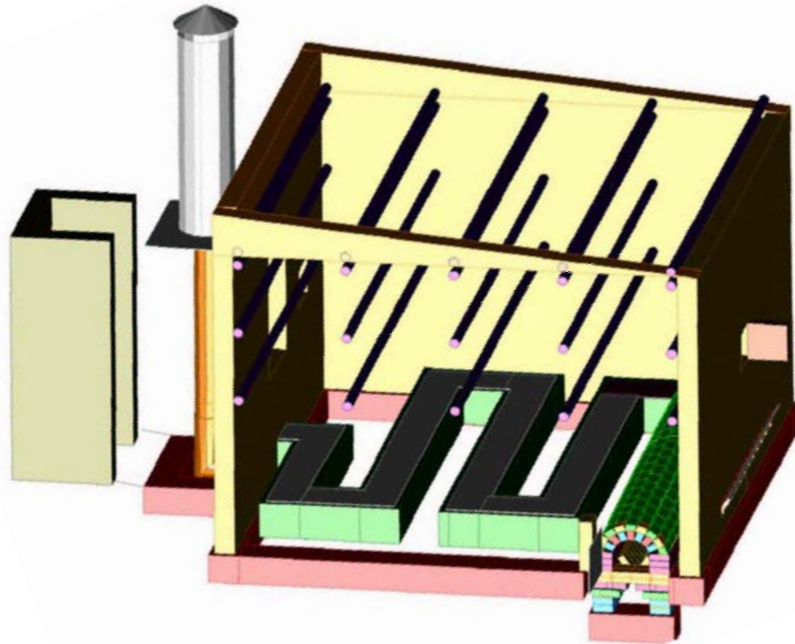


STEP-BY-STEP PLANS FOR CONSTRUCTING A 250 STICK
ROCKET BARN (RBN 3.0) (see RBR plans for furnace and metal
component construction)



DESIGNED BY PETER SCOTT
DESIGN COPYRIGHT PETER SCOTT
MAY 13, 2008



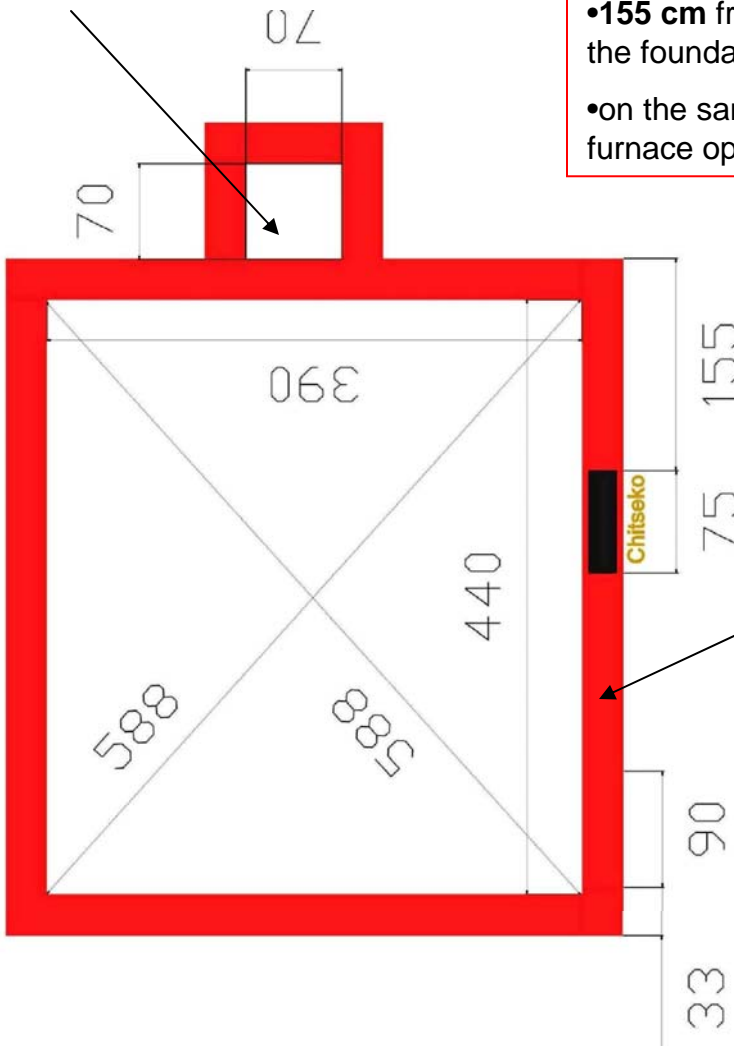
DESIGNED FOR FARMERS
WITH MAX FIREWOOD LENGTH
OF 125 CM by 30 CM

Brick Chimney foundation = **70 by 70 cm** internal dimensions. Centered on narrow side of barn

Door opening is :

- 75 cm wide
- 155 cm** from the edge of the foundation
- on the same wall as the furnace opening

STEP 1 FOUNDATION



Rocket Barn Foundation = **440cm by 390cm** Internal dimensions

Diagonal measurements = **588cm**

Furnace opening is 90 cm wide and set 33 cm from foundation edge



Foundation Top View

All dimensions are internal!

Note: If possible the foundation should be set on a flat ,well drained ground

STEP 2 FOUNDATION (2)

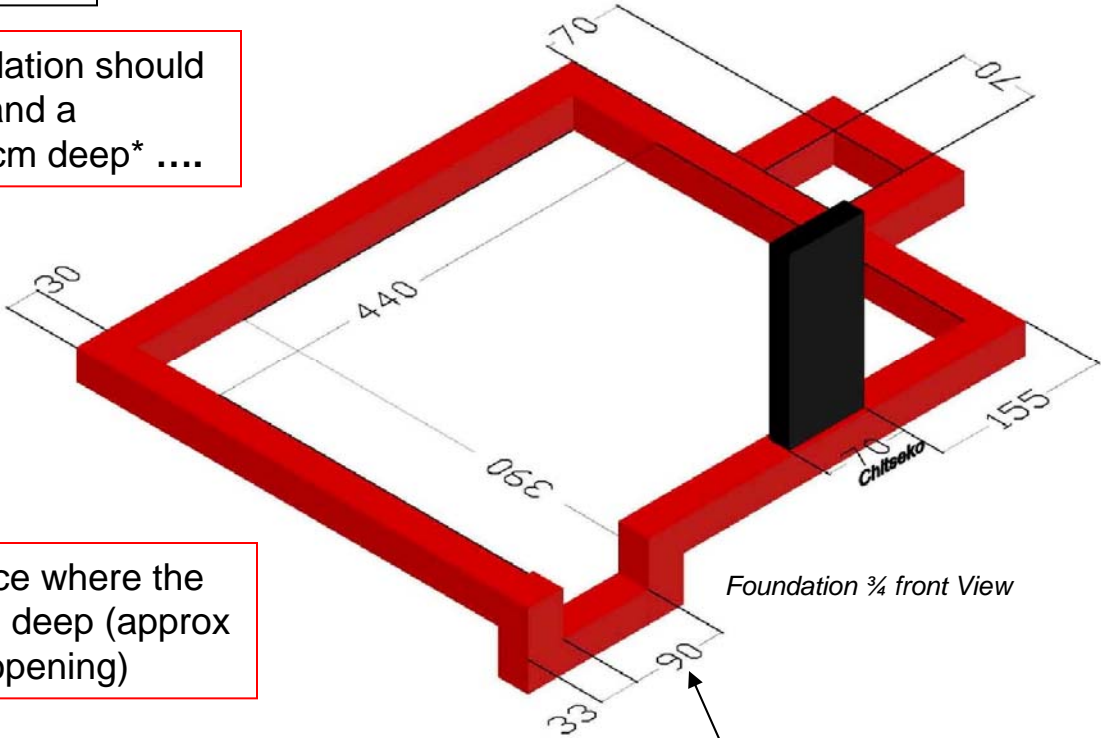
All dimensions are internal!



Excavation for Furnace Foundation

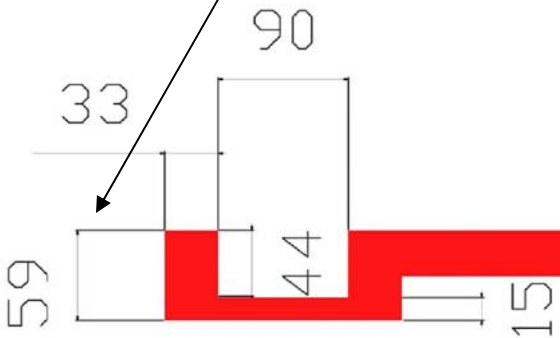
The entire foundation should be 30 cm wide and a minimum of 30 cm deep*

...except under the furnace where the foundation must be 59 cm deep (approx 2 courses under furnace opening)



Foundation 3/4 front View

The furnace opening begins 33 cm from the foundation edge and is 90 cm wide and 44 cm deep



Cross-sectional furnace_door side view



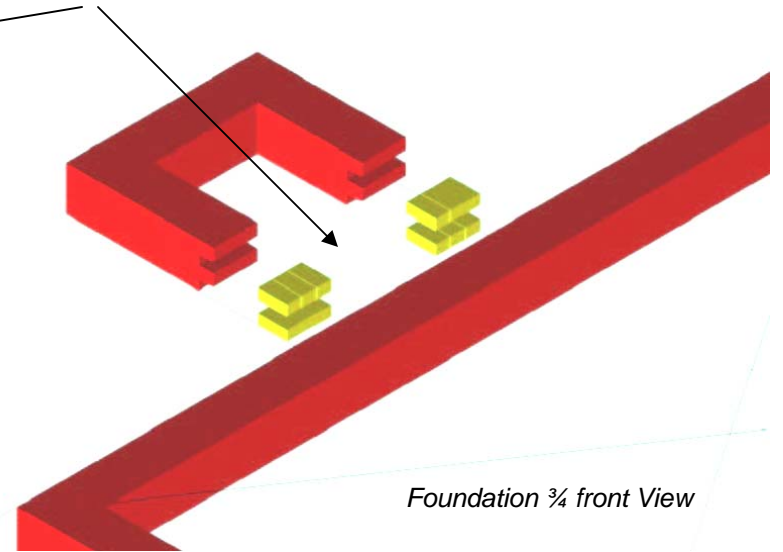
Furnace Foundation

*The foundation depth will vary depending on the slope of ground but it must be at least 30 cm deep

STEP 3 FOUNDATION (3)



interlock the chimney foundation into the wall foundation!

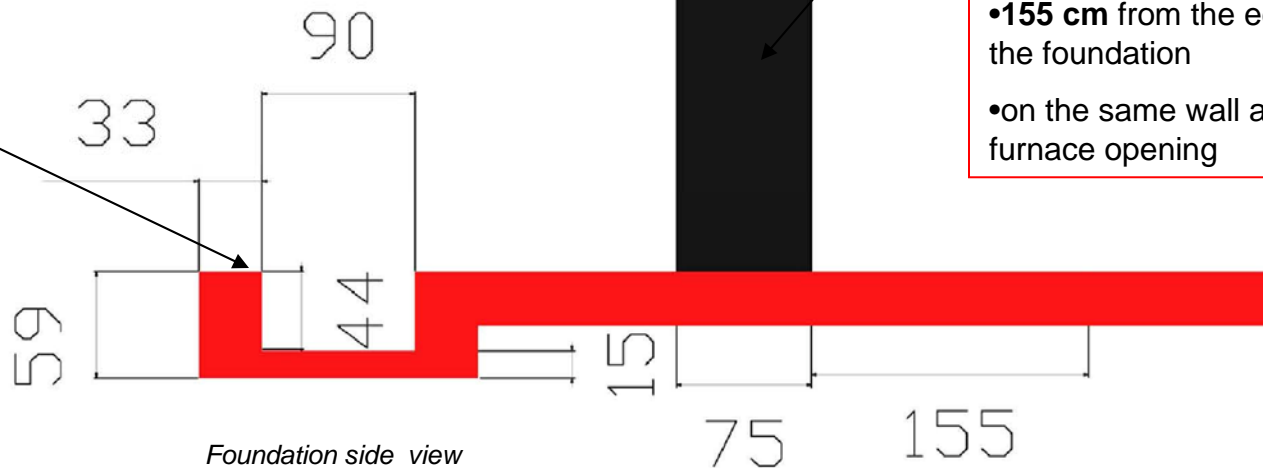


The internal dimensions chimney foundation are 70 cm by 70 cm

Door opening is :

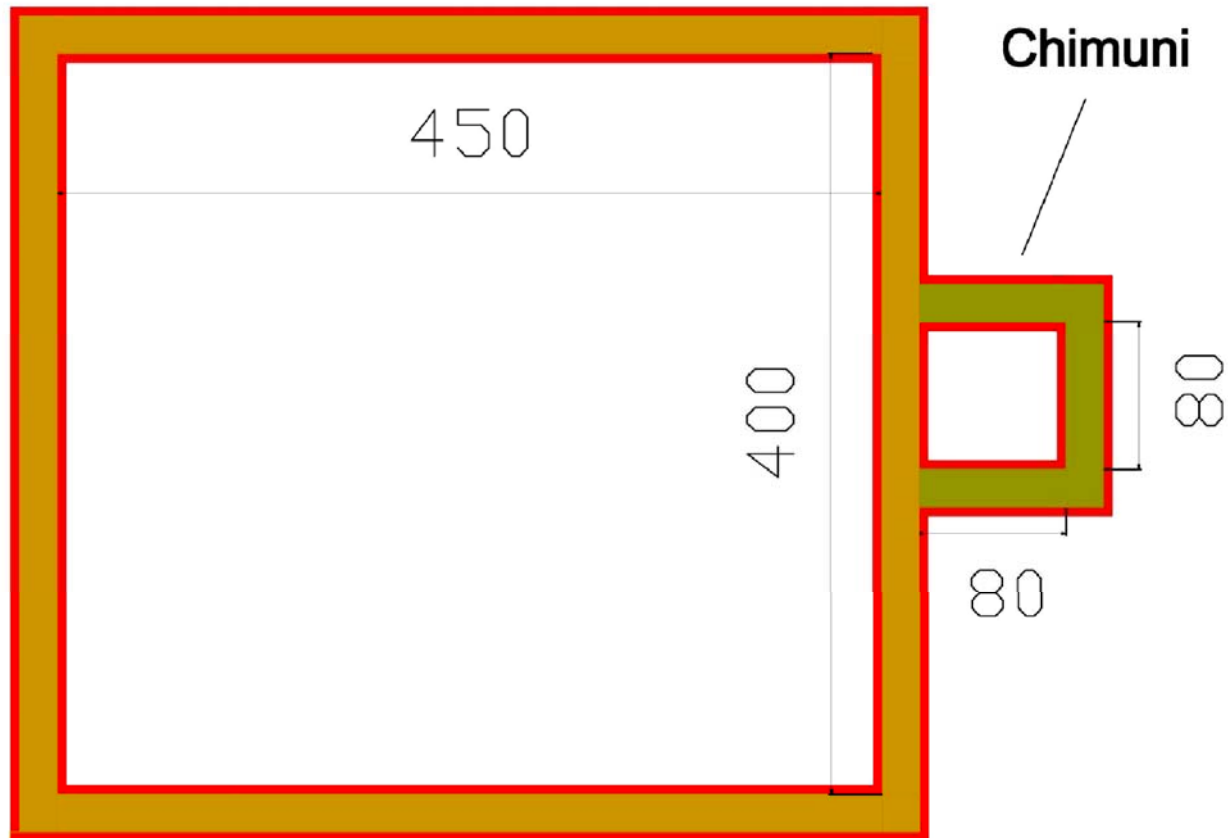
- 75 cm wide
- 155 cm from the edge of the foundation
- on the same wall as the furnace opening

The furnace opening begins 33 cm from the foundation edge and is 90 cm wide and 44 cm deep



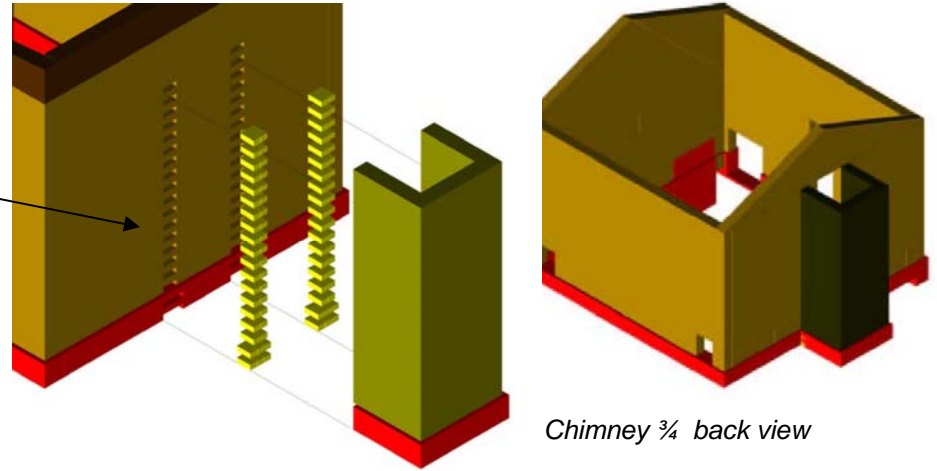
STEP 4 WALLS AND CHIMNEY

Dzipupa pamodzi ndi chumuni kudzionera kuchokera pamwamba.

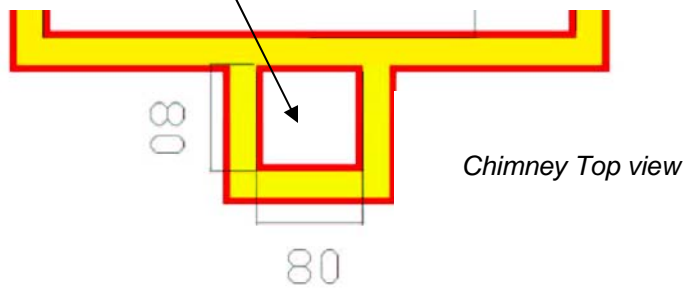


STEP 5 WALLS AND CHIMNEY

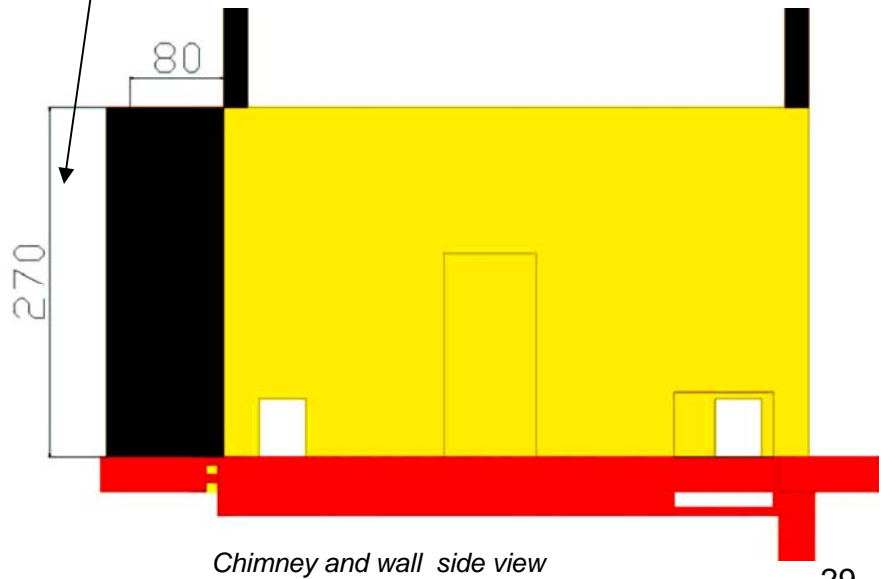
For strength interlock the barn and chimney walls



Chimney **wall** internal dimensions = 80 cm by 80 cm



Chimney wall height = 270 cm

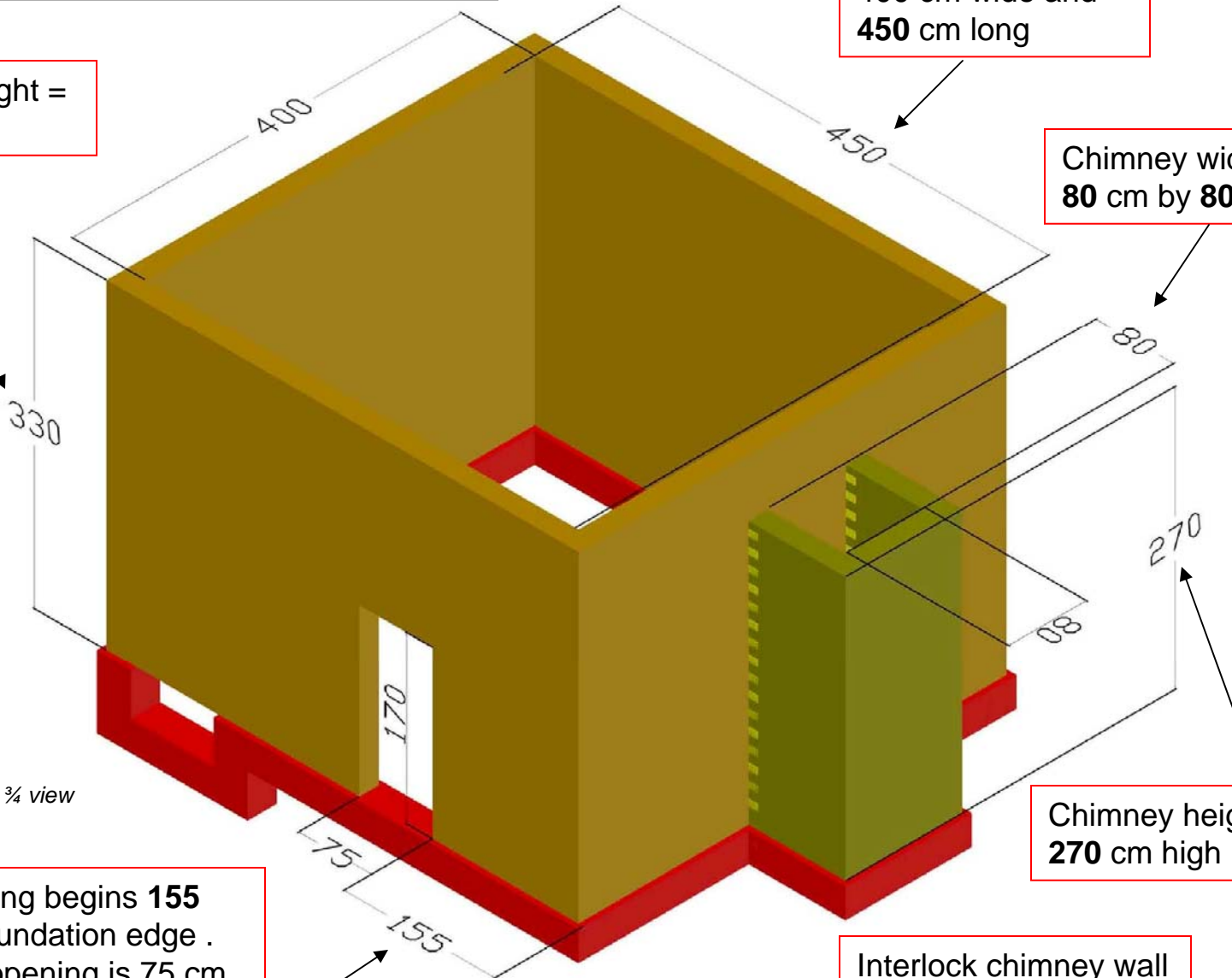


STEP 5 WALLS AND CHIMNEY

Note wall height = **330 cm**

Wall dimensions
400 cm wide and
450 cm long

Chimney width =
80 cm by 80 cm



Wall and chimney $\frac{3}{4}$ view

Door opening begins **155**
cm from foundation edge .
The Door opening is 75 cm
wide by 175 cm high

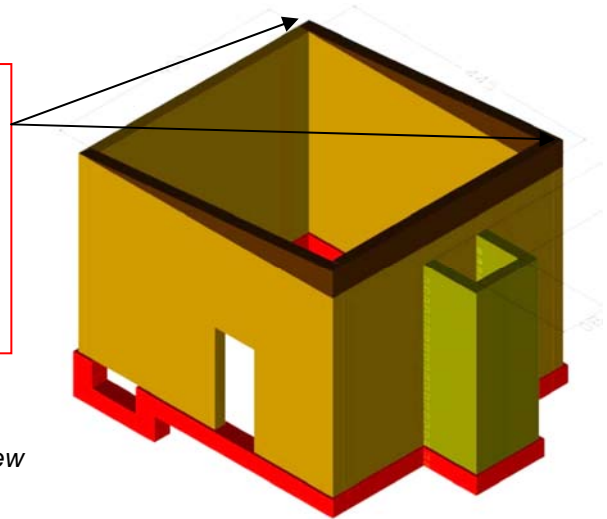
Chimney height =
270 cm high

Interlock chimney wall
to the barn wall

STEP 33 WALL SLOPE



2. Construct the barn walls so that the furnace side is 330 cm high and the chimney side is 375 cm high.



Walls ¾ back view

Dzipupa ndi chumuni kudzionera mbali



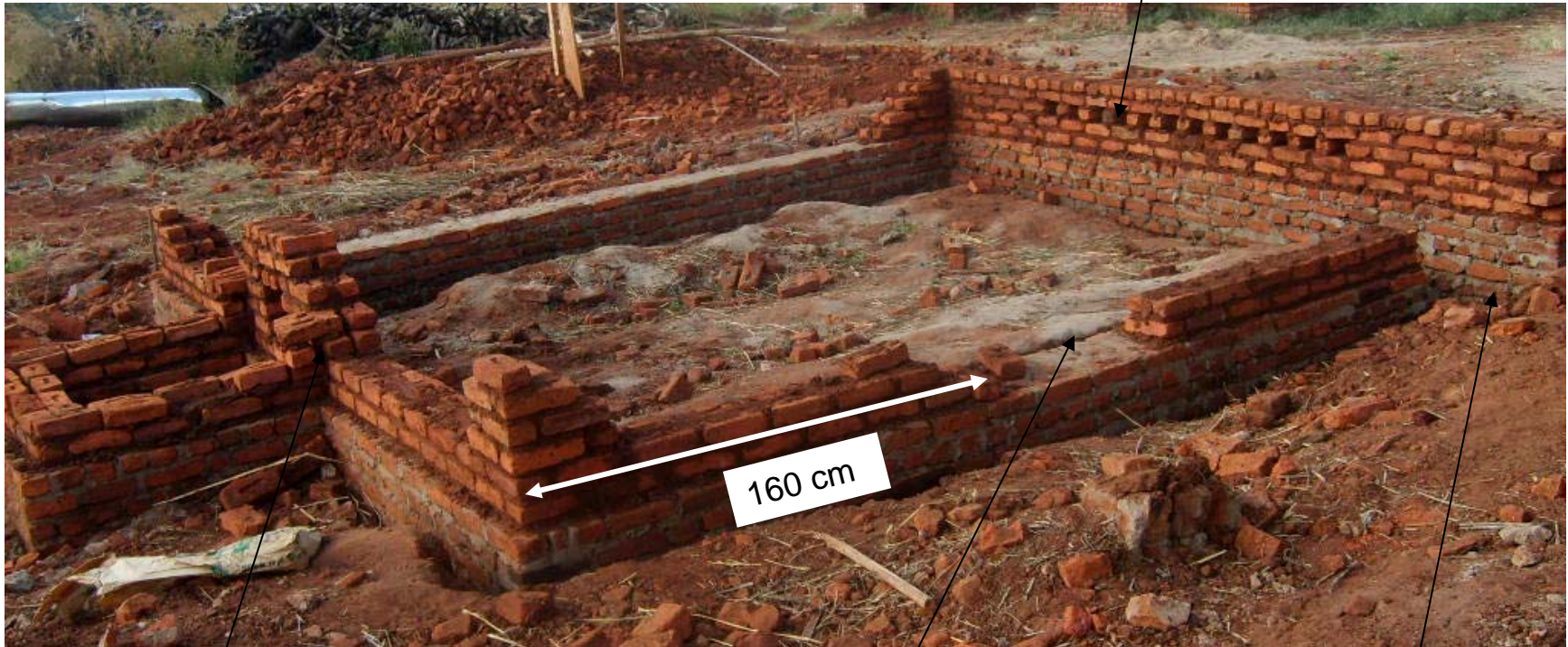
Walls side view



Walls side view

STEP 6 WALLS INITIAL

1. Air vent begins 2 courses above foundation . Number of openings (8,10,12) will depend on size of bricks used



1. Chimney. Note that the chimney interlocks into the barn wall

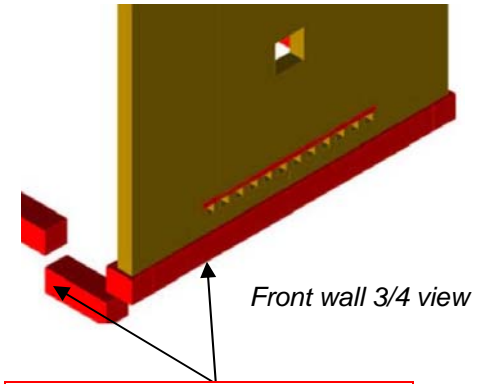
1. Door opening : 160 cm from rear wall corner

1. Furnace opening on same side as door

STEP 6A FRONT AIR VENTS



1. Mark the center point of the front wall, above the foundation. With 20 cm thick walls, the center point will be 220 cm from the outside corner wall



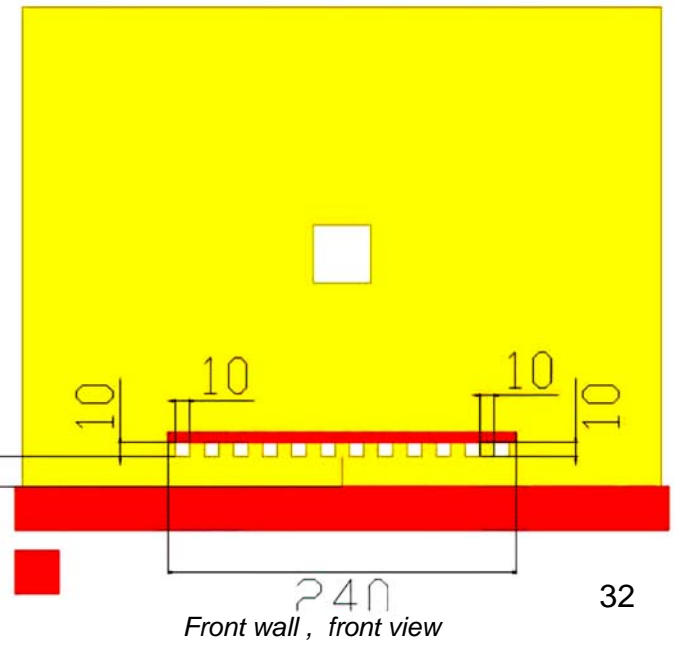
Note: the air vents are placed on the wall adjacent to the new furnace opening



2. Make six 10 cm by cm openings (at 10 cm intervals) to the right and the left of the centre point. This will make a total of 12 openings. See following page for spacing with non standard bricks



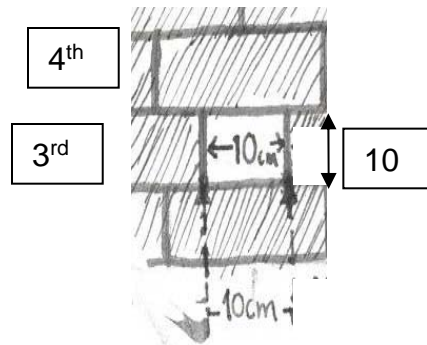
2 courses



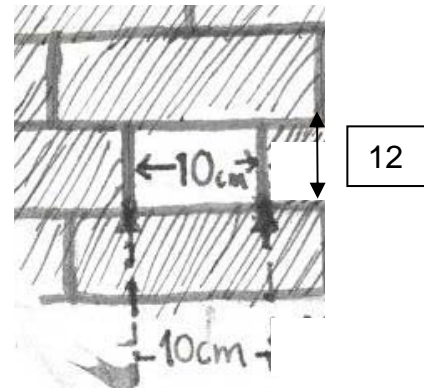
STEP 6B FRONT AIR VENTS (for non-standard brick sizes)

If non standard brick sizes are used then this will change the number and size of the air vents will change. The width of the opening will always be 10 cm

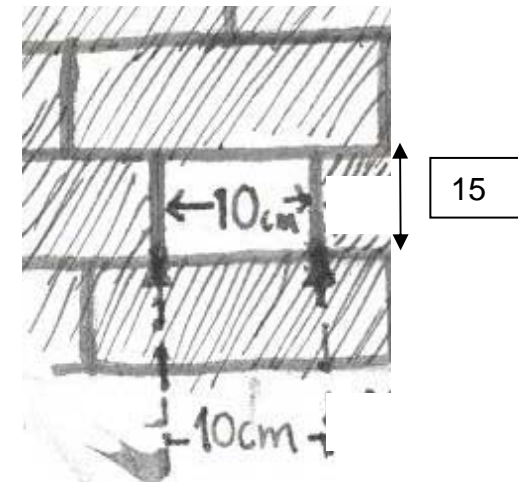
Be sure that each brick on the fourth course is properly supported by the two bricks on the 3rd course



If the height of the 3rd course is **10 cm** make a total of twelve air intakes (**12 * 10 cm** by 10 cm)



If the height of the 3rd course is **12 cm**, make a total of ten air intakes (**10 * 12 cm** by 10 cm)



If the height of the course is **15cm**, make a total of eight air intakes (**8 * 15cm** by 10 cm)

STEP 7 FIRE BOX OUTLET/ CHIMNEY INTERFACE

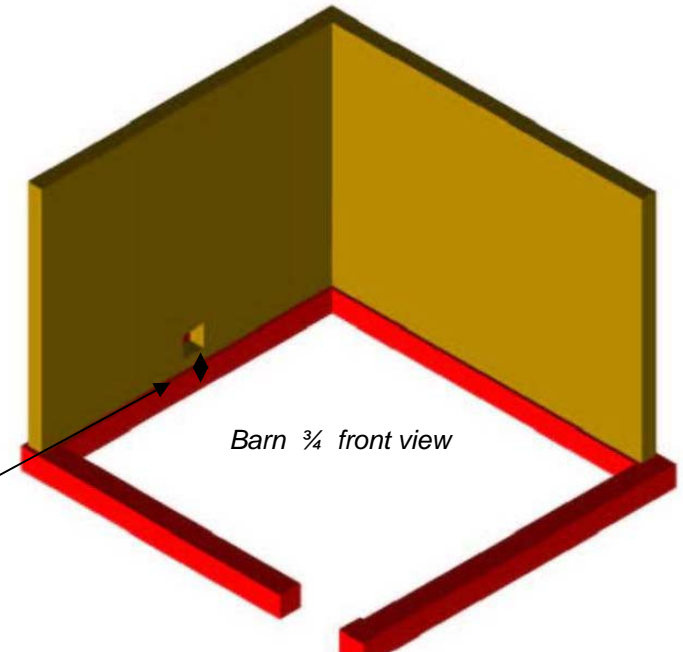


1. Find the **center point** of the inside back wall (200 cm)

2. From the centre point measure **8 cm** (a minimum of 1 course) up from the foundation.



3. Centered above the 8 cm mark, cut a **30 by 30 cm** opening into the back wall



center point
Back wall front view

STEP 8 BARN OUTLET / CHIMNEY INTERFACE



1. Make a mark 120 cm up from the foundation centre point on the inside of the back wall

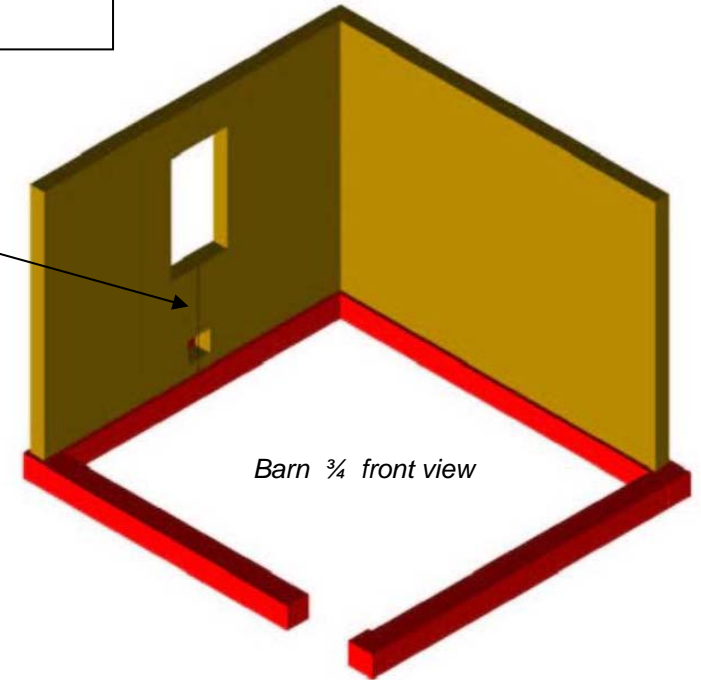


2. From this centre point measure 80 cm wide and 150 cm high

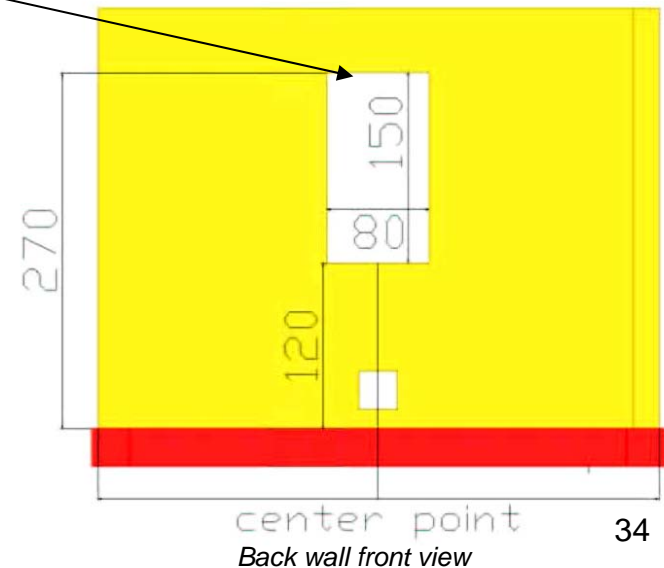


3. The new opening is flush with the inner walls of the chimney

4. To make the lintel for the outlet use timber treated with used motor oil to prevent termite infestation



Barn ¾ front view



center point
Back wall front view

STEP 9 FRONT VIEW WINDOW



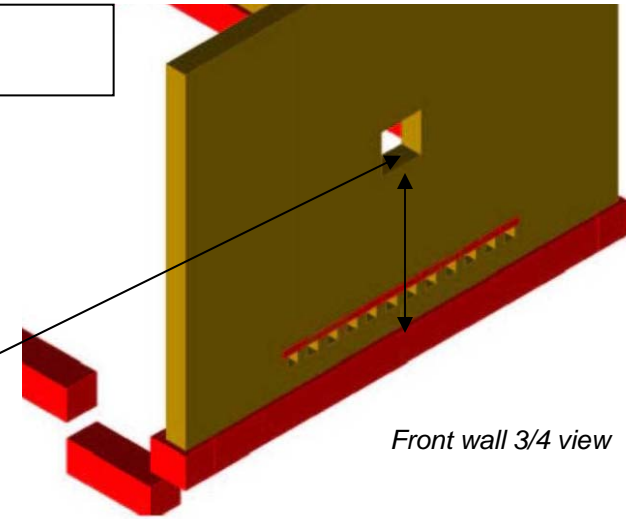
Instead of building the wall *and then* cutting hole, better to build window *as you* build the wall



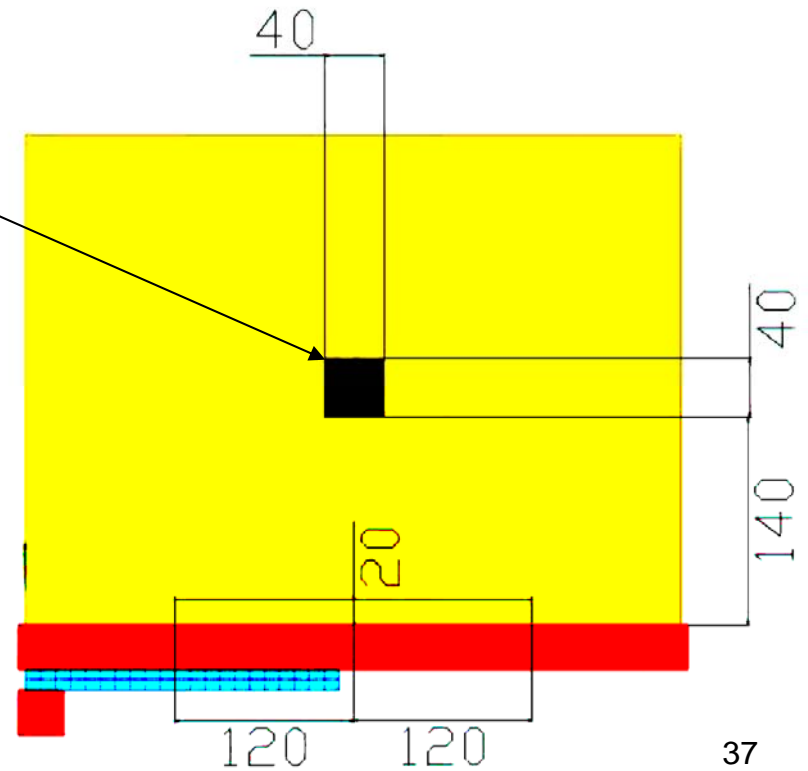
1. Mark the center point of the front wall, **140 cm** above the foundation



2. Centered above the 140 cm mark, leave a **40 cm by 40 cm** opening into the front wall



Front wall 3/4 view



STEP 10 REAR VIEW WINDOW

The rear view window should be placed on the rear wall near the corner that is farthest from the barn door.



1. Mark **140 cm** above the foundation and **50 cm** out from the chimney



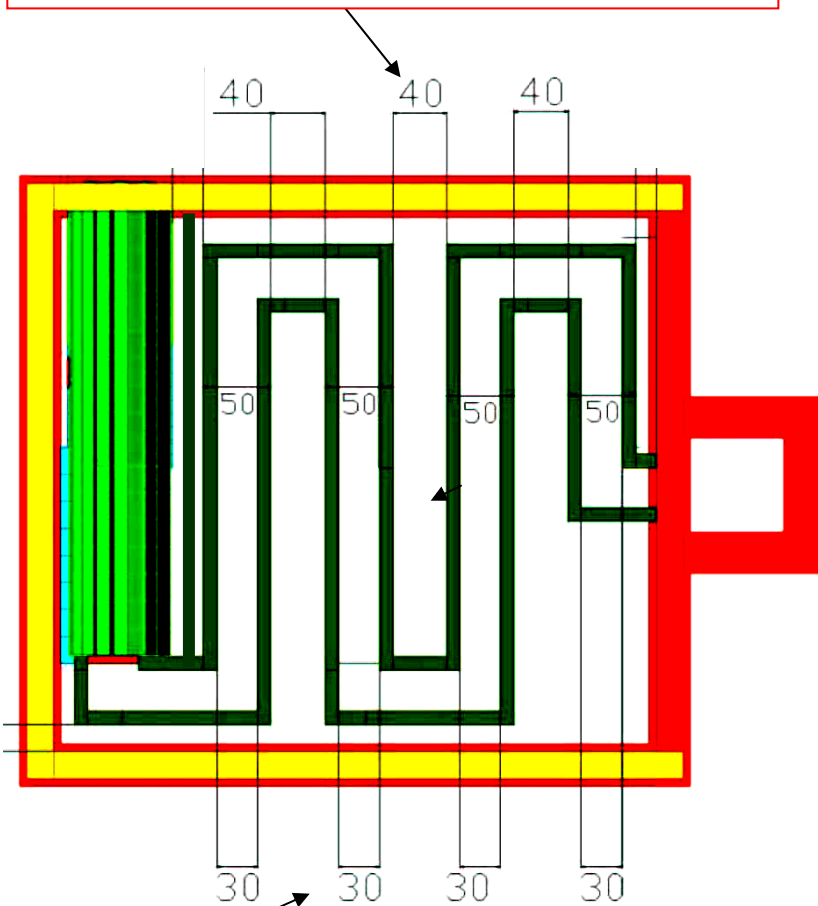
2. From this point, make a **40cm by 40cm** opening



3. After cutting the opening install the view window



1. The openings between the fireboxes are **40 cm*** wide (assuming standardized bricks).
With larger bricks, the 40 cm opening will be reduced.

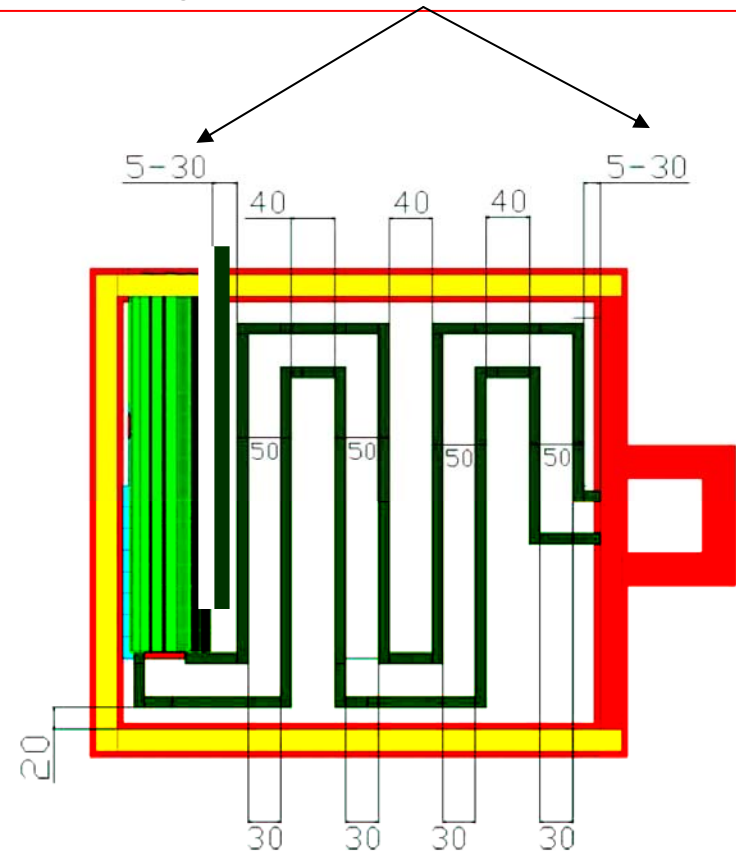


2. The openings **inside** each firebox is **30 cm** wide. **This can not change.**

3. Assuming that 10 cm wide bricks are used then the total firebox width will be **50 cm** (30cm + 10cm + 10cm)

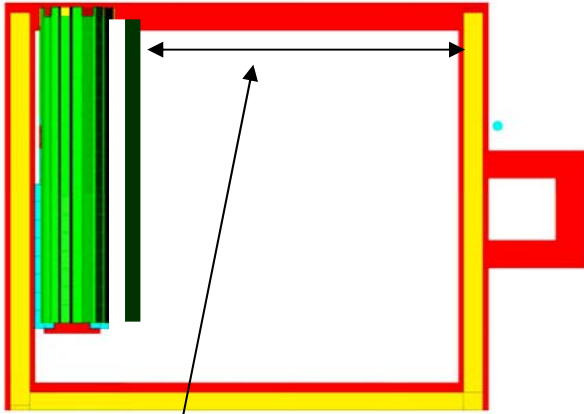
STEP 11 FIREBOXES (1)

- Keep the distance between the firebox and protector wall and firebox and rear wall equal.
See next page to calculate ...



Fireboxes top view

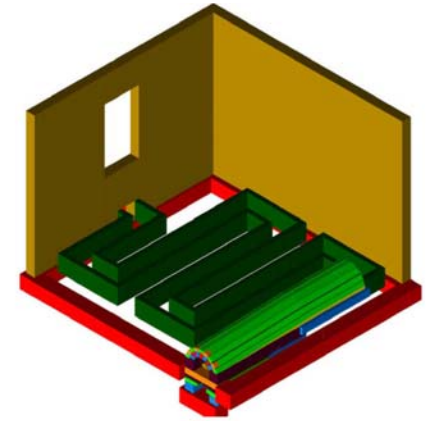
Furnace/walls top view



STEP 12 FIREBOXES (2)

if the measurement from step 1 is **344 cm**..
 -200 (for fireboxes)
 -120 (for openings between fireboxes)
 = 24.
 Divide by 2 = 12 cm
 Gap from firebox edge = **12 cm**

Fireboxes 3/4 view



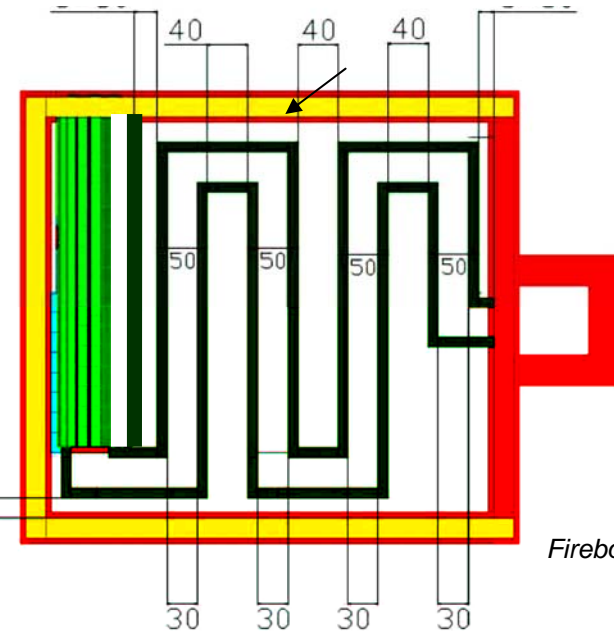
1. The distance from the rear wall to the furnace protector wall should be **344 cm**

2. From that distance subtract **200 cm** for the 4 fireboxes which are each 50 cm wide

3. subtract **120cm** for the openings **between** the fireboxes. There are 3 openings each of which are 40 cm wide* (see step 1 page 39)

4. Take the remaining distance and divide by 2. This will give you the correct distance from the furnace protector wall to the first firebox **and** the distance from the back wall to the last fire box

12 cm

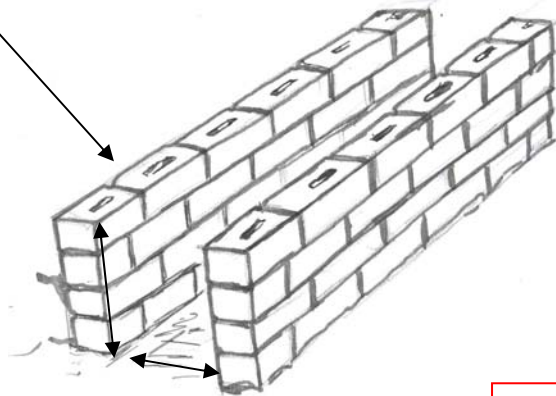


Fireboxes top view

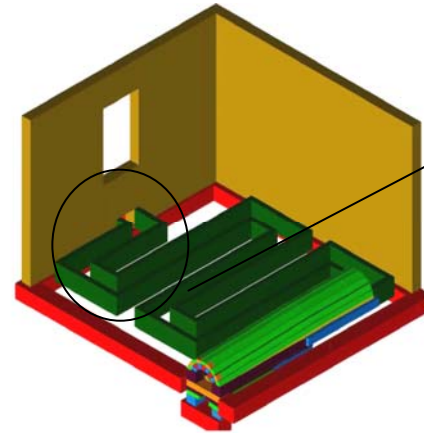
Space between firebox edge and side wall = **20 cm**

STEP 13 MARKING THE FIREBOXES

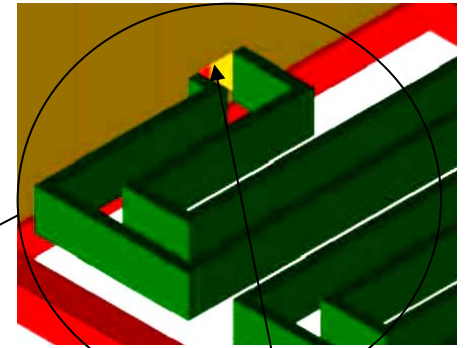
1. Build the fireboxes **30 cm** wide and **38 cm** above the foundation



Fireboxes 3/4 view

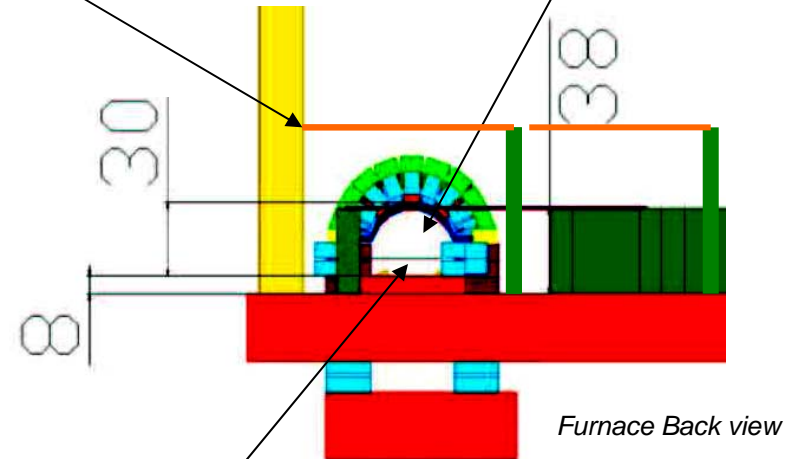
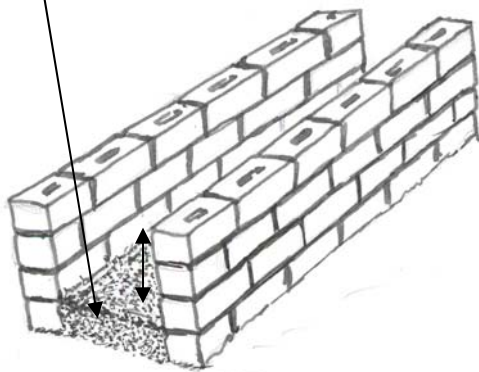


Furnace protector cover must be 10 cm above the furnace



The height of both the firebox outlet and furnace outlet is **30 cm**.

2. After constructing the fireboxes, fill the bottom with **8 cm** of loose dry dirt, thus reducing the firebox internal dimension to **30 cm high** by **30 cm wide**



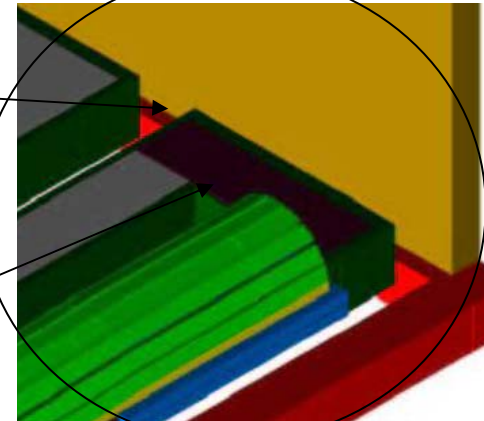
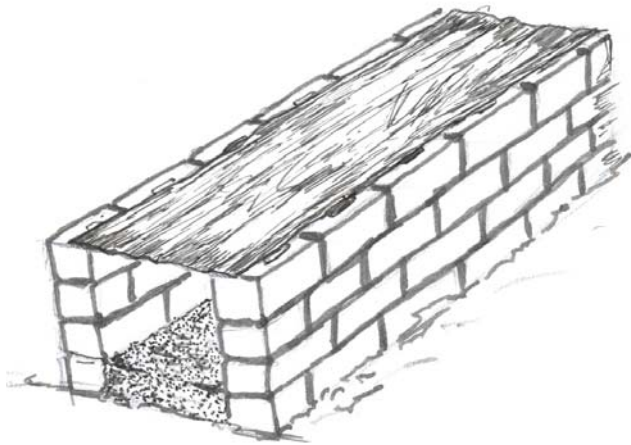
The bottom of the furnace outlet will be **8 cm** above the foundation

1. After filling the fireboxes with 8 cm of loose dry dirt, cover them with the metal flat sheet

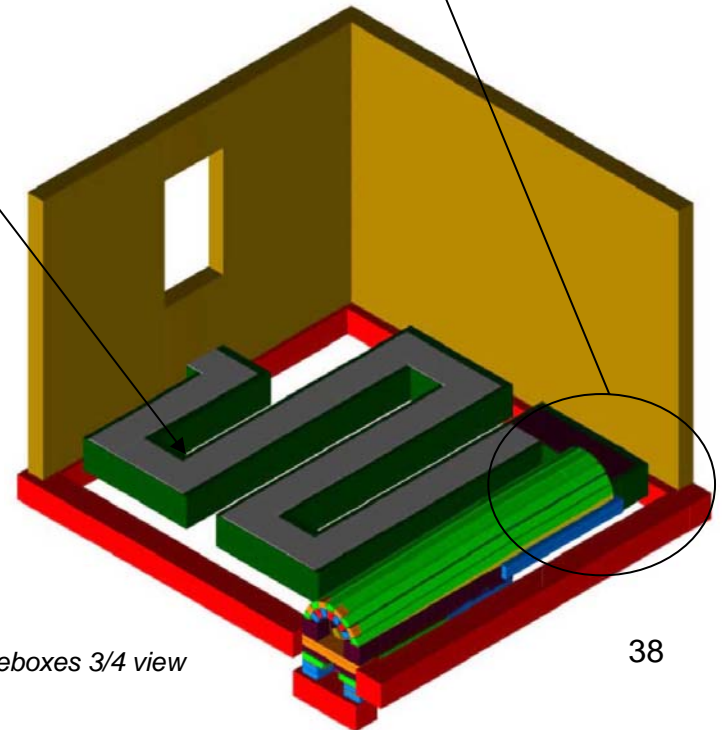
STEP 14A METAL FLAT SHEET

Note: Two types of metal flat sheet are required for covering the fireboxes - 24 and 28 gauge

2. Near the furnace outlet use 24 gauge mild steel sheet (purple)



2. For the rest of the fireboxes use a minimum of 28 gauge (grey). Take five 180 cm by 77 cm flat sheets and cut them in half lengthwise to make ten 38.5 cm by 180 cm sections

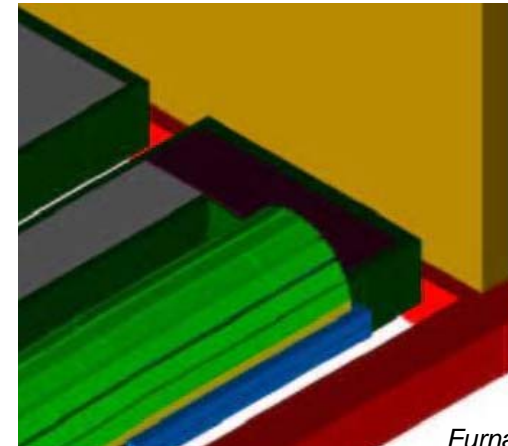


Fireboxes 3/4 view

STEP 14B METAL FLAT SHEET



Note: the heavy gauge sheet is cut so as to fit tightly against the furnace exit



Furnace Back view

1. The first sheet is placed under the thinner metal. This underlap is continued to the end of the fireboxes: the sheet closer to the furnace is placed **under** the sheet that is farther from the furnace

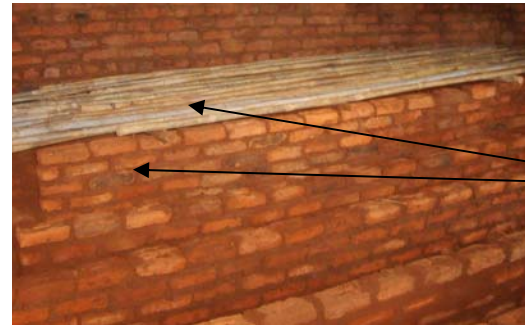
2. Where the metal sheet meets the furnace - reinforce with bricks **and** matope, not just matope. **This is the most vulnerable point in the barn!**



STEP 15 FURNACE PROTECTOR AND SUPPORTING WALL



1. Construct the furnace protector supporting wall 5 cm from the edge of the furnace



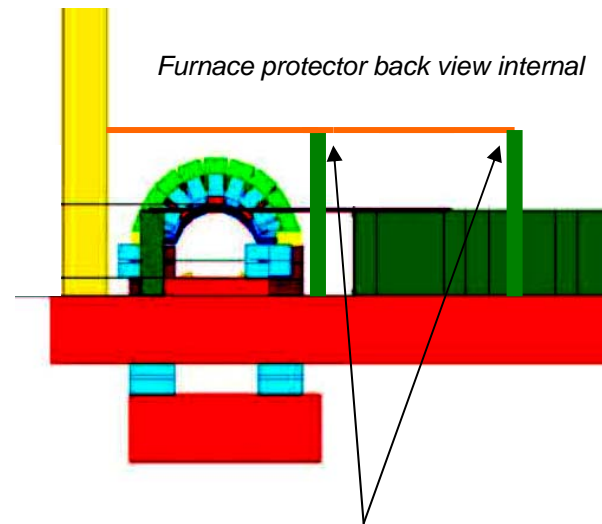
2. The wall and the protector must be **10 cm higher** than the top of the furnace



3. Use bamboo or thin tier poles for the furnace protector. Space poles so that air will pass through but tobacco will not.



The furnace protector must extend so as to cover as much of the heavy gauge sheet metal firebox as possible!



New: In order to further reduce fire hazard, an additional wall and fire box protector (removable) should be added here

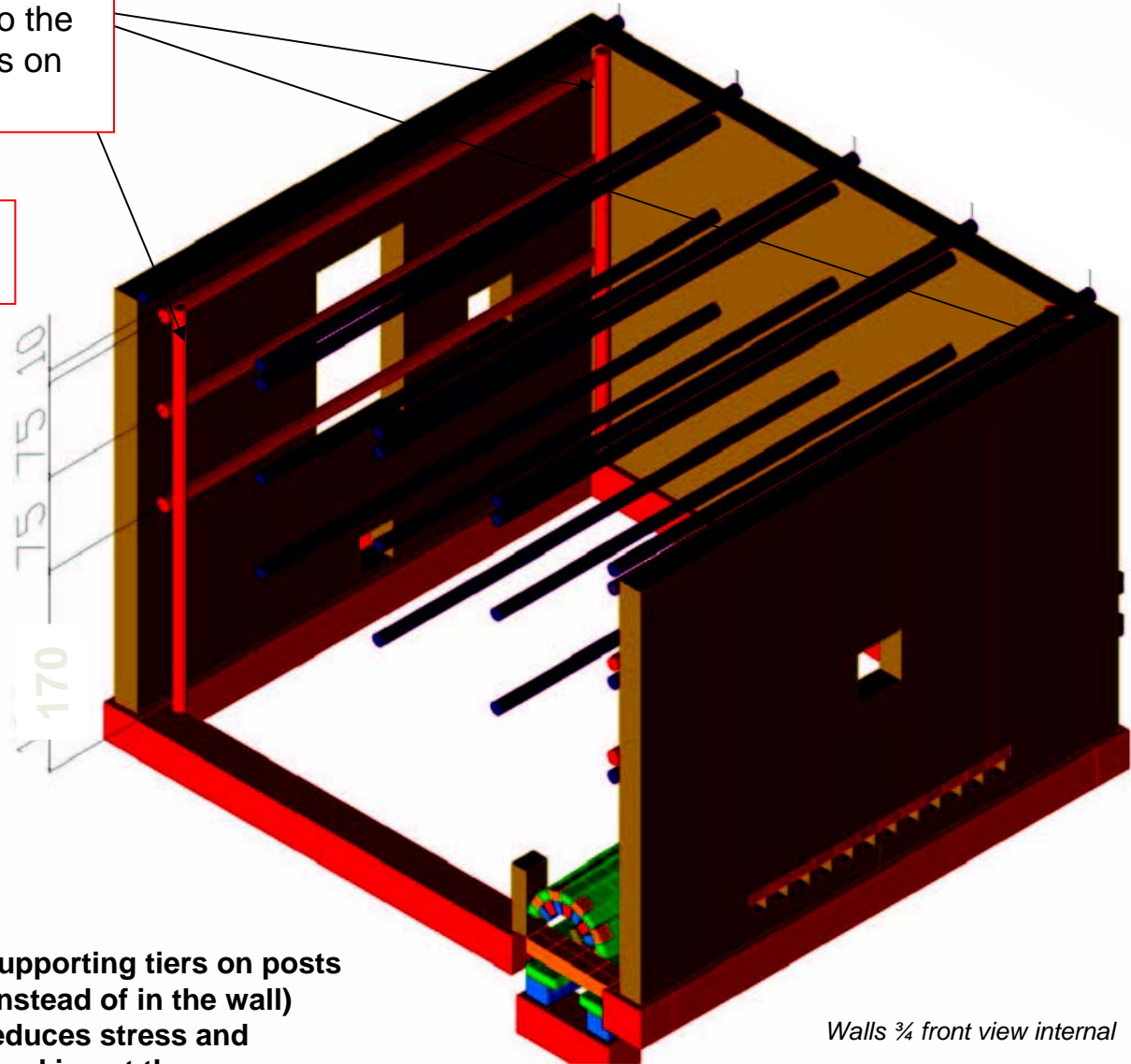
STEP 16 TIER POLES

Note: the **red** tiers at the **back** of the barn are supported on **posts**. These 3 tiers do not enter into the barn wall. This reduces stress on the corner walls

1. Place the first set of tiers **170 cm** above the foundation

2. Then place the second set of tiers **75 cm** above the first

3. Then place the third set of tiers **75 cm** above the second. This should create a **10 cm** gap between the third tier pole and the ceiling

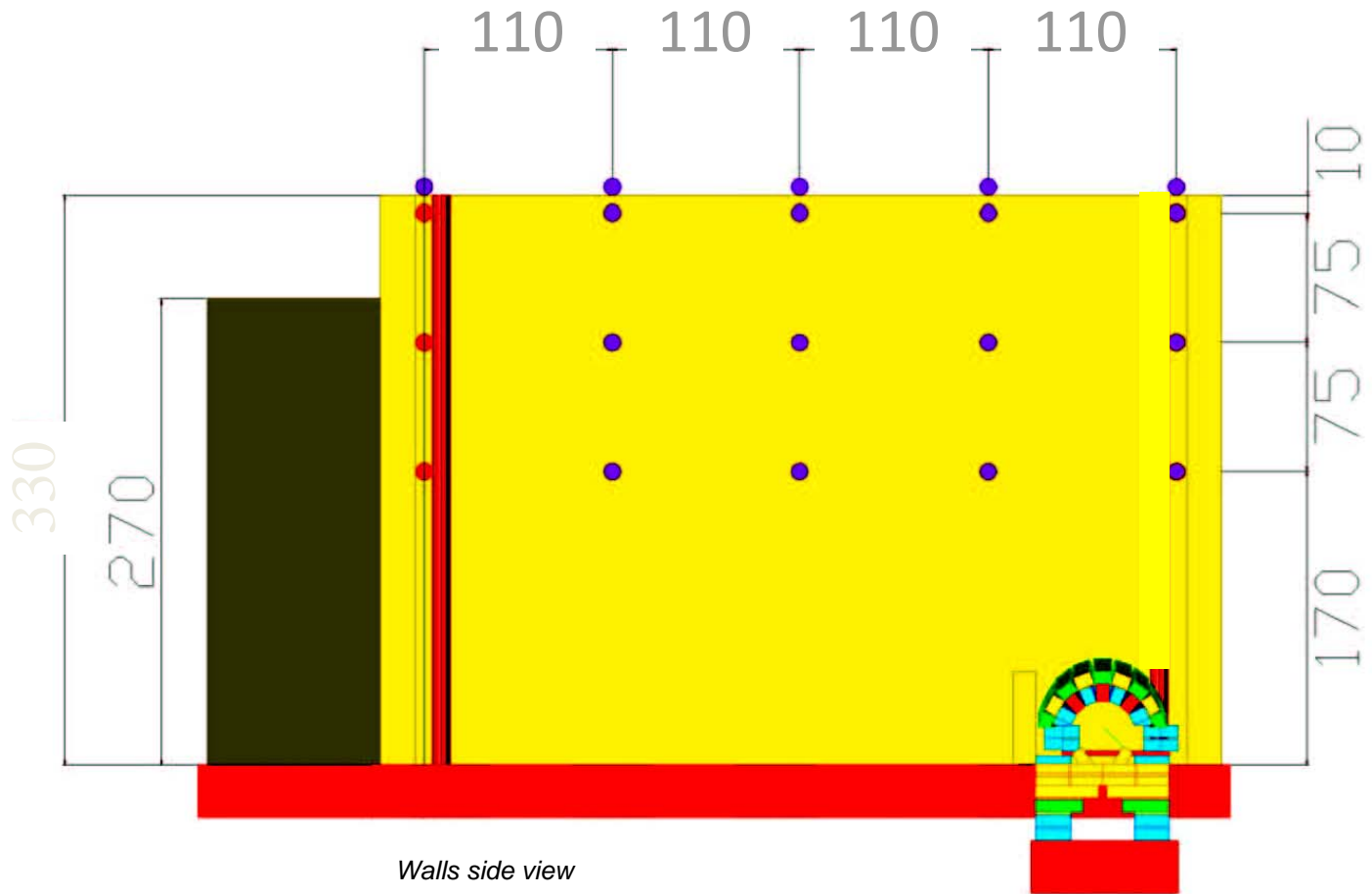


Supporting tiers on posts (instead of in the wall) reduces stress and cracking at the corners

Walls ¾ front view internal

STEP 17 HORIZONTAL TIER SPACING

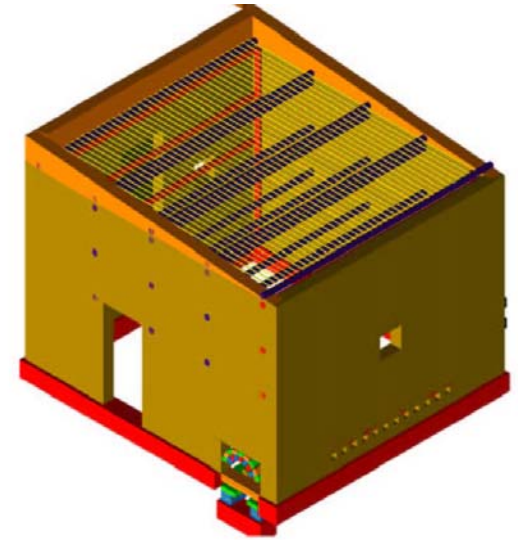
Horizontal tier spacing is 110 cm (on center).



STEP 35 CEILING



1. The ceiling tier poles are placed on top of the 330 cm high wall. Bamboos (or thin tier poles/ branches) are then laid on top of the bamboo



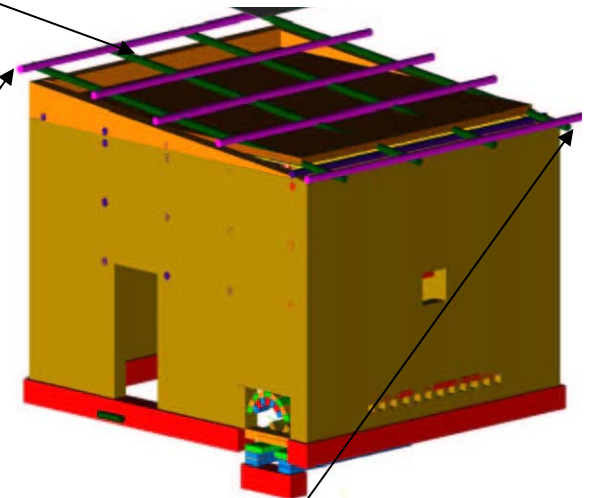
STEP 36 ROOF JOISTS



The first course of joists requires 4 poles (green) laid lengthwise

The second course of joists are laid perpendicular to the first course and require 5 poles (purple)

There should be an approximate 40 cm overhang around all 4 walls to support the iron sheeting



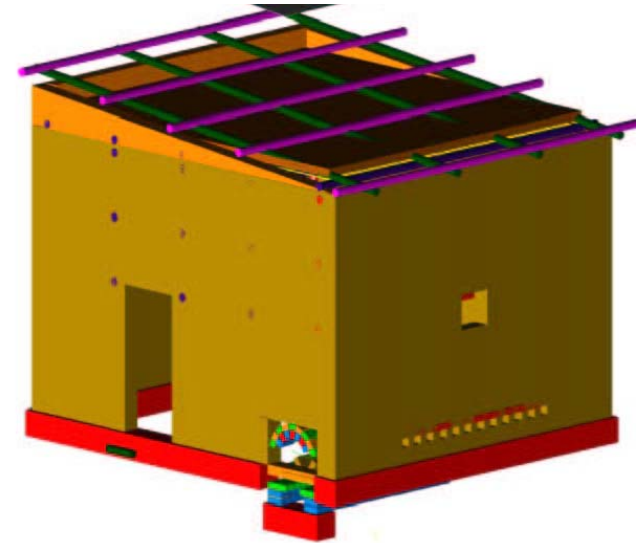
STEP 37 INSULATING WITH GRASS



1. Pack grass 15 cm thick (approx 40 bundles) between the roof joists and the bamboo. No plastic or cardboard is needed.



2. Tightly pack grass (15 cm thick) on top of the bamboo. Seal all gaps to prevent air or light leaks

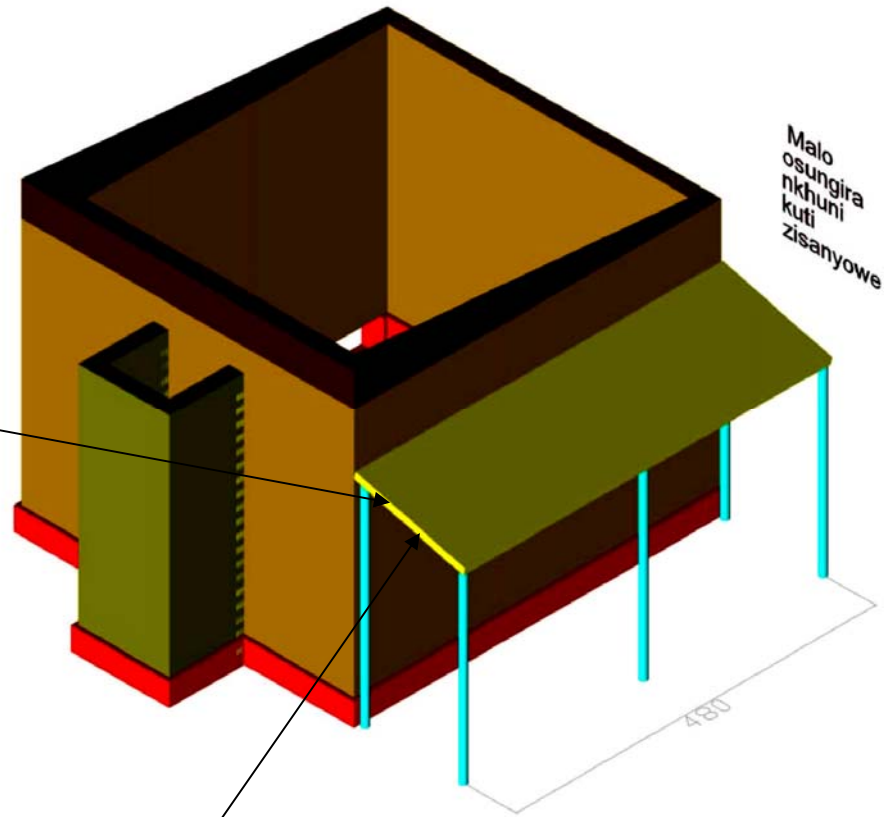
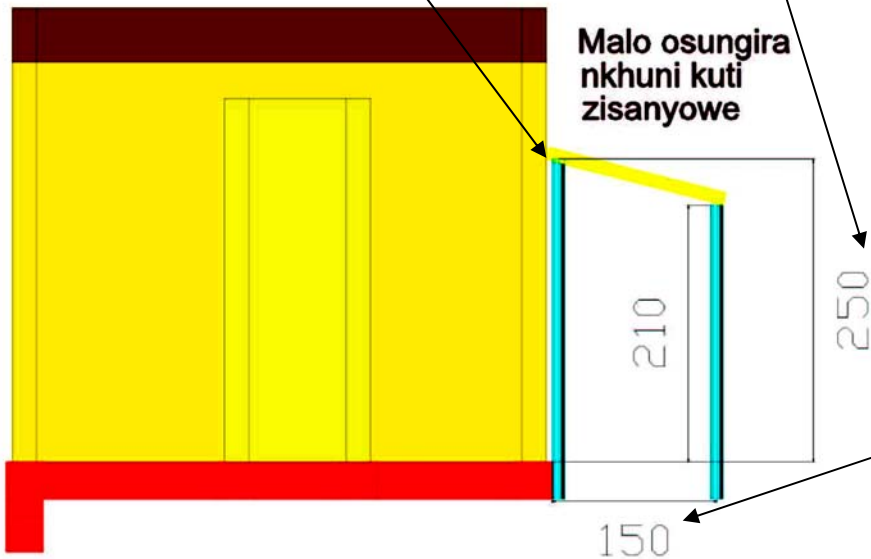


STEP 39 WOOD SHELTER

Wood preparation: To decrease wood consumption, cut and split wood at the beginning of the dry season and then store the wood, covered, just before the first rains

1. Take the 6 poles and bury them so that the back 3 poles are against the wall and **250 cm** high and the front 3 poles are 150 cm away from the wall and **210 cm** high

For increased strength, the top of the posts should be connected to the second set of tier poles that protrude from the barn wall



2. Use grass (or scrap metal if desired) to cover the shelter

This shelter will provide enough shelter for approximately 10 cubic meters of wood. If more shelter is required then the width can be extended from 150 cm to **300 cm** to cover 2 stacks of wood