

CONSTRUCTION GUIDE FOR STABILIZED COMPRESSED EARTH BLOCKS

SCEB BUILDING BINDER



Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development
and Cooperation SDC

skat Swiss Resource Centre and
Consultancies for Development
PROECCO **PR**oMoting **E**mPloyment through
Climate Responsive **CO**nstruction

00

TABLES OF CONTENTS

1.0	Early Stage	5
	Technical drawings	5
	Site selection	7
	Terracing	8
	SCEB production	9
	Setting UP	11
<hr/>		
2.0	Implementation	12
	Digging trenches	13
<hr/>		
3.0	Masonry Works	14
	Stone foundations	14
	Stone Footings	16
	Lower ring beam	17
	Doorsteps	20
	DPC (Damp proof Course)	21

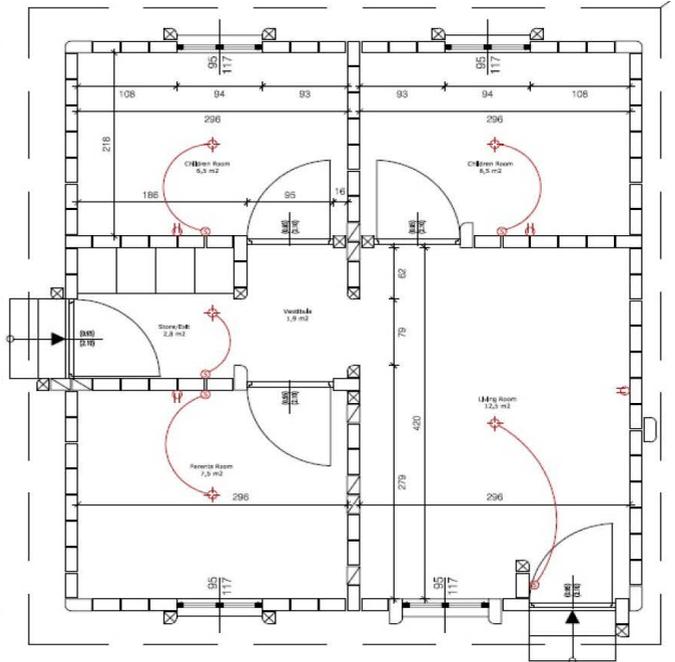
Masonry	22
Masonry - Corner Reinforcements	25
Masonry - Doors & windows anchoring	26
Masonry - Details	27
Masonry - Buttresses	28
Wiring	29
Precast concrete lintels	30
Roof anchoring	32
Upper ring beam	33
.....	
4.0 Roofing	34
Trusses	34
Load Bearing structure	36
Purlins	38
Doors and windows	39
External finishing	41

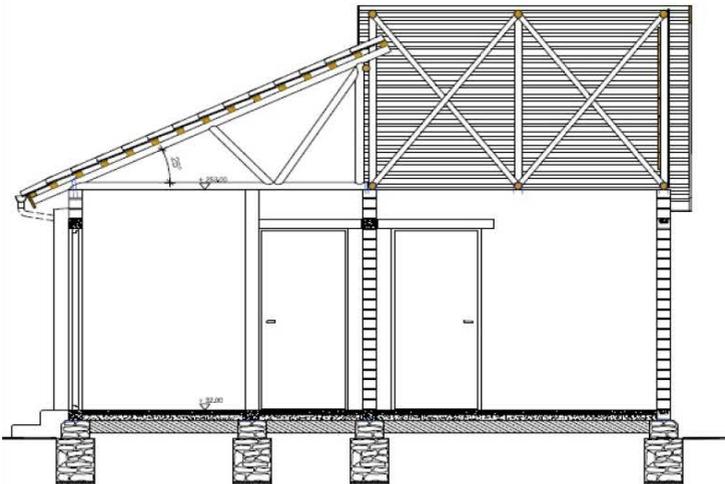
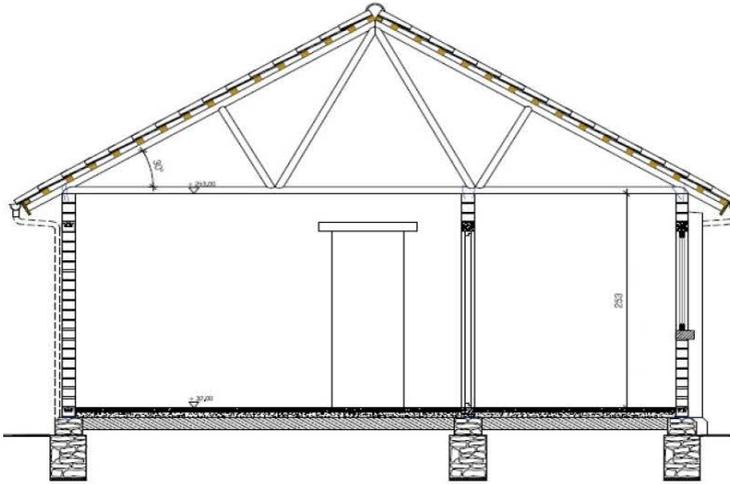
01

EARLY STAGE ONGOING PROCESS

The aim of this pilot building made out of stabilized compressed earth blocks is to show a further technical option for family units with higher income.

TECHNICAL DRAWINGS





SITE SELECTION

The site was chosen in close cooperation with the authorities involved in the program.



TERRACING

The steeply sloping of the site has imposed an important work of preliminary terracing.



SCEB PRODCUTION

After testing several types of soil a suitable option has been found not far from the site.
The press used for the production is a Testaram.





SETTING UP

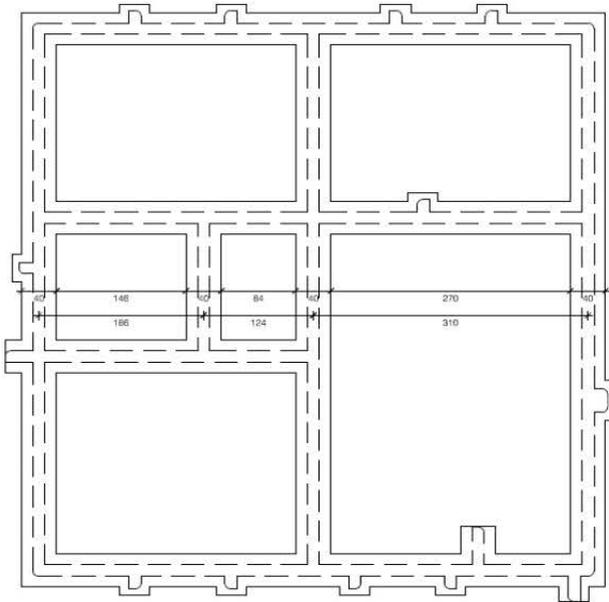
The position of the building is the result of compromise between the needs of future users and the several constraints of the site.



02

IMPLEMENTATION ONGOING PROCESS

The foundations trenches (see plan above) were 50 cm deep and 40 cm wide.



DIGGING TRENCHES

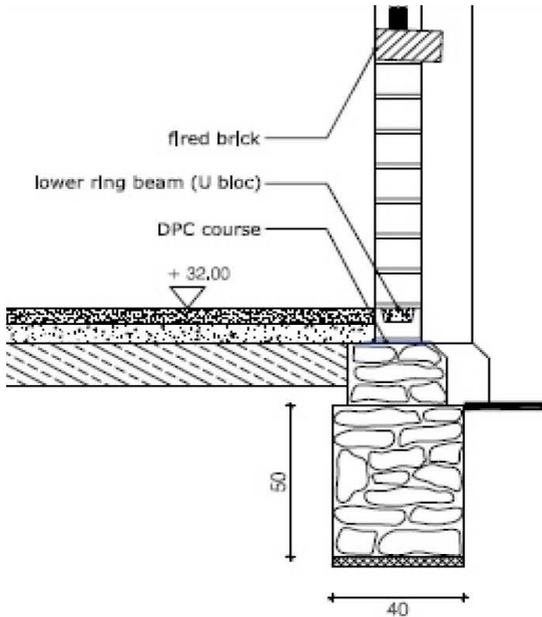


03

MASONRY WORKS ONGOING PROCESS

STONE FOUNDATION

After laying 3 cm of lean concrete on the bottom of the trench (150kg/m³), stones are put in place with cement mortar.





STONE FOOTINGS

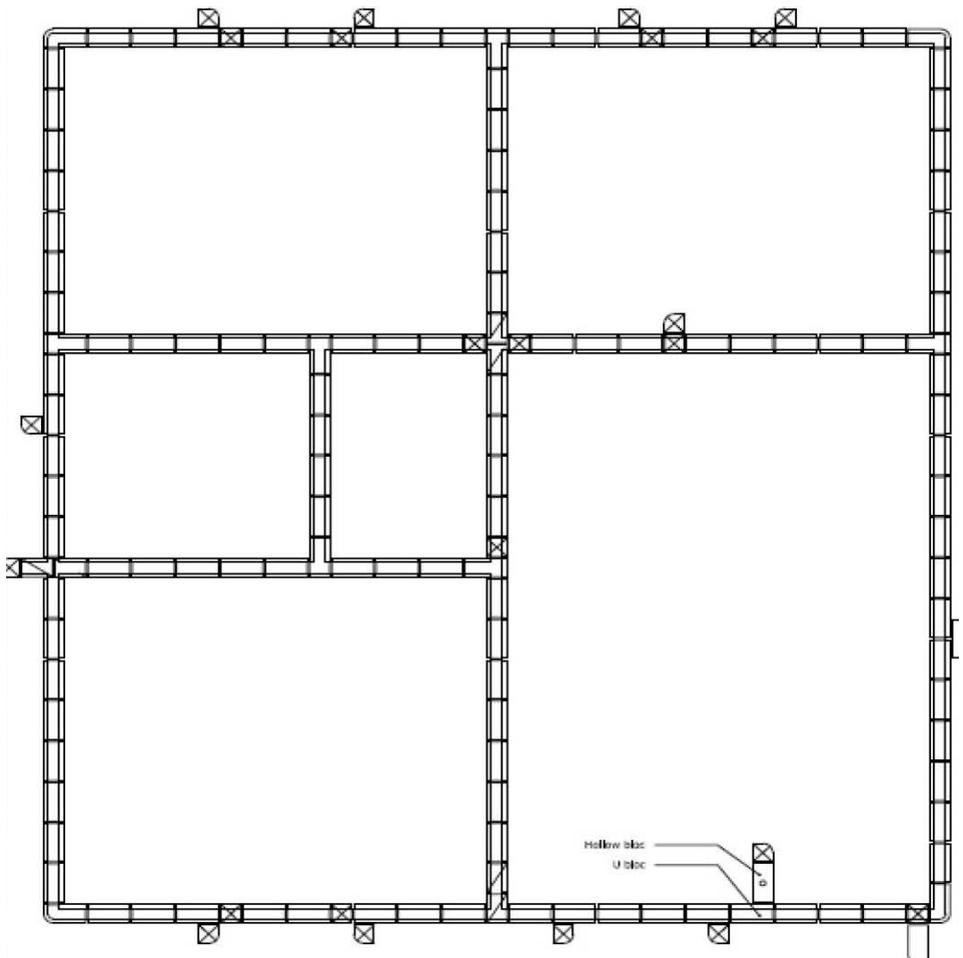
In order to protect the base of the walls from friction and water erosion, a 30 cm high stone cement base has been foreseen.

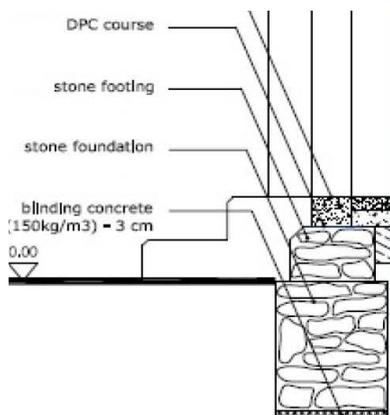
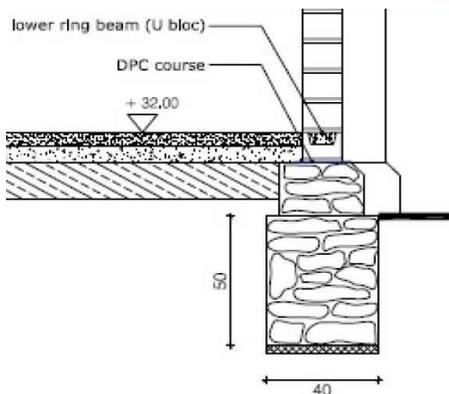
Great attention has been paid to prevent corners damages, to drain rain water away and to make a smooth and good looking external surface.



LOWER RING BEAM

The lower ring beam has been made out of U blocks filled with reinforced concrete (300kg/m³).







DOOR STEPS

To avoid bricks erosion over time, doorsteps are made out of concrete. This solution allow to keep continuity of the lower ring beam.



DPC (DAMP PROOF COURSE)

To avoid water to rise into the wall by capillarity, a water proof barrier has been laid just on the lower ring beam.

Materials standing under the DPC must be water resistant.



MASONRY

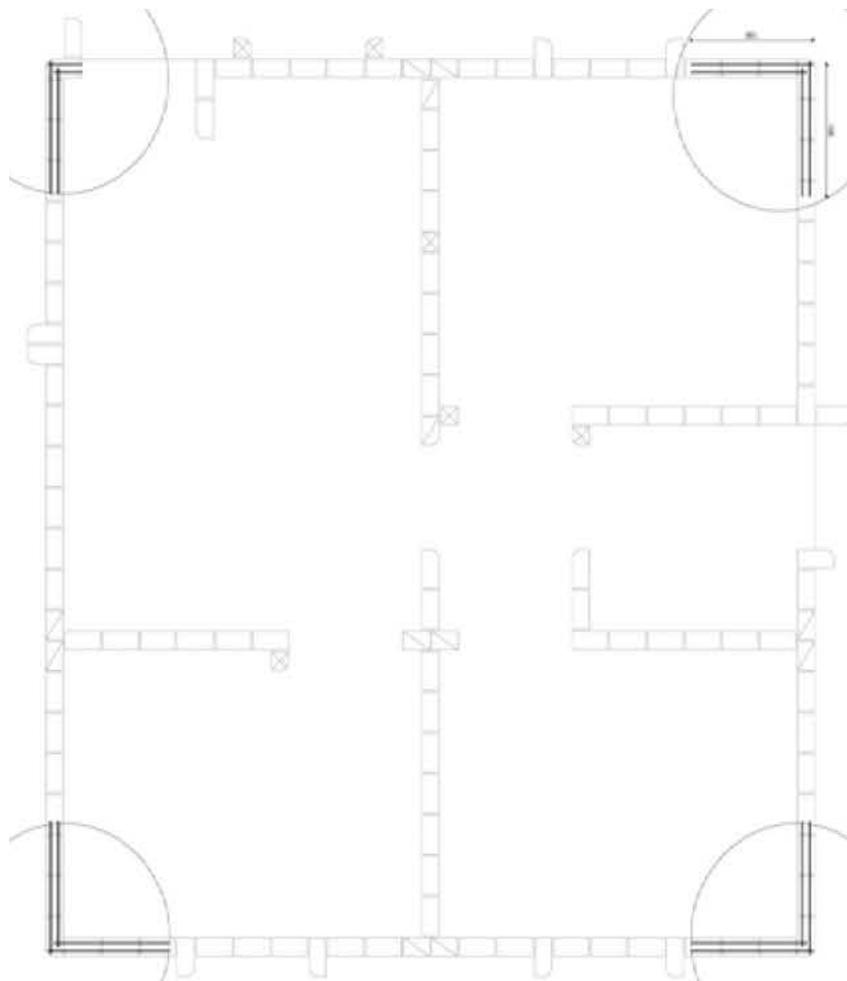
SCEB blocks are laid with soil cement mortar (10% ratio).

To lay SCEB blocks needs much more attention and skills than needed for adobe masonry works.



MASONRY CORNER REINFORCEMENTS

To improve earthquake resistance, reinforcements have been foreseen in the four angles of the building, every four brick courses.





MASONRY CORNER REINFORCEMENTS

To improve corner resistance, rounded stabilized SCEB have been laid.



MASONRY DOORS AND WINDOWS ANCHORING

Some examples of windows and doors anchoring.



MASONRY DETAILS

- Window sills have been made out of fired bricks laid with lime cement sand mortar.
- Settling joints are made under each window.
- Ventilations have been implemented on the top of the windows.



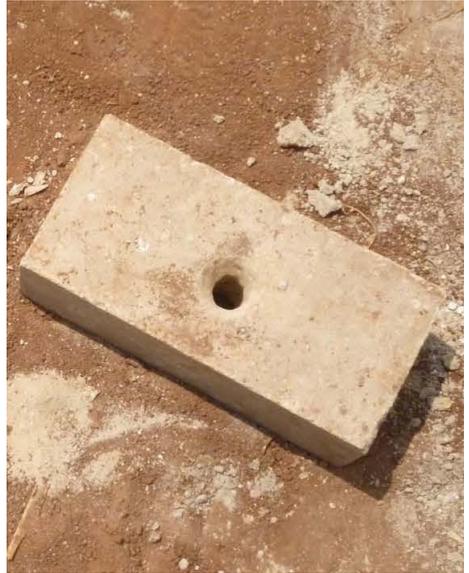
MASONRY BUTTRESSES

Since the walls are just 14 cm thick buttresses are essentials to ensure their stability.



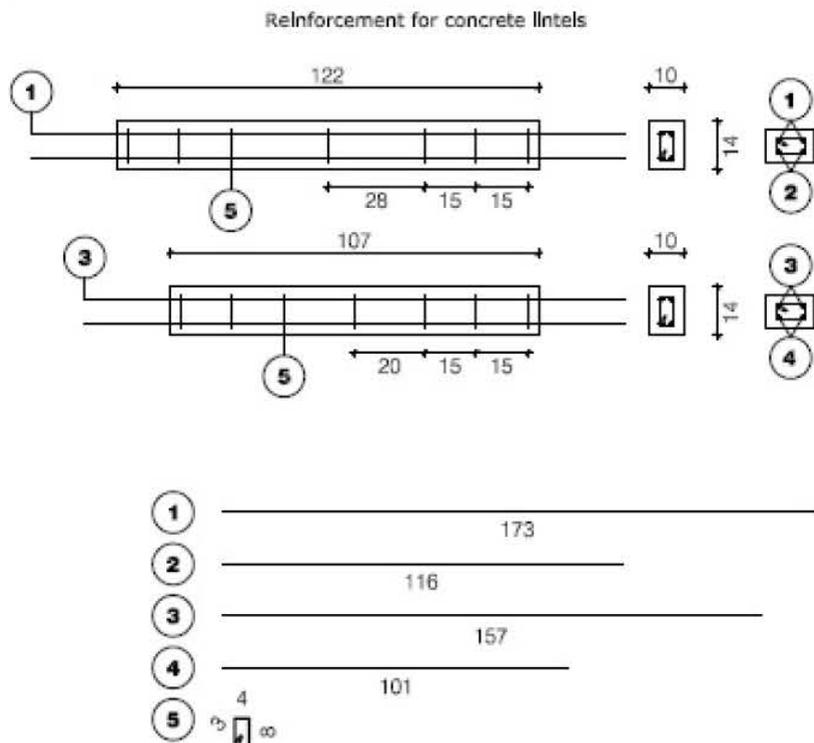
WIRING

Wiring has been implemented during masonry works. Lines pass through hollow blocks.



PRECAST CONCRETE LINTELS

Concrete lintels have been prefabricated about five weeks before to be laid on. Due to an unforeseen, some of them had to be implemented directly on the wall (see picture on the left).

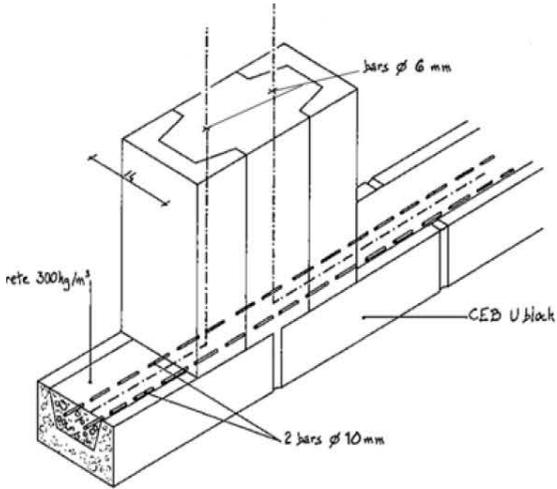


REF.	n	Ø [mm]	Lenght [cm]
1	18	10	173
2	18	10	116
3	18	10	157
4	18	10	101
5	77	6	34



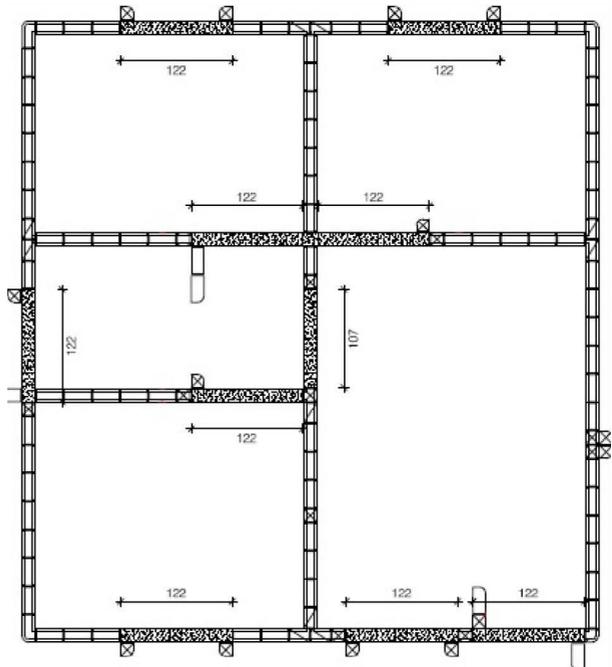
ROOF ANCHORING

The bearing structure is tied by mean of two 6mm iron bars for each anchor point. These steel bars stay under the ring steel bars to guarantee a strong link.



UPPER RING BEAM

The upper ring beam is made with U blocks filled with reinforced concrete ($300\text{kg}/\text{m}^3$).



04

ROOFING TRUSSES

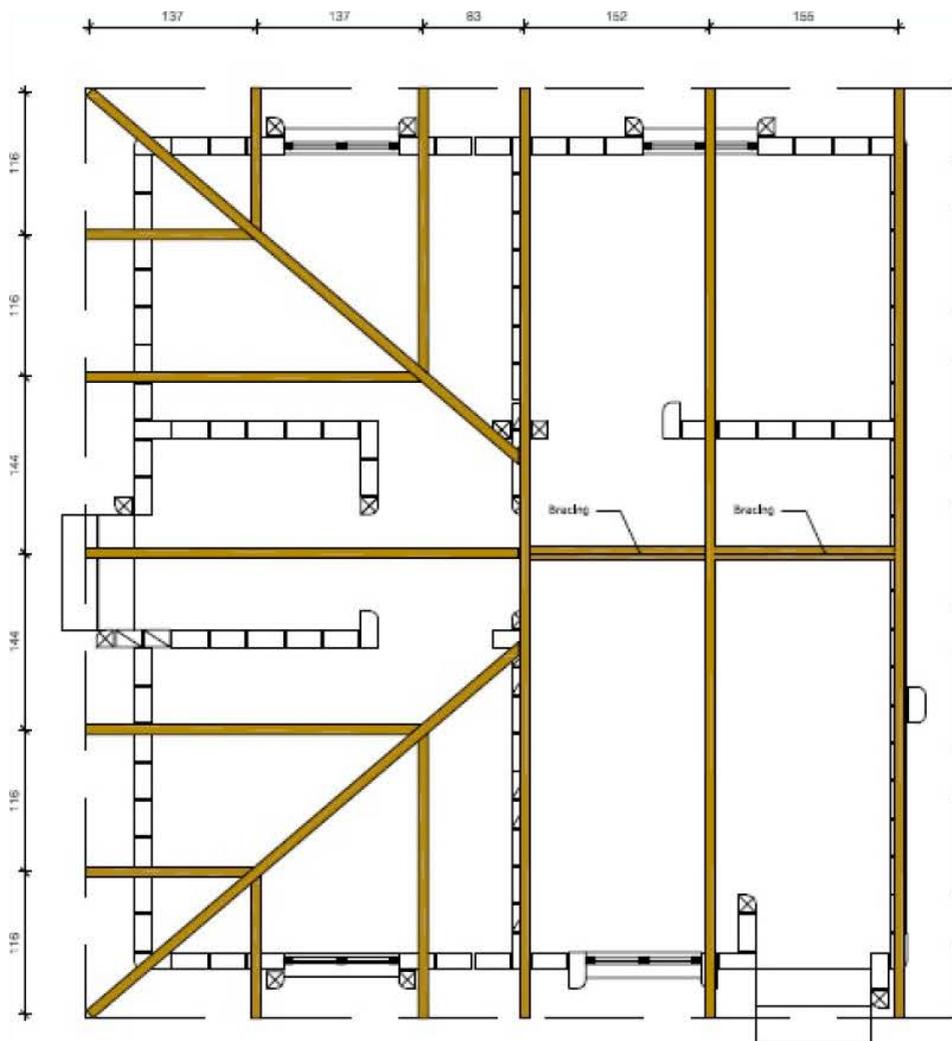
The load bearing structure is composed by five trusses and 6 half trusses making a four slopes roof. To get the openings on the top of the roof, the trusses are 30° sloped instead of the half trusses that are 25° sloped.





LOAD BEARING STRUCTURE

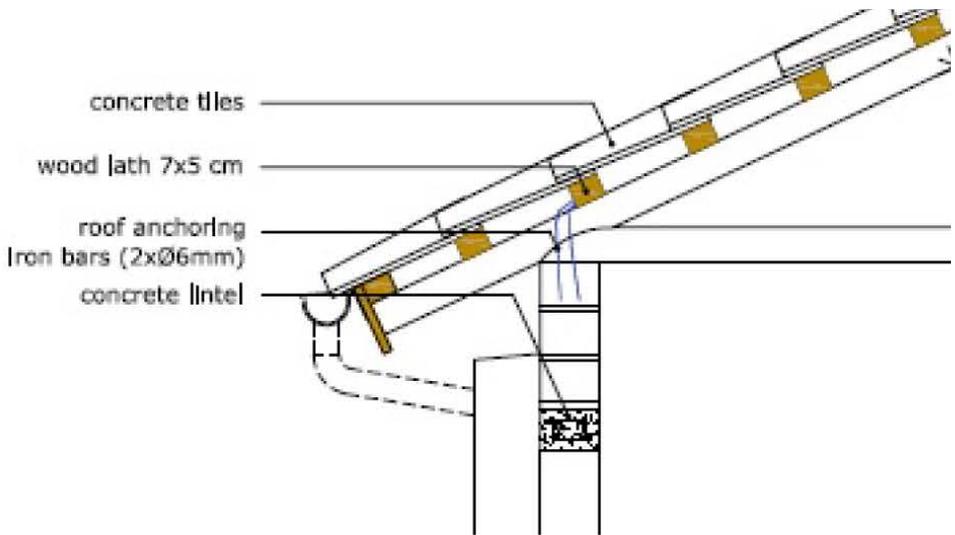
The load bearing structure is composed by three trusses and three half trusses making a three slopes roof. To get the opening on the top the trusses are 30° sloped instead of the half trusses that are 25° sloped.





PRULINS

Some images and details about roof implementation.



DOORS AND WINDOWS

Doors and windows have been produced by a workshop nearby the site.





EXTERNAL FINISHING

Since SCEB walls are not plastered, a smooth and good looking masonry work is mandatory. Verticality and horizontality of the blocks must be carefully and constantly checked during wall implementation.



Skat Consulting Rwanda
KG 5 Ave, No 40. Kigali, Rwanda
phone: +250 (0)78 838 57 90 (office)
www.madeingreatlakes.com

Skat Swiss Resource Centre
and Consultancies for Development
PROECCO Promoting Employment through
Climate Responsive Construction

Skat Consulting Ltd. (Head Office)
Vadianstrasse 42 CH-9000 St.Gallen Switzerland
phone: +41 (0)71 228 54 54
web: <http://www.skat.ch>