

# CONSTRUCTION GUIDE FOR ADOBE BUILDING BINDER



Schweizerische Eidgenossenschaft  
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Swiss Agency for Development  
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**skat** Swiss Resource Centre and  
Consultancies for Development

**PROECCO** PROmoting Employment through  
Climate Responsive COnstruction

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# 00

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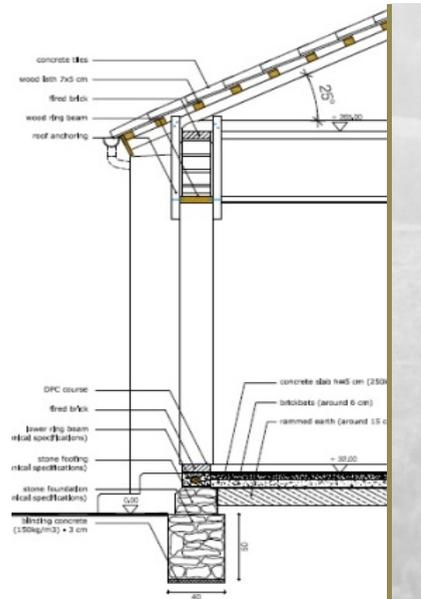
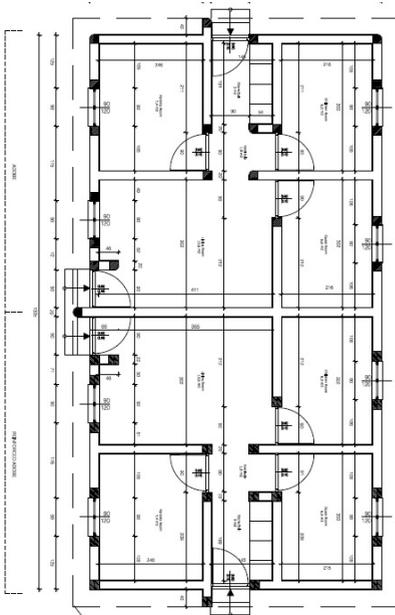
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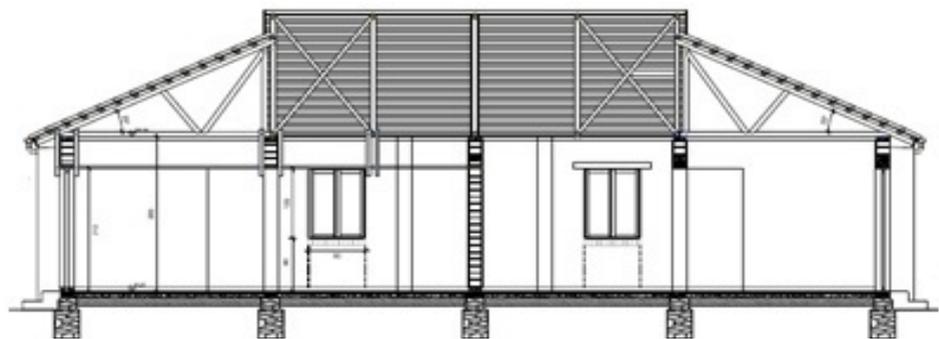
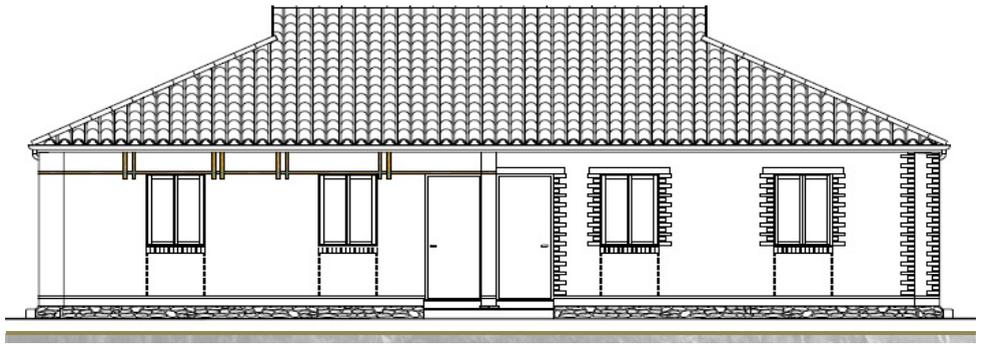
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# 01

## EARLY STAGE ONGOING PROCESS

This pilot building has been conceived to propose several constructive options. The left half side (A) and the left one (B) have different technical solutions.





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## SITE SELECTION

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



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## TERRACING

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



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## ADOBE PRODUCTION

After testing several soil and sand and fiber ratios, the fitting mixture was found.



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## 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



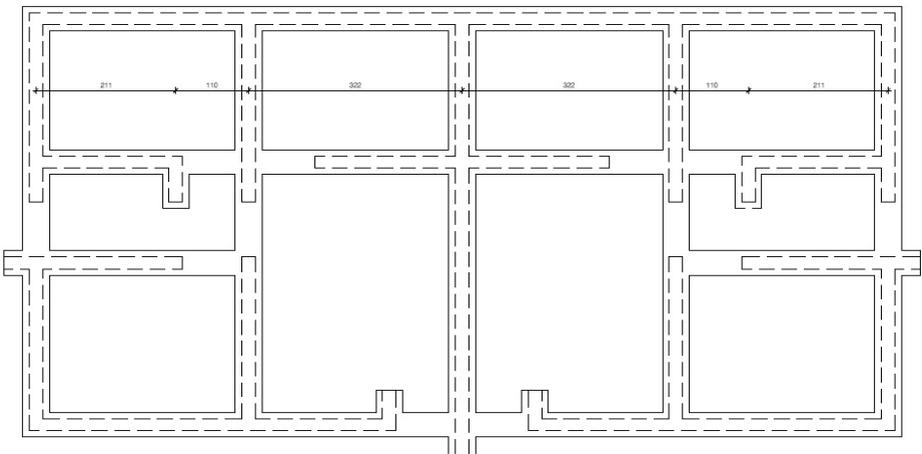
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# 02

## IMPLEMENTATION ONGOING PROCESS

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



## DIGGING TRENCHES

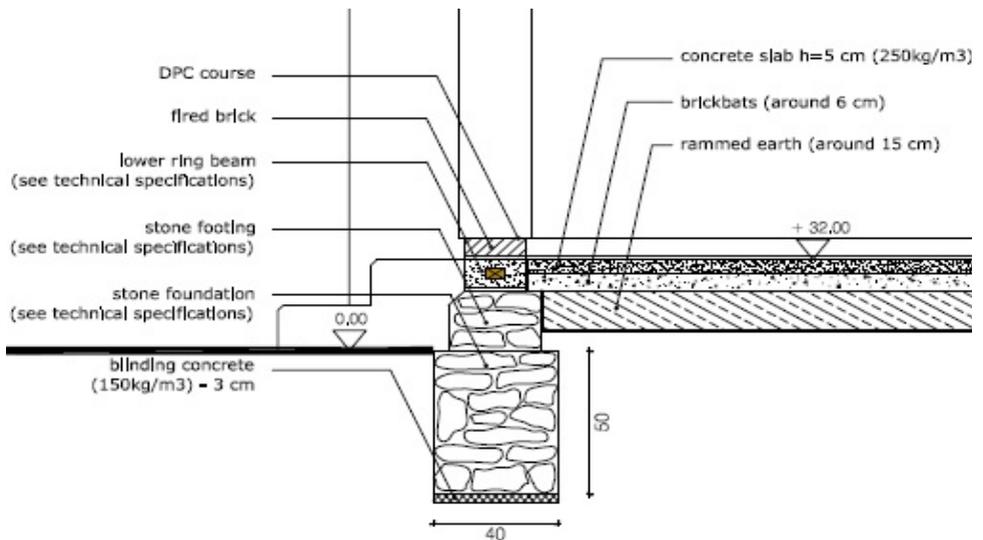


# 03

## MASONRY WORKS ONGOING PROCESS

### STONE FOUNDATION

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





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## 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.

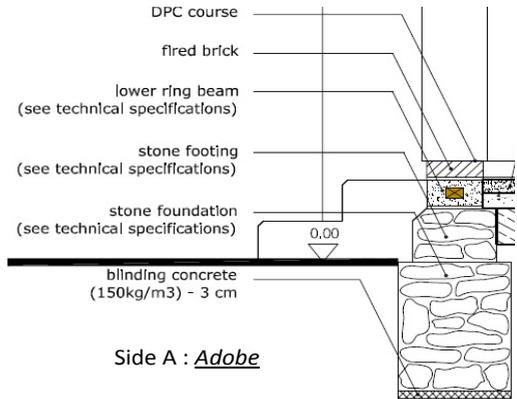
Great attention has been paid to prevent corners damages, to drain rain water away and to make a smooth and good looking external surface.



## LOWER RING BEAM

For the lower ring beam two different solutions have been proposed.

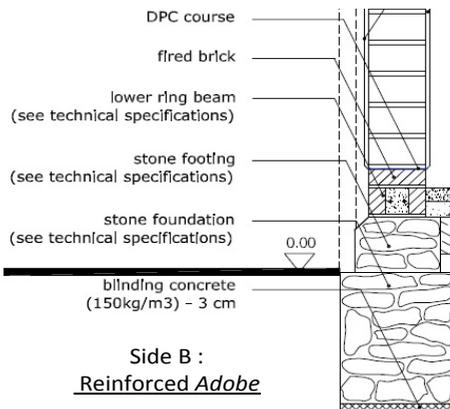
Side A : between two lines of fired bricks as formwork, wood lintels drawn in a lime-sand mortar (350kg/m<sup>3</sup>)





## LOWER RING BEAM

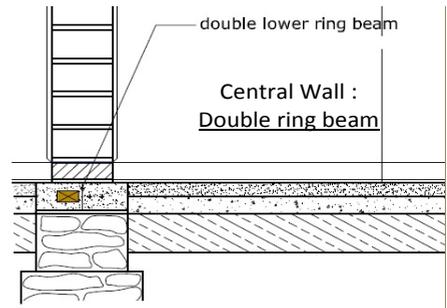
Side B : between two lines of fired bricks as formwork, reinforced concrete beam (300kg/m<sup>3</sup>)





## LOWER RING BEAM

Central Lower Ring Beam : to preserve the effectiveness of both of ring beams, mostly in case of earthquake, the two constructive elements have been kept separated.





## 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 before the first adobe course.

Materials standing under the DPC must be water resistant.



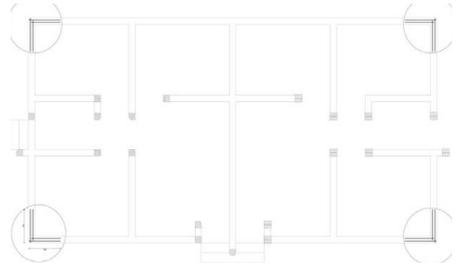
## MASONRY

Adobe blocks are laid with soil mortar; for fired bricks, mortar is a sand-cement-lime mixture.



## 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 Adobe (side A) and fired bricks (side B) have been laid.



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## MASONRY DOORS AND WINDOWS ANCHORING

Some examples of windows and doors anchoring.



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## MASONRY DETAILS

Window sills have been made out of fired bricks laid with lime-cement-sand mortar.

The top of the walls is protected from seepages by a course of fired bricks and lime-cement-sand mortar.

- Ventilations have been implemented on the top of the windows.



## WIRING

Wiring has been implemented after masonry works. Lines will be covered by the plaster.

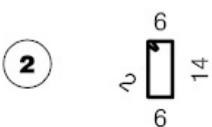
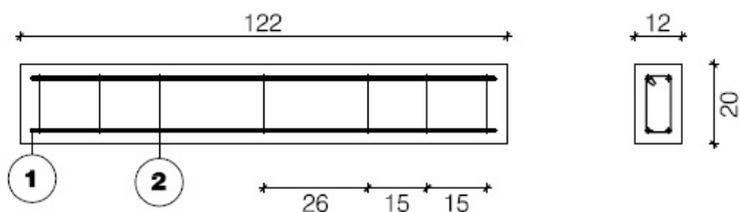


## PRECAST CONCRETE LINTELS

Concrete lintels have been prefabricated about five weeks before to be laid on



Reinforcement for concrete lintels



REF.	n	Ø [mm]	Lenght [cm]
<b>1</b>	44	10	116
<b>2</b>	77	6	48



## ROOF ANCHORING

Side A : The bearing structure has been nailed to the ring throughout wood vertical.

Side B : The bearing structure is tied by means 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 rings have been laid at a different height. Since sides A and B differ, they behave differently in case of earthquake. Therefore they must be as disconnected as possible from one to another.

Side A : wood ring beam.

Side B : concrete ring beam between two fired bricks as formwork



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# 04

## ROOFING TRUSSES

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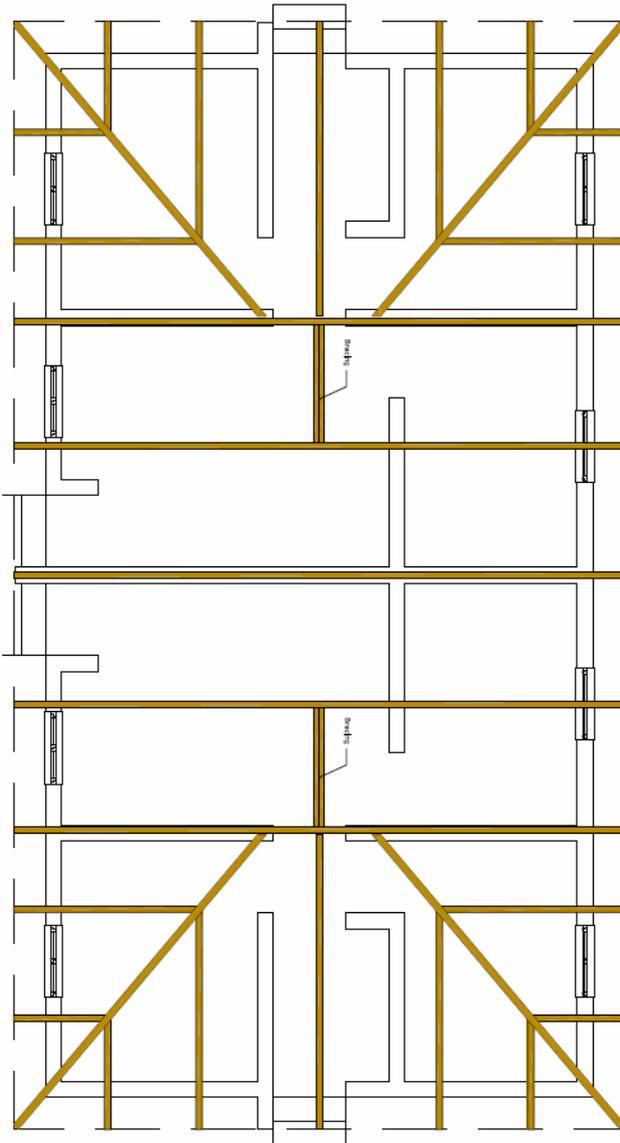
The load bearing structure is composed by five trusses and 6 half trusses making a four slopes roof. To get the openings on the top of the roof, the trusses are 30° sloped instead of the half trusses that are 25° sloped.

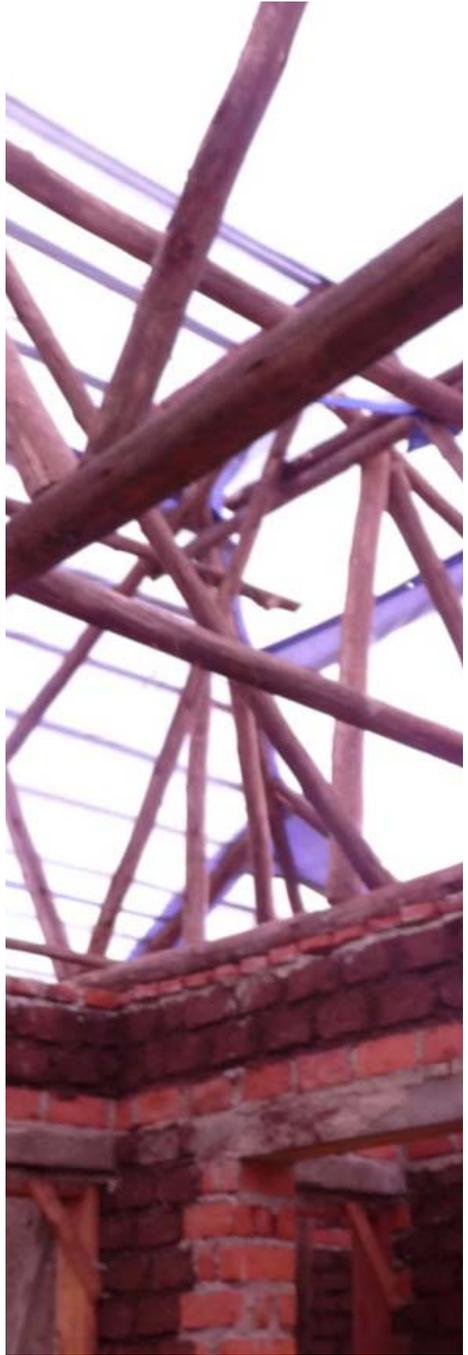




## LOAD BEARING STRUCTURE

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

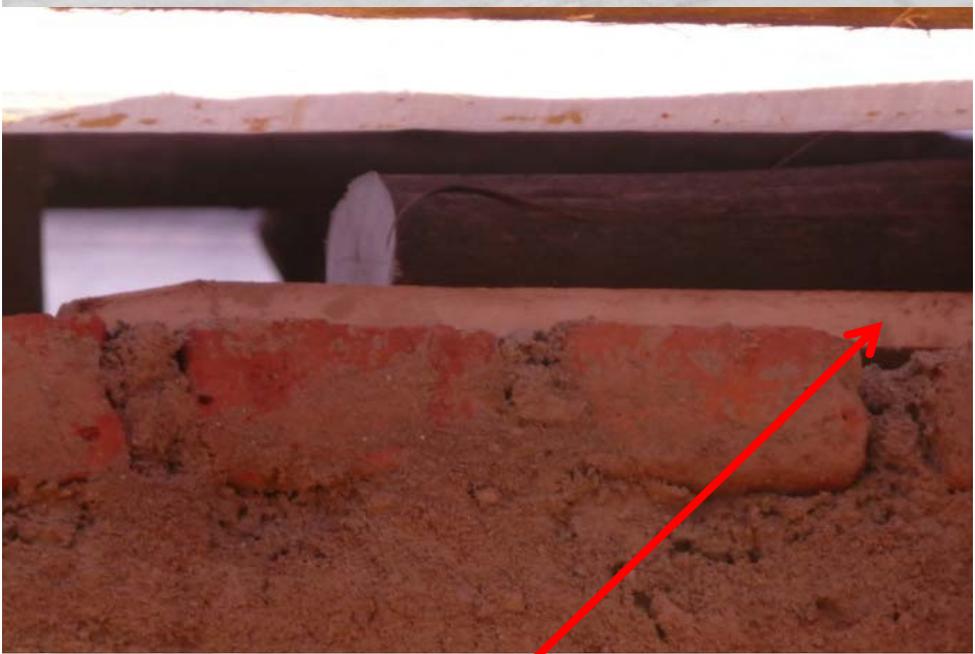
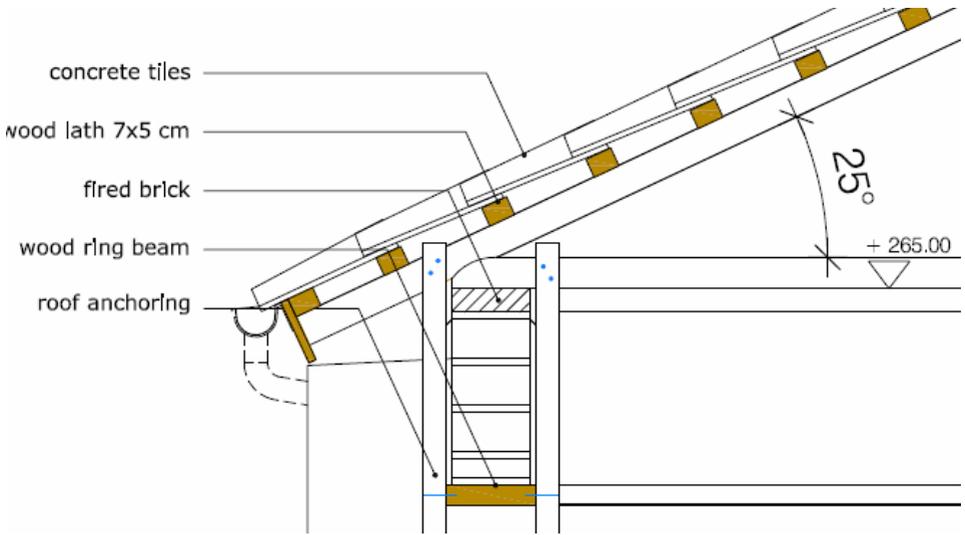




## PRULINS

Some images and details about roof implementation.





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## DOORS AND WINDOWS

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





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## EXTERNAL PLASTERING

External plaster is a sand-cement-lime mixture at the ratio in volume of 8-1-2. Fired blocks and wood ring beam are not plastered.

It has been implemented in two coats. A first raft layer to level wall surfaces and a second finishing layer.



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## INTERNAL PLASTERING

Internal plaster is a sand-cement-lime mixture up to 180 cm and a mud plaster from 180 cm up to the top of the wall. Fired blocks and wood ring beam are not plastered.



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