sub-intensive care unit, a 32-bed surgical ward, 2 consultation rooms, a radiology and ultrasound department, a laboratory and blood bank; a catheterization laboratory, a physiotherapy department, a pharmacy, offices, warehouses, auxiliary services and a 50-bed guesthouse for patients' relatives.

Triage Consultations: 5,534
Specialist Cardiological Consultations 4,076
Total number of patients admitted: 886
- Paediatric patients: 230
- Female patients: 51%
Main pathologies treated: valvular (534 cases); congenital
(185); ischemic (167)
Number of Patients operated: 645
Interventional Cardiology Procedures: 47
Diagnostic Cath Lab Procedures: 229
Expatriate Staff: 1 medical coordinator; 6 cardiac surgeons; 6 cardiologists; 6 anaesthetists; 3 perfusionists; 28 nurses; 1 pharmacist; 1 programme coordinator; 8 logisticians, technicians and IT support staff.
National Staff: 13 doctors; 92 nurses and auxiliary staff;
about 200 administrative and general staff.

Name (please print) RAUL PANTALEO

Signature Raul Pantaleo Firmato digitalmente da Raul Pantaleo
ND: cn=Raul Pantaleo, o=studio tamassociati, ou=architetto, email=raul.pantaleo@tamassociati.org, c=IT
Data: 2009.11.16 14:27:39 +01'00' Date

MATERIALS IDENTIFICATION FORM

Provide a full list of all material being submitted

No.	Description	Remarks
1	Architect's record (Document B)	Envelope 01
2	Two main A3 panels (color-printed hard copies)	Envelope 02
3	Image identification form (Document D)	Envelope 03
4	Contact sheet with thumbnails	Envelope 03
5	Cd with digital images	Envelope 03
6	Curriculum vitae	Envelope 04
7	Seven additional A3 panels (color-printed hard copies)	Envelope 05
8	Emergency NGO – Activity Report (printed copy)	Envelope 06
9	Emergency NGO – Sudan Programme (printed copy)	Envelope 06
10	Emergency NGO – DVD Presentation Salam, 17'	Envelope 06
11	Emergency NGO – CD Video of the first operation	Envelope 06
12	Links and bibliographical references	Envelope 07
13	CD with all the digital materials	Envelope 08
14	Materials identification form (Document C)	Envelope 08
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18_PAV	Meditation Pavilion internal view	Raul Pantaleo	March 2007

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