



Project Report CMR_01

Technology without Borders, Germany – Solutions applied together

Topic:	Hospital Waste
Location:	Hospital Protestant de Ndoungue, Cameroon (Littoral region)
Travel period:	09.04.2014 – 05.05.2014
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ABSTRACT

Cameroon faces problems in waste management. Especially in hospitals, infectious waste is a big challenge. Goal of this project is the complete disposal of the infectious waste in the hospital protestant de Ndoungue.

A waste management including separation and burning of the infectious waste was installed. An incinerator (DeMontfort Mark9) was built up. The commissioning of the incinerator worked without any troubles.

Responsible persons were appointed to the several tasks, like collecting and burning the waste. A separation system was discussed and the burning process trained.

The waste separation and collection system has to be improved. Cooperation partners of Humanitäre Hilfe e.V. has to observe the progress of the project.

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1 BOUNDARY CONDITIONS

1.1 HOSPITAL

Ndougue is situated between Bafoussam and Douala in the region Littoral of Cameroon. The hospital was founded in 1906 by Basler Mission. Meanwhile it is led by E.E.C. (= Eglise Evangelique Cameroun) and is administrated by Dr. Djomou.

Theoretically it offers 213 beds, 30 are used at the moment.

Surgery, Laboratory, Ultrasound and X-Ray are available.

The waste is not separated in clinical and domestic parts. Staff and visitors dispose their waste in bins in front of the wards. Afterwards the waste is disposed behind the clinical area. There is no official service of the government.

1.2 PROJECT



This project was realized in cooperation with Humanitäre Hilfe e.V. (HH). The leader of all projects in Ndougue is Dr. Soeren Gatz. HH realizes several projects in the hospital and is working close together with the hospital staff. Members of HH are in the hospital almost all of the time.

HH did all preparations for the project.

The whole project was financed by the German Embassy of Cameroon.

**Dr. Djomou (Administrator) and
Mrs. Birk (Project leader of TeoG)**

2 CONTACT PEROSONS

- Dr. Francois Djomou (Administrator Hospital Ndougue):
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djomoufm@yahoo.fr
- Dr. Soeren Gatz
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+49 (0) 173 8194902

3 PROJECT REALIZATION

3.1 PREPARATORY WORK

The project was initiated by HH. Introduction of the project was made by HH. Complete financing was provided by the German embassy of Cameroon.

Foundation and roof was built by HH. Bricks have been bought by HH. Training of waste separation was held by HH.

3.2 TASKS

3.2.1 Incinerator

One Incinerator Mark 9 (list of materials see 7.1) was built within this project. Construction was made according to the manuals.

All steel was bought and cut in Douala bricks were available through HH. Welder and bricklayer were employed from Ndoungue. The brickwork was built with special fire proof bricks within one day. The step-by-step manual was very helpful. Only one case was built. Normal Protland cement (alpha 42.5R was used with a mixing ratio of 1:1). Steel parts have been welt at site within 3 days. Small things were flexed at site. Metal parts were discussed with the welder and laid on the floor so that he can see how to weld it. Continuous welding is very important for the stability and air-tightness of the steel parts.

Richard was involved in the whole building process, so that he is able to repair everything.



Mark 9 Incinerator

3.2.2 Burning process

Training of the burning process was held just twice because of the small amount of waste arising in the hospital. Richard and Alain were trained.

Starting the burning process with paper and clean plastic, the incinerator got hot very quickly. The incinerator burned for approximately 20 minutes until all plastic waste was burned. To burn the sharps, the incinerator has to get even hotter (45 min).

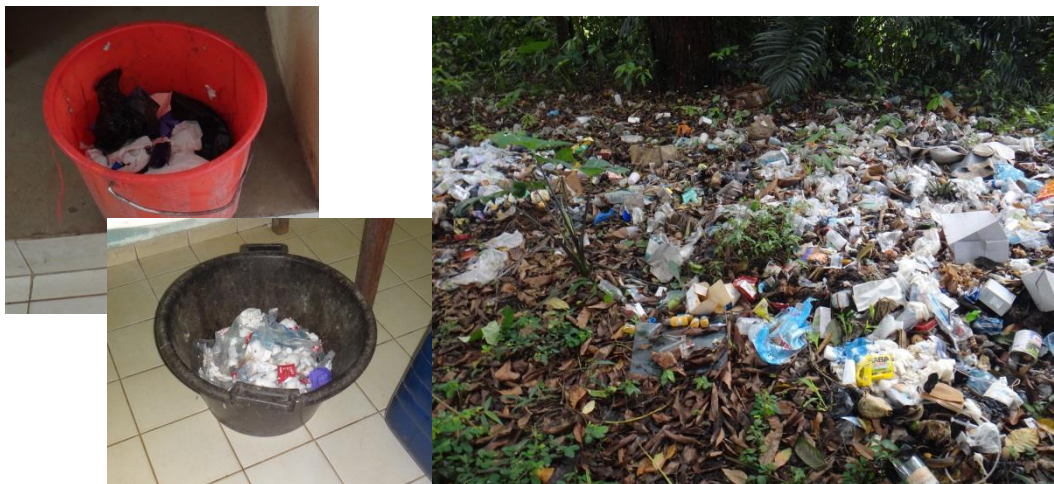
Richard showed the burning process to the administration. The concept of the burning process was introduced to Dr. Djomou and HH theoretically. Hard copies of training material as well as maintenance instructions were left at the administrator and Richard.



Training and demonstrating the burning process

3.2.3 Waste management

Waste management and separating system has been discussed with Dr. Djomou, Richard and Jonas. Bins are used but have different sizes, see Fig.2. New ones with color coding have to be bought. They are not available in Nkongsamba but Jonas and Richard know the right size and style. Plastic bags have to be bought in Douala at a big seller. The bags in Nkongsamba are too expensive. The waste has to be separated in plastic/domestic, infectious and organic waste. Plastic/domestic and infectious waste can be burned whereat the infectious waste has to be burned at high temperatures.



Waste situation on the hospital

3.3 PROBLEMS AND OPTIMIZATIONS

3.3.1 Incinerator

- The ashes have to be put in a cemented pit. For now the ashes should be disposed in the existing pit.

3.3.2 Waste management

Team in the hospital is not cooperating very well between each other. The hospital faces reorganization. Installing a working waste management is very difficult. HH should be always involved in the actual activities.

3.4 SUSTAINABILITY

3.4.1 Training of hospital staff

To ensure a sustain Project, the focus of the lies on the training of the hospital staff.

A system to sort and collect the waste was discussed with Richard Kameni. This system was introduced to the board and all hospital staff.

Several burning processes were executed together with Richard and introduced to the hospital staff that everybody can identify himself with the project.

3.4.2 Maintenance of incinerator

To ensure a proper burning process the incinerator has to be maintained regularly. The brickwork has to be checked and cracks have to be repaired with mortar every month. The steelwork has to be checked every 3 months and parts replaced eventually.

The Incinerator has a life span of about 5 years. The brickwork has to be replaced completely. Steel components have to be replaced.

The roof of the incinerator has to be checked regularly and damages have to be repaired.

3.4.3 Memorandum of understanding

A MoU (see 7.3) has been concluded. It regulates the reports and maintenance of the waste yard. It sets down responsible persons for the several tasks of the project.

4 CASH UP

The costs of the project amounted to 3 877 785 XOF (5 912,79 EUR, 11.06.2014). For details see 7.1.

5 PROJECT IDEAS

No future projects were discussed.

6 LESSON LEARNED

Investigation through TeoG is very necessary to get to know the circumstances and people you are working with.

7 APPENDIX

7.1 LIST OF MATERIAL AND DIMENSIONS OF INCINERATOR

List of material and dimensions:

Bauteil	Länge	Breite	Höhe	D (innen)	D (außen)	Stärke	Anz	Komm
Ash Tunnels								
Stahl Platte	350	235	x	x	x	2	4	
Stahl Platte	350	280	x	x	x	2	4	
Stahl Platte	400	50	x	x	x	2	2	
Stahl Platte	280	50	x	x	x	2	4	
Stahl Platte	250	235	x	x	x	2	1	
Stahl Platte	270	235	x	x	x	2	1	
U-Stahl	100	100	50	x	x	2	2	
Scharniere	50	x	x	x	5	x	4	
Top Frame								
U-Stahl	725	100	50	x	x	2	8	45°
Stahl Platte	200	100	x	x	x	2	6	
Chimney support								
Stahl Platte	300	300	x	x	x	5	1	
Stahl Platte	675	675	x	x	x	5	1	
L-Stahl	675	50	x	x	x	2	4	45°
L-Stahl	665	50	x	x	x	2	1	
L-Stahl	200	50	x	x	x	2	2	
H-Stahl	675	80	80	x	x	2	2	
Rohr	500	x	x	egal	130	2...5	1	
Loading door								
Stahl Platte	475	475	x	x	x	5	1	
Stahl Platte	675	675	x	x	x	5	1	
L-Stahl	50	50	x	x	x	2	4	
L-Stahl	675	50	x	x	x	2	4	45°
Rohr	920	x	x	egal	40	2	1	
Rohr	890	x	x	egal	40	2	1	45°
Scharnier	100	x	x	x	10	x	2	
Grate								
L-Stahl	100	50	x	x	x	2	4	
L-Stahl	400	50	x	x	x	2	2	
Stange	400	x	x	x	20	x	8	
Poker								
Rohr	2000	x	x	egal	10	x	1	
Stahl Platte	150	70	x	x	x	2	1	
L-Stahl	100	50	x	x	x	2	1	
Chimney								
Rohr	5000	x	x	135...137	140	3...5	1	
Stahlkabel								
Bricks								
	23,5	10,5	6,5	x	x	x	400	
Cement								
	x	x	x	x	x	x	150 Kg	

7.2 CASH-UP

Kostenrechnung Projekt Krankenhausmüll Ndougue CMR_01			Budget	Σ Projekt n		
Beträge in EUR				Einnahmen	Ausgaben	Anmerkungen
Einnahmen			7.567,38			
	Spenden			7.567,38		
	Geldspenden		844,08	844,08		
	Sachspenden		0,00	0,00		
	Eigenbeteiligung Projektpartner		6.723,30	6.723,30		
	Sonstige Einnahmen		0,00	0,00		
	Forderungen		0,00	0,00		
	Kontotransfer vereinsintern			0,00		
	Verein => RG		0,00	0,00		
	RG => Verein		0,00	0,00		
	Rundungskorrektur					
Ausgaben			7.945,75			
	Projekte					
	Reisekosten		1.621,02		1.621,02	
	Gesundheitskosten		0,00		0,00	
	Übernachtung		26,37		26,37	
	Verpflegung		0,00		0,00	
	Transportkosten		0,00		0,00	
	Materialkosten		5.912,79		5.912,79	
	Personalkosten (Externe)		0,00		0,00	
	Kosten Lokale Firmen		0,00		0,00	
	sonstige Kosten		7,20		7,20	
	Verbindlichkeiten		0,00		0,00	
	Rundungskorrektur					
	Projektsteuerung		378,37		0,00	entfällt
Saldo			-378,37	7.567,38	7.567,38	
655,83 Umrechnungsfaktor 1=> € zu Landeswährung				Projektbilanz	0,00 €	
0,00 Umrechnungsfaktor 2=> € zu Landeswährung						
0,00						
Abweichung Projektkosten gegenüber Budget					378,37 €	

Projekt CMR_01 Ndougue			Budget	Σ Projekt n			
Beträge in EUR	Datum	Beleg Nr.		Einnahmen €	Einn. Land	Summe	Anmerkungen
Einnahmen							
	Spenden						
	Geldspenden		844,08 €			844,08	
	Sonstige Hauptverein		844,08 €	844,08			
<i>in dieser Zeile neue Zeilen einfügen</i>							
	Sachspenden		0,00 €			0,00	
<i>in dieser Zeile neue Zeilen einfügen</i>							
	Eigenbeteiligung Projektpartner		6.723,30 €			6.723,30	
	German Embassy Cameroon		5.912,79 €	5.912,79	3.877.785,00		
	Veronika Birk		810,51 €	810,51			Flug+Visum
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	Sonstige Einnahmen		0,00 €			0,00	
<i>in dieser Zeile neue Zeilen einfügen</i>							
	Forderungen		0,00 €			0,00	
<i>in dieser Zeile neue Zeilen einfügen</i>							
	Kontotransfer vereinsintern					0,00	
	von Hauptverein		0,00 €				
	Flug Visum Unterkunft			0,00			
<i>in dieser Zeile neue Zeilen einfügen</i>							
	an Hauptverein		0,00 €			0,00	
<i>in dieser Zeile neue Zeilen einfügen</i>							
Summe Projekteinnahmen			7.567,38 €			7.567,38	

7.3 MEMORANDUM OF UNDERSTANDING



Memorandum of Understanding

Technology without Borders – Solutions applied together (TeoG)

Project sustainability commitment

between

Humanitäre Hilfe e.V.

and

Technik ohne Grenzen e.V.

(Technology without Borders)

(TeoG)

and

Hospital Protestant de Ndoungue

Cameroon

In order to make sure the achievements of the projects last long and sustainability is generated.

23.04.2014
(Date)

Dr. François Marie
Spécialiste en Médecine Interne
(Signature, team leader Cameroon)

23.04.14
(Date)

[Signature]
(Signature, TeoG leader)



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1 General information

This Memorandum of Understanding addresses the cooperation of the German associations Humanitäre Hilfe e.V., Technology without Borders e.V. (TeoG) and Hospital Protestant de Ndoungue on improving the hospital's waste management. The first steps and plans of this cooperation were done in November 2012 and the main work is carried out in April 2014 (for details see 2.1).

TeoG wants to transfer knowledge and give consultation. Humanitäre Hilfe is the Project leader on the part of Germany. Humanitäre Hilfe arranges every organizational step.

TeoG is interested in a long-term cooperation beyond the above mentioned time frame, but cannot give any kind of guarantee for the work which is done with its support. It is Hospital Protestant de Ndoungue and not Humanitäre Hilfe or TeoG who is fully responsible for the success and sustainability of this project.

In order to ensure a sustainable long-term cooperation, this Memorandum of Understanding should provide a framework with the most important agreements.

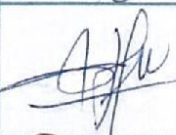





2 Aims of the project

2.1 Short term (during realization phase)

- **Incinerator-Construction:** The hospital staff and its partners will construct an incinerator for infectious waste and a storage- and roofing construction. A team of TeoG and Humanitäre Hilfe e.V. will be present during the incinerator erection and provide construction guidance, knowledge and help.
- **Incineration Training:** After the incinerator is built, TeoG will provide training for the correct usage of the incinerator. 2-3 men from the hospital staff shall be educated and learn about the incineration process, its necessities and dangers. At least one of them will carry out the waste incineration at the hospital every day, the others support and back-up if necessary.
- **Supervision and responsibility by a team leader:** Besides that, a responsible supervisor from the hospital management or a doctor should understand the incinerator system and the burning process as well. If possible he/she should also be involved in the waste separation in the wards and keep an overview about the hospital's waste management system.
- **Improvement of the waste separation and management system:** A working waste separation can decrease the waste amount and the hospital's cost and is the key for successful recycling and incineration. TeoG wants to give consultation and advice addressing the hospital's separation system but not only impose its own ideas.
- **Financing:** Humanitäre Hilfe e.V. (supported by the German Embassy of Cameroon) is willing to provide financial support for the above mentioned construction and the necessary material.



3 Responsible persons

	Tasks	Name & Phone	Signature
Administrator	Main responsibility. Give regular reports (incl. pictures) of the project.	Doctor Djomon Francois	
Project leader (Humanitäre Hilfe e.V.)	Project leader of project realization. Contact person for sustainability.	Doctor Soeren GATZ	
Maintenance	Observe state of waste yard & incinerator. Arrange and supervise all necessary repair works.	Mister SANGUE Nathurin	
Supervisor Waste Management	Supervision of waste separation in the departments and periodic refreshers on waste management.	Mister Albert + philouete	
Supervisor Incinerator	Supervision of the incineration procedure and periodic discussions & refreshers with persons in charge of incineration.	Richard Kameni	
In Charge of incineration	Daily incineration of the hospital waste and report of problems to the "Supervisor Incinerator".	Richard KAMENI	
In Charge of incineration	Daily incineration of the hospital waste and report of problems to the "Supervisor Incinerator".	Mister ALAIN NGONDI	

If one of the responsible person couldn't be any longer in charge of his part, the Hospital Protestant de Ndoungue makes sure, that another skilled and trained person will get in charge.

