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

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DESIGNED FOR FARMERS WITH MAX FIREWOOD LENGTH OF 125 CM by 30 CM
**STEP 1 FOUNDATION**

**Foundation Top View**

All dimensions are internal!

**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

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

Diagonal measurements = 588 cm

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

*Note: If possible the foundation should be set on a flat, well drained ground*
STEP 2 FOUNDATION (2)

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)

All dimensions are internal!

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

*The foundation depth will vary depending on the slope of ground but it must be at least 30 cm deep
STEP 3 FOUNDATION (3)

The internal dimensions chimney foundation are 70 cm by 70 cm

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

Door opening is:
• 75 cm wide
• 155 cm from the edge of the foundation
  • on the same wall as the furnace opening

interlock the chimney foundation into the wall foundation!
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
Note wall height = 330 cm

Wall dimensions 400 cm wide and 450 cm long

Chimney width = 80 cm by 80 cm

Chimney height = 270 cm high

Interlock chimney wall to the barn wall

Door opening begins 155 cm from foundation edge. The Door opening is 75 cm wide by 175 cm high
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.
STEP 6 WALLS INITIAL

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

1. Door opening: 160 cm from rear wall corner

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

1. Furnace opening on same side as door
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.

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.

Note: the air vents are placed on the wall adjacent to the new furnace opening.
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 15 cm, make a total of eight air intakes (8 * 15 cm 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
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
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
STEP 10 REAR VIEW WINDOW

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

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

3. After cutting the opening install the view window

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

Keep the distance between the firebox and protector wall and firebox and rear wall equal. See next page to calculate …
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 **120 cm** 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

   *if the measurement from step 1 is **344 cm**:
   - Subtract **200 cm** (for fireboxes)
   - Subtract **120 cm** (for openings between fireboxes)
   - Remaining distance = **24 cm**.
   - Divide by 2 = **12 cm**

   **Gap from firebox edge = 12 cm**

   **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.

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

Furnace protector cover must be 10 cm above the furnace.

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.

**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.
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.
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.

**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.

Supporting tiers on posts (instead of in the wall) reduces stress and cracking at the corners.
Horizontal tier spacing is 110 cm (on center).
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.

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.
**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.