



Projects library of the specialized group for construction

**PUBLIC BUILDINGS**

Project	<b>Health (hospital)</b>	
Project name	<b>Tellewoyan Memorial Hospital in Voinjama, Liberia</b>	
Country	<b>Liberia</b>	
Region/town	<b>Lofa County – Voinjama</b>	
GIS data (WGS 84)		
Project type	<b>Rehabilitation and new constructions</b>	
Typology	<b>Hospital complex</b>	
Approach	<b>Contracted construction</b>	
Beneficiaries	<b>Regional population</b>	
Climate	<b>Hot, humid</b>	
Special constraint	Termites	
start / end of project	<b>2006 / 2009</b>	
Country GNP	<b>USD/cap</b>	

**Partners**

Organization (donor)	Financed by SDC
IO/NGO partners	Solidarmed / IMC / STI Basel (studies only)
GO partners	Ministry of Health and Social Welfare

**Context to project**

Initial Situation	The Tellewoyan Memorial hospital in Voinjama was built in 1957 and expanded in 1977. In 1990: end of activities due to the war. In 1997: Some refecton done and operated by MSF. In 2000: end of activities and destruction.
Goals, Beneficiaries	The project objective is that Lofa county has a ready to operate hospital infrastructure, witch will improve the quality and accessibility of Health Care services in the county.
Implementations/Results	SDC plan was to implement this project over a period of one and half year, with medical activities to take place over three phases. Finally, the activities effectively started after the second phase. (May 1 <sup>st</sup> 2008)

**Reference data (comparative)**

Land plot m2	36'180	Senior staff houses plot m2	8'740	Junior staff houses plot m2	3'730
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NB: The present report focuses mainly on the studies and on the construction works.



## Humanitarian Aid construction group

Hospital project	Works			Cost	
Architectures studies	Architectural / technical studies, establishing of plans.			21'450	
Preparation works	Various works : temporary fence, well, site panel etc.			21'240	
Hospital main buildings	Works	Unit	Surface	Cost in USD	USD/m2
Emergency Unit	Rehab.	m2	395.00	76'240.00	193.00
X – Ray unit	Rehab.	m2	75.00	36'000.00	480.00
Female ward	Rehab.	m2	523.00	93'120.00	178.00
Children ward	Rehab.	m2	618.00	114'936.00	185.00
Male ward	Rehab.	m2	540.00	132'200.00	244.00
Infectious ward	New	m2	259.00	109'270.00	421.00
Operation/obstetric	New	m2	755.00	276'630.00	366.00
Administration	New	m2	262.00	98'000.00	374.00
Kitchen	New	m2	320.00	73'740.00	230.00
Laundry	New	m2	400.00	84'114.00	210.00
Hospital dependences					
Morgue	Rehab.	m2	48.00	9'850.00	205.00
External Kitchen	New	m2	37.00	8'548.00	231.00
Generator house	Rehab.	m2	31.00	3'200.00	103.00
Water tank	Rehab.	m2	23.00	870.00	37.00
Fuel stores 1 and 2	New	m2	91.00	15'936.00	175.00
Palaver house	New	m2	85.00	12'000.00	141.00
Care taker kitchen	New	m2	23.00	4'370.00	190.00
Latrines	New	m2	35.00	7'870.00	224.00
Carport	New	m2	64	8'400.00	131.00
Guard boot + entrance gate	New	m2	7	6'930.00	990.00
Underground water tank	New	m2	162	80'000.00	493.00
Senior Residences					
Four 2 bedrooms houses	New	m2	304	141'300.00	464.00
Two 2 bedrooms houses	New	m2	462	94'019.00	203.00
One old Dr's house	Rehab.	m2	190	9'445.00	49.00
External works, generators, fence	New		----	16'500.00	
Junior residences					
Three 2 bedrooms houses	New	m2	261	102'276.00	391.00
One double studio	New	m2	128	44'424.00	347.00
External works, store, fence	New		----	31'163.00	
Other works and supplies					
Generators	New	Pcs	5	84'173.00	
Various works				19'418.00	
Water supply network				18'499.00	
Supervision	Participate site meetings + site			9'460.00	
External works	System			Cost	
Water well	Bore hole with submersible pump				
Fence	Wire mesh on galvanized metallic pipes			20'399.00	
Footpaths	Concrete pavement			11'236.00	
Covered ways	Galvanized pipes, wooden roof structure			7'908.00	
Roof gutters and cisterns	PVC roof gutters and PVC tanks			6'496.00	
Gutters	Cement blocks on concrete base			7'293.00	
Electricity distribution	Underground lines			68'559.00	
Various works				56'005.00	
Acces roads				14'514.00	
			USD	2'015'311.00	



Total cost for construction:

➤ Phase 1	USD	268'217	CHF	335'271
➤ Phase 2	USD	1'033'619	CHF	1'292'323
➤ Phase 3	USD	713'475	CHF	891'844
<b>Total cost construction</b>	<b>USD</b>	<b>2'015'311</b>	<b>CHF</b>	<b>2'519'138</b>

Total surface of buildings	6'242 m2
Number of patient beds:	150 units
Average cost per m2	USD 323 /m2 CHF 403/m2
Average cost per patient bed	USD 13'435 CHF 16'794
Air Conditioned surfaces	m2 280 (Operation Theatres, pharmacy, laboratories, morgue, medical store)

## Furniture

The supply of the furniture and medical equipment is also part of the project, although financed from another credit.

All standard furniture was produced locally in Voinjama. (Beds for residences, cupboards, chairs, tables, shelves, benches etc.)

The standard equipments were purchased in Monrovia. (Fridges, cupboards, cookers etc.)

The medical equipments were partially given by the WAM (Hospital beds and other equipments) and partially purchased via the MET in Bern with support of the STI in Basel. (Medical equipments and drugs)

**Total cost furniture CHF 1'500'000**

## Approach to results

### Initial Situation

The Tellewoyan hospital who served as the main governmental referral hospital for the whole of Lofa, the adjacent Bong County and even patient from neighbouring Sierra Leone and Guinea was completely devastated after fourteen years of civil strife, with only the wall structure remaining. All equipment has been destroyed or looted throughout the years of conflict.

### Approach

The request for the rehabilitation of the Hospital came directly from the President of Liberia Mrs Ellen Johnson Sirleaf to SDC.

Wherever possible the existing structures were rehabilitated, but many new structures where also needed and executed.

The need evaluation was prepared with Dr. Jean-Pierre Stamm, medical advisor of SDC and with Dr. Chang from Solidarmed during the assessment mission in August 2006.

The project was developed with one local architect office in Monrovia (Design Group) and submitted for each phase to the Ministry of Health, the County Health team in Voinjama and initially to Solidarmed and later to IMC for remarks and approval.

SDC did also, from the beginning, insure the Liberian government of its support for a couple of years for the running of the hospital.



## Problems/Constraints

### For construction works:

The situation of Voinjama, 400 km from Monrovia, with very difficult access during the raining season, without electricity, water, petrol station, banks, hotels etc did not made the situation very easy.

Difficulties to find competent and reliable contractors in Voinjama.

No possibilities to find building materials in Voinjama.

All material, including gravel to be delivered from Monrovia by road.

Very long and sometime very bad road from Monrovia. (400 km; 200 partially teard and 200 with dust or mud, even cut for trucks during the raining season))

Difficulty to find materials of good quality in Monrovia and in the needed quantities.

### For use and maintenance:

Patient from villages not knowing how to use the sanitary installations, resulting in a lot of damages.

Very poor maintenance; even simple things like replacement of a light bulb is not done!

## Lessons learned

For a better follow up of the work, a competent local collaborator or a Junior assistant could have been of a good support.

Maybe, right from the beginning to order some materials from Switzerland! The quality would have improved, but probably also the price.

Difficulty to involved the local authorities.

## Evaluation

The running of the hospital is under the responsibility of the Ministry of Health and in the hands of IMC who managed the hospital.

The Hospital opened for patients on May 1<sup>st</sup> 2008 and the very first day a child was delivered by caesarean section in the operation room.

The hospital is now still in its initial phase and functioning with about 70 beds. Gradually it will extend to its full capacity of 150 beds.

The financial support for the smooth running of the hospital for the next few years is insured by SDC, who also supports the county health team with a medical expert.

## Legal framework

### Political attachment

MoU signed with the Ministry of Health and Social Welfare, the Ministry of Finance and the Ministry of Justice

### Type of ownership

The Hospital is the property of the state, represented by the Ministry of Health and Social welfare. The Director of the Lofa County Health team is the person in charge.

An handover certificate will be signed at the end of the works, bringing an end to the MoU and to our obligations.



## Construction

<b>Structure</b>	Foundations	RC concrete
	Walls or columns	Cement blocks
	Facade	Plaster and painted
	Roof	Wooden structure and green corrugated zinc cover
	Earthquake protection	None
	Wood protection	With Carboline against termites.
<b>Materials</b>	Floor surface	Various, terrazzo, ceramic tiles, PVC tiles
	Walls:	Various, Dispersion paint, oil paint, ceramic tiles.
	Doors	Wooden doors, some with glass oculus
	Windows	Louvers; sliding for Operation rooms and obstetric; with mosquito nets
	Ceiling	Ceiling boards or plywood.
	Thermo insulation	None.
<b>Watsan</b>	water	Three water tanks; one at hospital, one at senior residences and one at Junior residences.
	Toilets	English type inside buildings, plus pit latrine outside.
	Waste water	Several septic tanks
	Rain water	2 collection systems; one in four 1'000 gal tanks for local use. (garage, laundry and kitchen) and one supplying an underground water cistern. 250'000 l.
	Wastes	Dump pit, Incinerator, placenta pit, needle pit.
<b>Equipment</b>	Air conditioning	Individual or split system in Operation rooms, pharmacy, laboratory and morgue.
	Electricity connection	Generator system (three generator: 1 = 30 Kva and 2 = 130 Kva. All building connected via underground distribution net work.
	Telephone connection	Normal calls via local mobile networks. For hospital staff, ambulances and clinics a HF/VHF radio system is installed with radio room in hospital.
	Cooking facilities	Two kitchens are functioning; one internal with electric and gas cookers and one external kitchen for wood and charcoal.
<b>External works</b>	Entrance gate	Two gates permit the access; the main entrance sliding gate and the secondary access to the morgue.
	Fence	Galvanized fence on metallic pillars with 3 lines of barbed wire at the top.
	Guard house	Close to the main entrance to check access
	Access road	From the main entrance to the various buildings and one separate access to the morgue.
	Footpaths	Several footpaths across the compound made with concrete.
	Gutters	Rain water gutters with concrete slabs and concrete block sides.

## Urban planning

<b>Distance to :</b>	Referral clinics	From 20 to 80 km
	OPD	(Out Patient Department) 300 m from Hospital

## For further information

Involved SHA construction group consultants	Francois Poffet
Other involved SHA consultants	Bruno
Author / Contact:	Francois Poffet
Recommended Institutions:	
Recommended partners:	
Recommended books/reports:	Design for Medical buildings; manual for planning of health care facilities under conditions of limited resources. University of Nairobi
Relevant other projects (links):	





### Relevant illustration Hospital



General view on entrance



Children ward before ...



and after

### Senior Residences



Four of the 6 houses.



The rattan sofa set.



The water tower.

### Junior Residences



One 2 bed rooms house



The Sofa set



General view

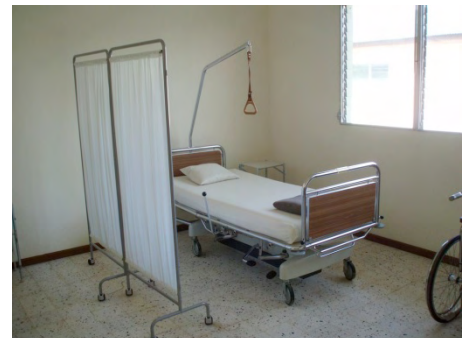
### Furniture - equipment



The operation theater



The x-Ray machine >



One observation room