

1<sup>st</sup> Edition April 29, 2003

The 2<sup>nd</sup> edition should be published by May 30, 2003. Please make a note to download the second edition when it is ready. The first edition is imperfect. The second edition will be easier to use.

# The Rebar Foodspa Construction Manual



Prepared for

**Help For the Hungry**

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For further information, visit our website at

<http://helpforthehungry.org/> or <http://henspa.com/>

# Rebar Foodspa Instruction Manual

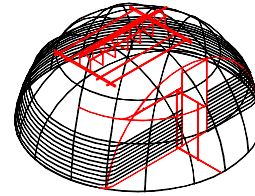
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## Understanding the Rebar Foodspa

The Rebar Foodspa is a flexible design. You can add more or less canopy, depending on the amount of severe weather it will be exposed to. If chicken wire is available, it can be used to replace a number of circular rebar rings and reduce the weight of the unit. This manual assumes a rebar pig wall, instead of a combination chicken wire rebar wall, although some of the photos show chicken wire in the pig wall.

The rebar foodspa consists of several components that are the focus of attention during the building process.

- Ground Stakes
- Ground, Middle and Upper Circles
- Parallel Arcs (3 sets of 2 arcs)
- Top Arcs (3 arcs that intersect on the top)
- Door Frame and Water Support
- Pig Wall
- Nest System
- Canopy (not pictured)



The following drawings allow you to identify most of these components.



Figure 1 - Ground Stakes

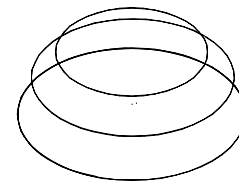


Figure 2 – Ground, Middle and Upper Circles

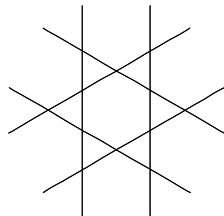


Figure 3 - Parallel Arcs (top view)

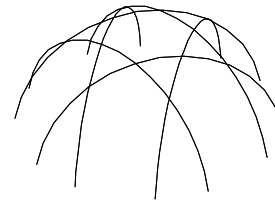


Figure 4 - Parallel Arcs (isometric view)



Figure 5 - Top Arcs

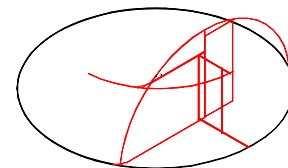


Figure 6 – Door Frame and Water Support

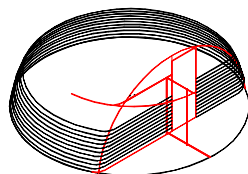


Figure 7 – Pig Wall Shown with the Door Frame



Figure 8 – Nest and Roost Pole System Suspended from Ceiling

## Understanding The Use of U-bolts

There are 2 sizes of u-bolts used. Stainless steel u-bolts are used for all ground contact. If there is no ground contact or exposure to weather, the zinc-coated u-bolts are used.

- 1/4" X 3/4" X 1 3/4" U-bolt (Small Short U-Bolts)
- 1/4" X 3/4" X 2 3/4" U-bolt (Small Long U-Bolts)

The following indicates the generic usage of each u-bolt size and type.

1/4" X 3/4" X 1 3/4" U-bolt



The Small Short U-Bolts are used to bind 2 pieces of rebar together. Remember to use stainless steel where the rebar is going to be exposed to the weather.

1/4" X 3/4" X 2 3/4" U-bolt



The Small Long U-Bolts are used to 3 pieces of rebar together.

## Tasks List For Constructing a Movable Dome

<b>Action Item</b>	<b>Estimated Time Required in Hours Two People Working Together</b>
Gather Required Tools	2.0
Purchase Needed Items	2.0
Select Site	.5
Precut Rebar	1.5
Layout the Ground Circle	.25
Construct the Tripod	.25
Construct The Ground Circle	.25
Assemble Parallel Arcs and Lifting Pedestal	1.5
Lift The Dome Using The Tripod	.5
Install the Middle Circle	.5
Install the Top Arcs	.5
Install the Upper Circle	.5
Install Water Support and Door Frame	1.0
Install Water System	1.5
Build/Install Nest	1.0
Install the Canopy	4.0
 <b>Total Time</b>	 <b>17.25</b>

### Gather Required Tools

Conduit Bender (optional – can be rented)	½” electric drill. (Battery powered is easiest to use.)
Hammer	Pliers
Power hacksaw (Optional– can be rented)	Magic Marker or Piece of Chalk
The use of a hand-powered hacksaw will increase time to build.)	Supplied in kit from Egganic Industries: 3 -7’ layout cables, wire tie tool.
7/16” deep socket and drive for ½” electric drill	

Two electric drills and socket sets are preferred so that two people can use a drill at the same time.

## Materials list

### Items Supplied By Egganic Industries

Visit <http://henspa.com/domes.htm> for pricing information.

75	Rebar Clips
50	Galvanized Connector Rings
2	Cable Clamp For Chain Fall Cable
3'	Yellow Rope for Utility Pulley
1	Tripod Fixture
3	7' Layout Cables
1	Vinyl Cover
3	¼ X 3 1/32" Carriage Bolts, nuts and washers
1	Wire Tie Tools
150	Galvanized Wire Ties
1	Utility Pulley
1 50' roll	Duct Tape
	<b>U-bolts</b>
46	1/4" X 3/4" X 1 3/4" Zinc U-bolt Assembly
6	1/4" X 3/4" 2 3/4" Zinc U-bolt Assembly

### Items to be purchased locally

3	5/8" Rebar – 20' Length
36	3/8" Rebar – 20' Length
3	2 X 4 X 8 (yellow pine preferred)
1 50' roll	Duct Tape

### Select Site

Site selection should take into account future moves of the dome. Although the dome can be moved without getting off your front-end loader tractor, since it is 28' wide, it may not pass along certain roadways or between permanently installed fence gates.

### Precut Rebar

You will need the following length of rebar. It is most efficient to cut them prior to beginning construction of the dome.

Quantity	Length	Description
7	18"	Ground Stakes
6	53"	Horizontal Lifting Bars
3	36"	Top Arc Extenders
5	78"	Roost Poles
2	74"	3/8" rebar for nest

The precut rebar will be cut from 5 - 20' lengths of rebar.

### Layout the Ground Circle

Having selected the site, drive a ground stake in the ground at the center of the dome. Since the dome is easily moved, it is best to build it on ground that is as level as possible. (Drive all stakes approximately 10 inches into the ground, leaving 8" exposed.)

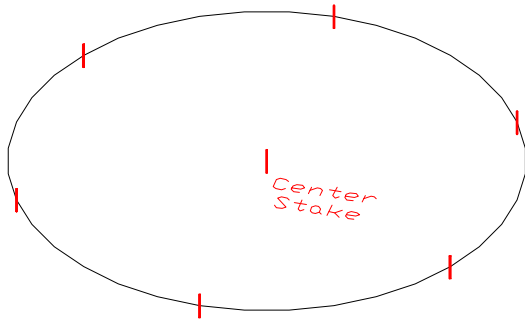


Figure 9 - Diagram of Completed Ground Circle with Ground Stakes



Figure 10 - 3 Layout cables locate ground stakes

The stake on the right is the center stake. Using the 3 layout cables provided to determine the correct distances, install the stake in the center of the doorway and the stake immediately to the left of that stake. Place the loops on the ends of the cables over the stakes and make the cables taunt.

Continue installing the ground stakes, moving the layout cables in the pattern indicated below.

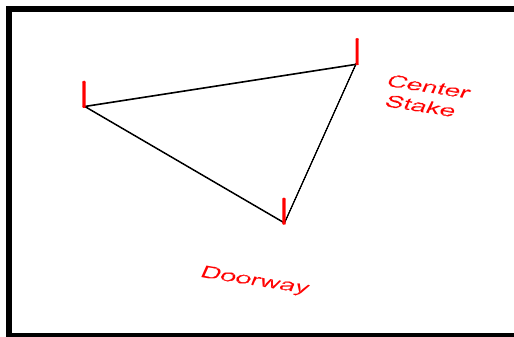


Figure 11 - Door Layout

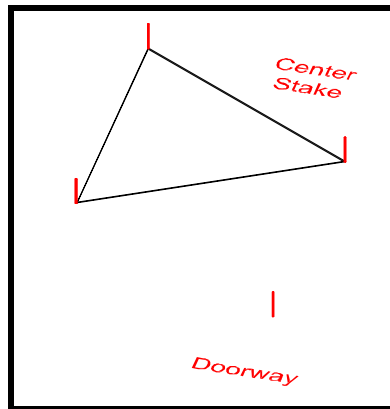


Figure 12 - 2nd Section

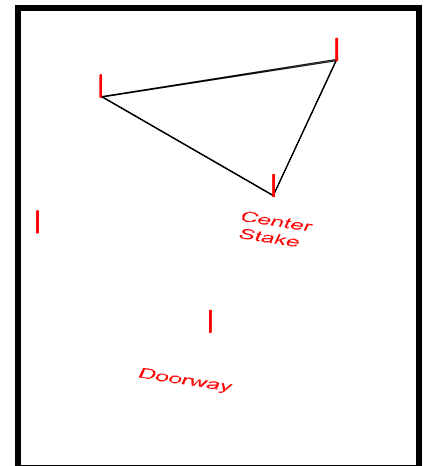


Figure 13 - 3rd Section

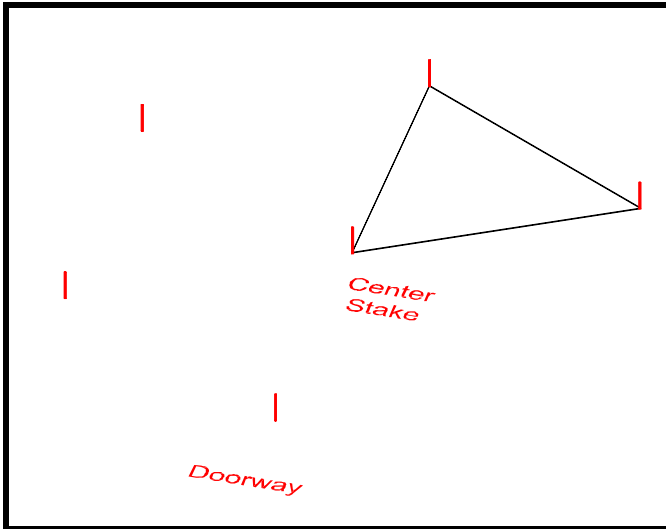


Figure 14 - 4th Section

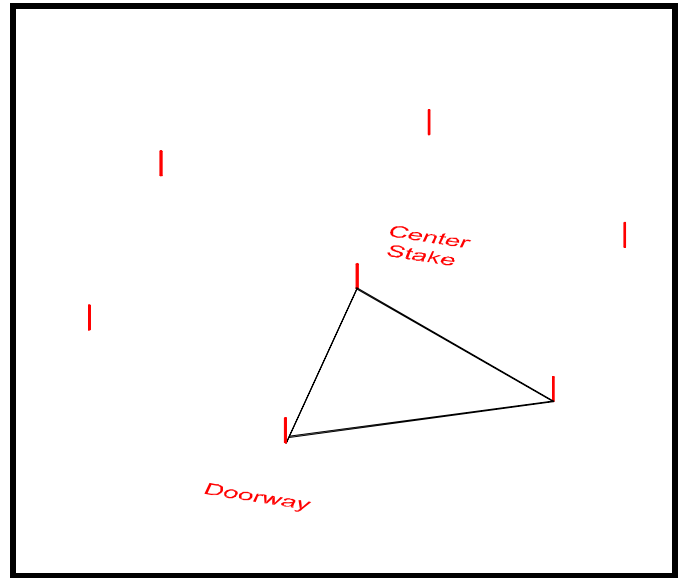


Figure 15 - 5th Section

The 6 ground stakes define the ground circle and locate the 3 top arc members.

The center stake will also be used to locate the center of the lifting tripod.

## Create the Ground Circle

### Ground Circle Connections.

Lay the rebar on the ground so that the ends overlap 13”.

Secure them with 2 Galvanized Connector Rings and a Small Short SS U-Bolt (3/4” X 1 3/4”) as pictured.



Figure 16 - Ground Ring Connection

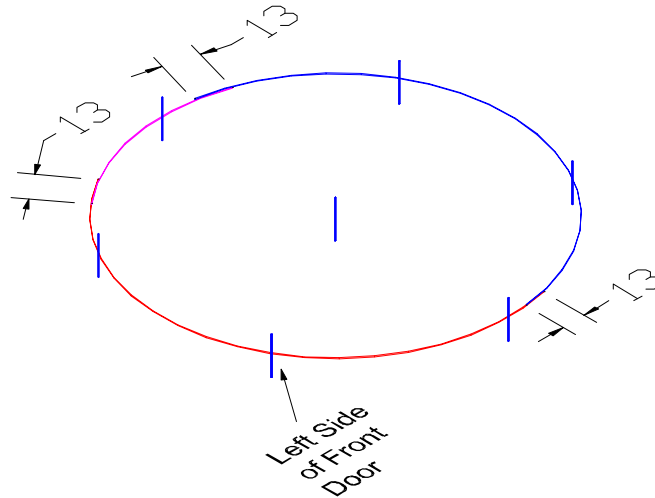


Figure 17 - 5 Overlapping 20' lengths

Place the center of the first 20' section by the stake that locates the left side of the front door. Attach a 7' 4" piece of rebar to the left of this piece and a 20' length of rebar to the right of the original piece, overlapping each joint 13" and connecting each joint as pictured above.

Bend the rebar to the stakes and join the remaining two ends of rebar using the galvanized connectors and a Small Short SS U-bolt.

### Mark the Future Position of the 6 Parallel Arcs

Use a magic marker or a piece of chalk to mark the future positions of the ends of the 6 parallel arcs. Make a mark 26" to the left and 26" to the right of each ground stake.

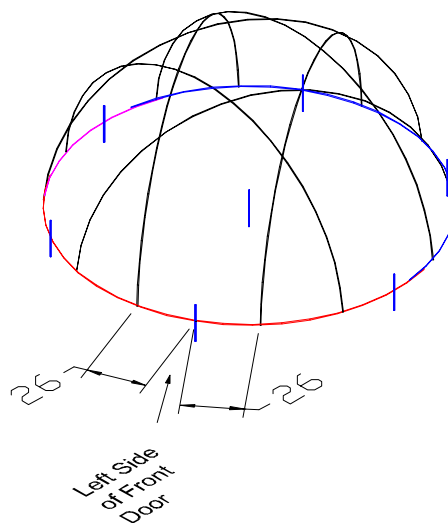


Figure 18 – Use a Chalk or Magic Marker to Mark Parallel Arc Positions 26" to Left and Right of Each Ground Stake

### Construct the Tripod



Place 14/” X 3 1/2” bolts in the lower holes. Thread the 3’ of yellow rope through the holes above the fixture and through the center hole in the tripod fixture to provide a loop for hanging the utility pulley.

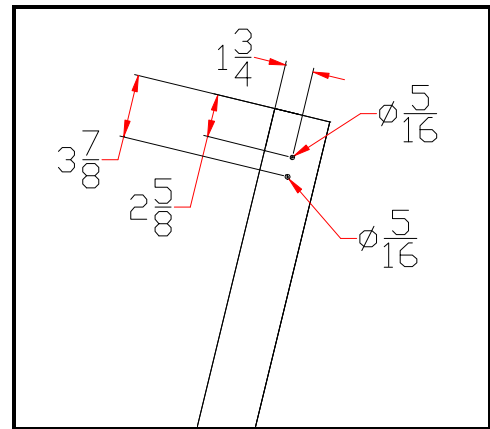


Figure 19 - Provide 2 holes in the end of three 8’ long 2 X 4’s

The lower hole will receive a 1/4” bolt. The upper hole will receive the lifting cable (yellow rope).

Install the 3 layout cables on the stakes indicated in the diagram. The tripod will be erected as shown. Photos describing the tripod follow.

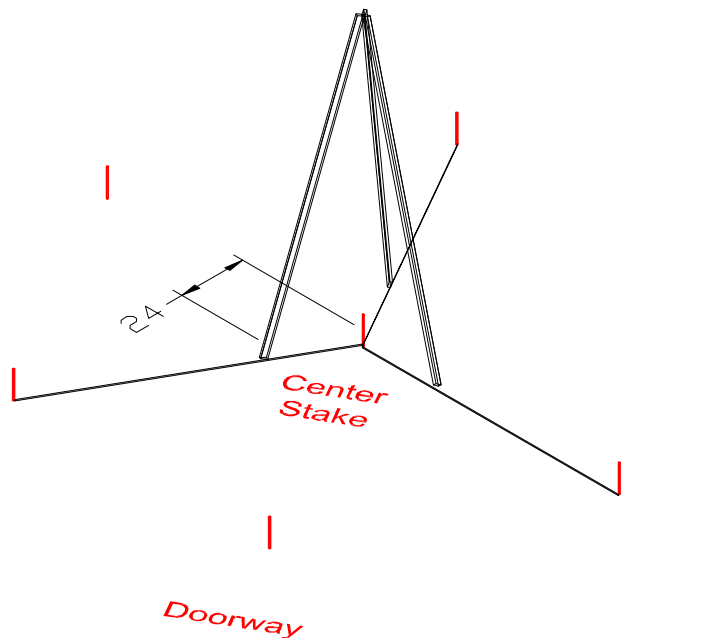
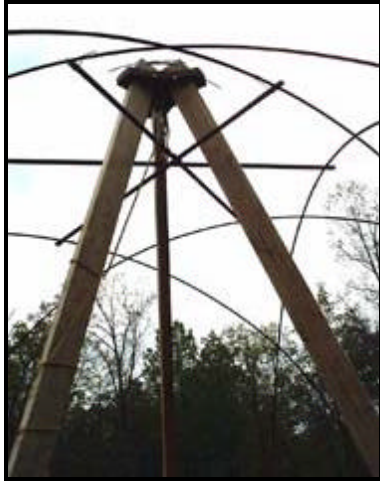


Figure 20 - Each leg of the tripod will be about 24” from the center stake.

### Hang the Utility Pulley from the cable on the tripod



The 6 pieces of rebar are heavy enough to justify tying the end of the lifting rope to a stake on the ground to hold the parallel arcs in position as you are working.

### Create The Parallel Arcs

You will build a total of 3 pairs of parallel arcs made of a total of 6 pieces of 20' long rebar and three 53" rebars. Before laying them out on the ground, use the magic marker or a piece of chalk to mark the center of each of the six 20' pieces of rebar.

### Join the center of the Parallel Arcs to the 53" Spacer



Figure 21 - Marking the Center of the Parallel Arcs

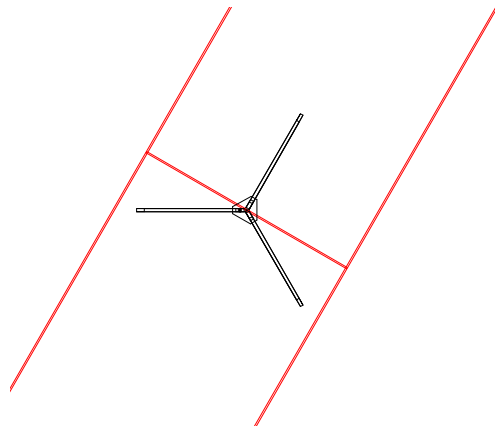


Figure 22 - Orientation of 1st Pair of Arcs in Relation to the 53" Spacer (90 degrees from leg of triangle.)

You will repeat this procedure for the remaining two sets of Parallel Arcs.

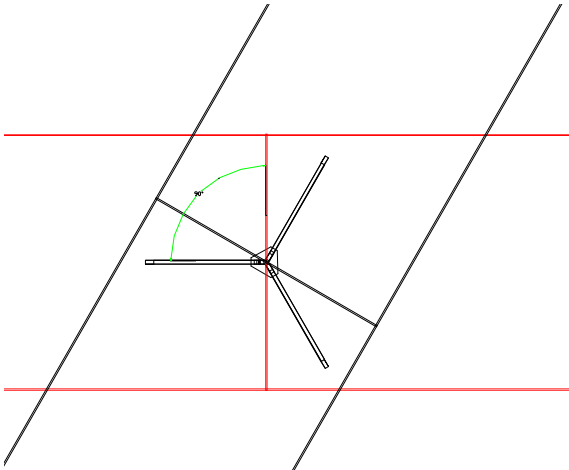


Figure 23 - Orientation of 2nd Pair of Arcs in Relation to the 53'' Spacer (90 degrees from leg of triangle.)

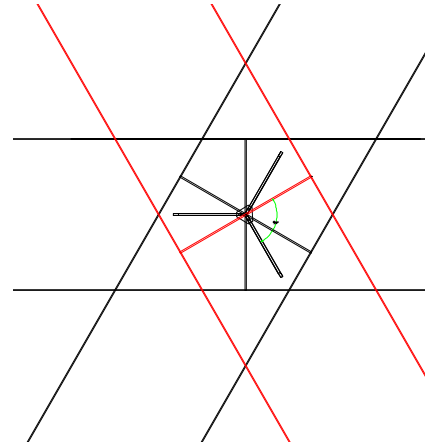


Figure 24 - Orientation of 3rd Pair of Arcs in Relation to the 53'' Spacer (90 degrees from leg of triangle.)

### Lift The Dome Using The Utility Pulley

Once the parallel arcs are in position, tie them together at the intersection of the 53'' spacers. Use the same rope to go through the utility pulley and back toward the ground. Lift them from the center. When the arcs are high enough, attach the legs of the parallel arcs to the ground circle at the location marked 26'' from the left and the right of the ground stakes using stainless steel Small Long U-Bolts.



Figure 25 - Dome in Up Position



Figure 26 - While the tripod is holding the dome, place the Parallel Arcs inside the Ground Circle and fasten them with stainless steel U-bolts on the 26 1/2'' marks provided earlier.

Adjust all of the parallel arcs so that they are straight and parallel where appropriate. Use #3 rebar clips to connect the intersections of the parallel arcs. Once the Top Arcs are in place, you will fasten the same intersections with a long U-bolt.



Figure 27 - Secured Intersection



Figure 28 - Remove the 53" Spacers, rope and pulley and take the tripod down.

### Install the Middle Circle

Overlap the first two rebars by 5" and connect them with 2 Galvanized Connector Rings, a small short u-bolt and Duct Tape.

Orient the center of the overlapped joint 12" to the right of the doorway stake. Join the Middle Circle to the parallel arcs using #3 rebar clips. Since the rebars cross at an angle, you will have to bend the rebar clips to make them work. After the dome is completed, the doorway section of the Middle Circle will be removed.

Continue to build the Middle Circle by adding another 20' piece of rebar 33" above the ground and overlapped approximately 5".

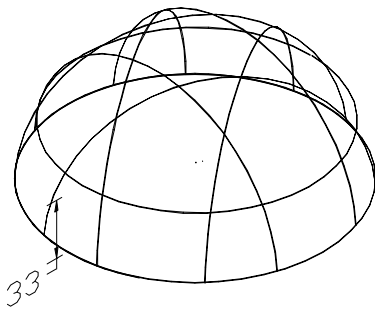
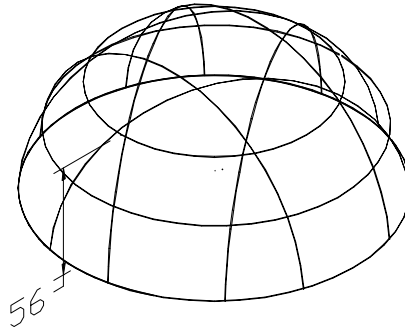


Figure 29 - Cut a measuring stick 33" long and use it to establish to height of the Middle Circle.



Figure 30 - Use Rebar Clip to fasten at 33" height



**Figure 31 - Upper Circle**

The upper circle is going to be created on the ground and lifted in place after it is created. Use two 20' pieces of rebar, overlapping them 64" at each of the two connections. Join each connection with 2 Galvanized Connector Rings, Duct Tape and 1 Small Short U-Bolt.

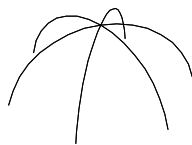
After creating the ring, lift it in place over the top of the dome. Take care that there is no connection near the center of the doorway. Adjust its position until it is approximately 56" above the ground. This height is going to become the height of the door and is usually necessary for a large tractor. Creating shorter overlaps for the Upper Circle will lower the entrance to the door.

Use #3 Rebar Clips to join the upper circle to the Parallel Arcs.

## **Top Arcs Installation**

Create 3 Top Arcs.

The Top Arcs are defined by the Ground Stakes. Each arc is approximately 22' long. Add a 36" extension to one end, overlapping it 12". Do not set the final length of the top arc until it is in position. Each arc is a slightly different length from the other due to there being installed on top of each other.



**Figure 32 - Top Arcs**

As each Top Arc is put in place, connect them to the ground circle at the ground stakes with a stainless steel Small Short U-Bolt.

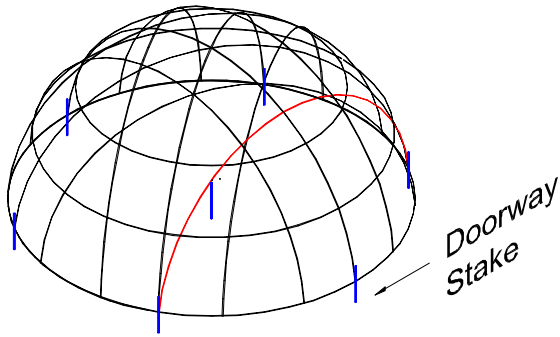


Figure 33 - 213" Door Frame Arc

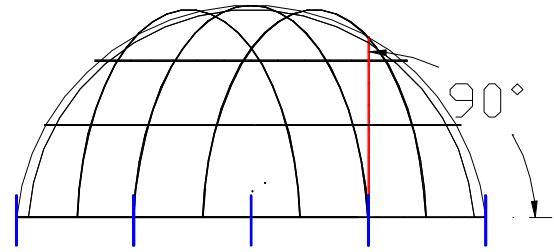


Figure 34 - Door Frame Arc is  
Perpendicular to the ground

The door Frame arc must be 213" long. It attaches to the ground circle at the ground stakes to the left and to the right of the Doorway Stake. When properly connected with #3 Rebar Clips to the Top Arc at the door and to the Parallel Arcs to the left and the right of the Doorway Arc, it will be at a right angle to the ground. (See drawing above.)

### Door Frame Bottom Piece

The Bottom Piece is made from a piece of rebar 157" long. Make marks 12" from each end of this piece and bend at each 12" mark so that the Bottom Piece fits the Ground Circle as pictured.

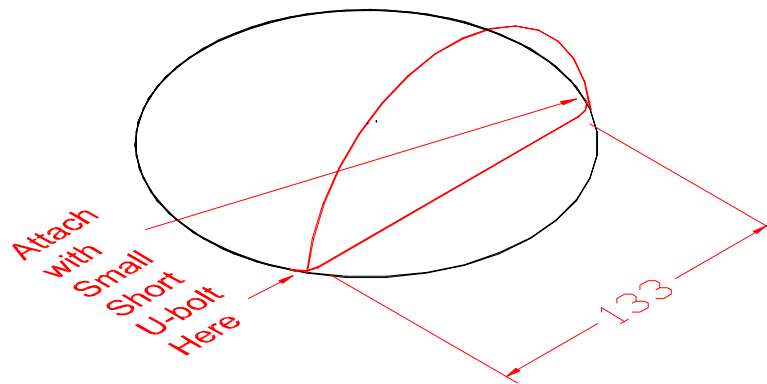


Figure 35 - The Bottom Piece must be directly beneath the Door Frame Arc

### Vertical Door Frame Pieces

The left side of the Door Frame is made from 5/8" rebar. Cut the left side 64" long. Cut the right side 60 1/2" long. Place them as pictured using 4 Small Short U-bolts. (The U-bolts near the ground must be stainless steel.)

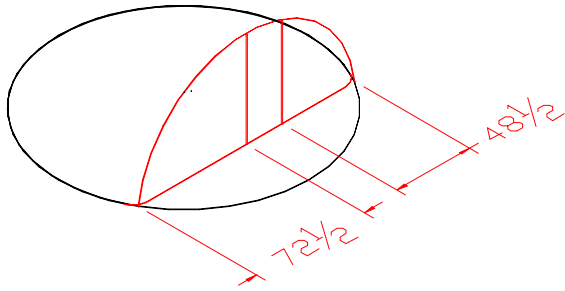


Figure 36 - Install the Vertical Door Frame



Figure 37 - You have just created the frame for the inside walls

The dimensions indicated are from where the ends of the Door Frame Arc intersect the Ground Circle.

### Water Frame Support

#### Water Frame Long Horizontal Support

The Water Frame Long Horizontal Support is an arc of rebar 100" long, parallel to the ground, 48 1/2" above the ground. The right end is fastened to the Top Arc adjacent to the Doorway Stake. The left end is fastened to a Parallel Arc as pictured

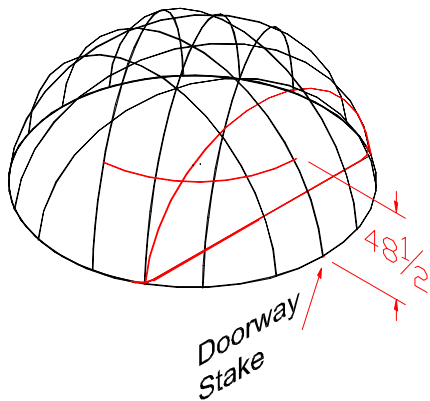


Figure 38 - Water Frame Long Horizontal Support



Figure 39 - You are now creating a frame for a vinyl water reservoir

The ends of the Water Frame Long Horizontal Support are fastened with Small Short U-Bolts. The other 3 intersections are secured with #3 Rebar Clips.

### Water Frame Short Horizontal Support

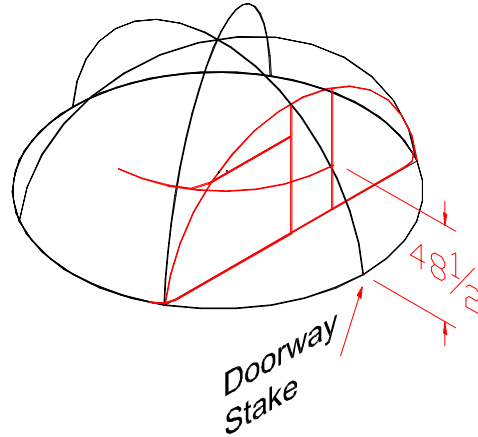


Figure 40 - Short Horizontal Support

The Water Frame Short Horizontal Support is made from a piece of 3/8" rebar 68" long. The right end is fastened to the Vertical Door Frame 48 1/2" above the ground with a Small Short U-Bolt. The left end is bent 20" from the left end to join the arc of the Water Frame Long Horizontal Member. They are fastened together with a Small Short U-bolt.

### Water Frame Short Horizontal Stiffener

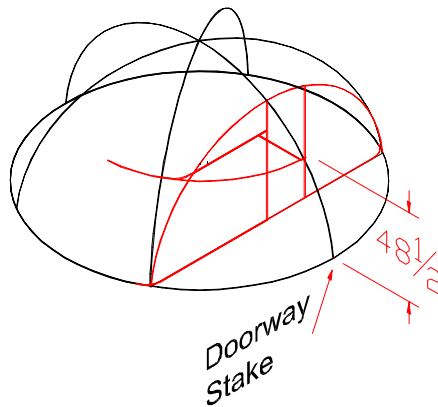
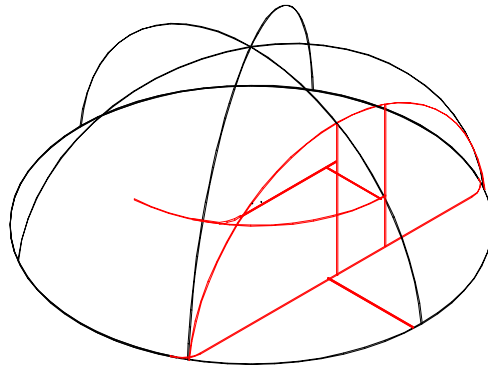


Figure 41 - Short Horizontal Stiffener

Fasten a 27" piece of rebar on top of the two Horizontal Supports fastening each end with a #3 Rebar Clip

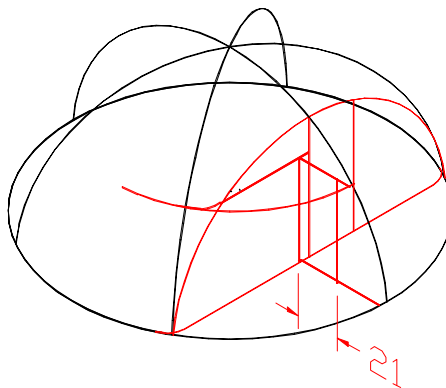
## Water Frame Long Horizontal Stiffener



**Figure 42 - Long Horizontal Stiffener**

Fasten a 40" piece of rebar directly below the Short Horizontal Stiffener using two # 3 Rebar Clips

## Water Frame Vertical Supports



**Figure 43 - Water Frame Vertical Supports**

Install two 53" long (use 5/8" Spacers) Water Frame Vertical Supports as pictured using four U-bolts.

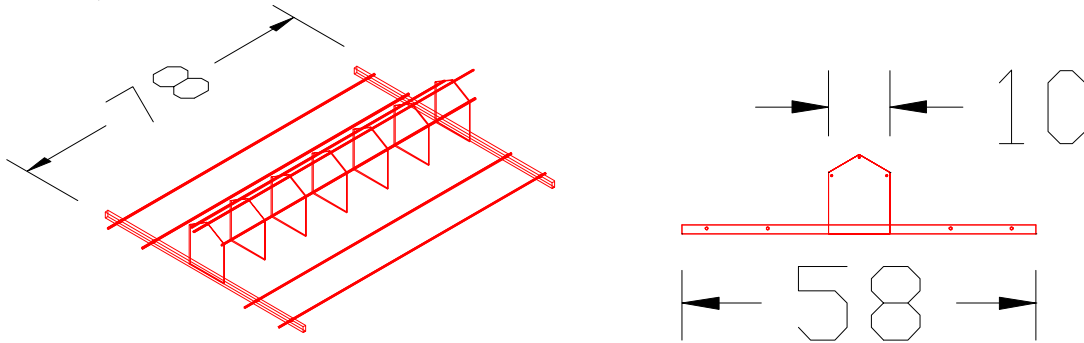
## Nest and Roost Poles

The nest and roost poles are created from:

- 5 - 78" long 5/8" rebar
- 2 - 74" long 3/8" rebar
- 7 - 1/4" X 10" X 12" Luan panels
- 2 - 58" Pieces of 1 X 2
- 4 - 2" #12 Machine Screws with Nut and Washer.
- 1 - Piece of Vinyl



**Figure 44 - Vinyl Nest**



Space the plywood panels 12” apart. Wrap the system in vinyl fastening the seam on the top with the 4 machine screws. Cut 8” diameter holes for the hens to enter and exit the nest areas

## Water Reservoir

The water reservoir is created from a single piece of vinyl. You will need

- 1 - 27” piece of 3/8” rebar
- 2 - 48” piece of 3/8# rebar

Begin by cutting a piece of vinyl 82” square.

The best way to get the fabric square is to begin with a piece 90 to 100” square.

Fold it into a piece 24” X 90” more or less. Cut an 82” length from the 90” piece, cross cutting the folded 24” width.

Refold it into another pieces 24” X 90” more or less and cut the second 82” length.

When you unfold it, it will be square.

This is not as complex as it looks.

Fold the 82” piece in half and you will only have to cut the line on the top edge of the drawing below.

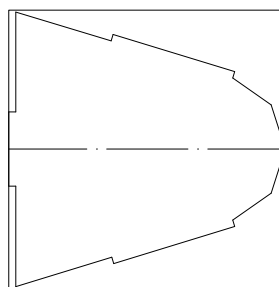
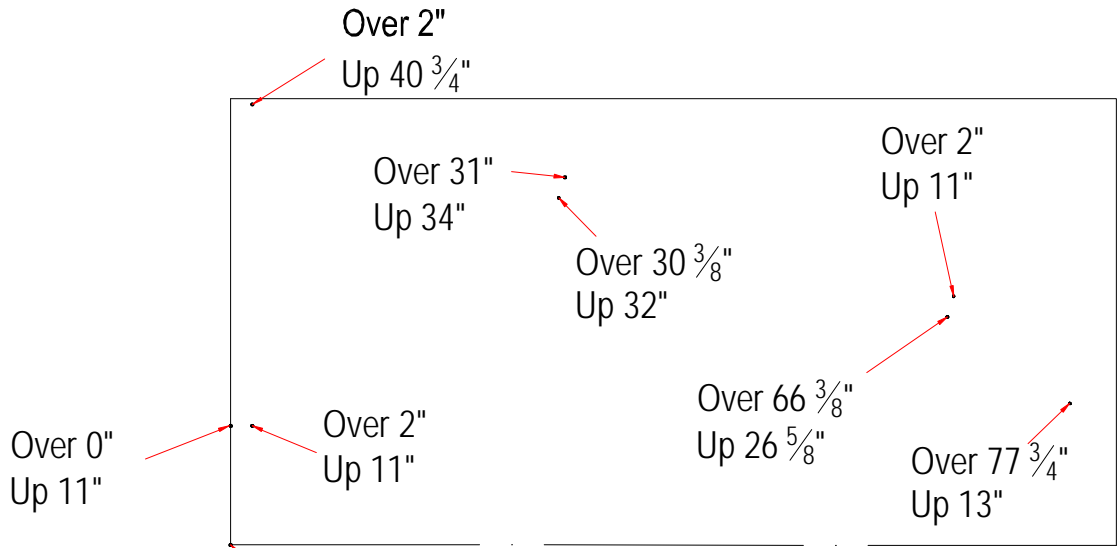
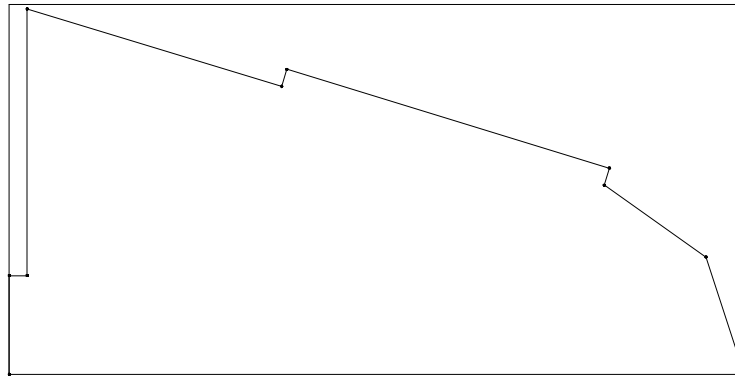


Figure 45 - Unfolded view of pattern to be cut to create a water reservoir



Make all measurements from this starting point. Over is a measurement to the right of this point. Up is up from this point.

**Figure 46 - Make marks at the locations indicated.**



Use a straight edge to guide your marker. Draw lines connecting the dots. Cut along the line.

**Figure 47 - Connect the dots with lines and cut with a utility knife**

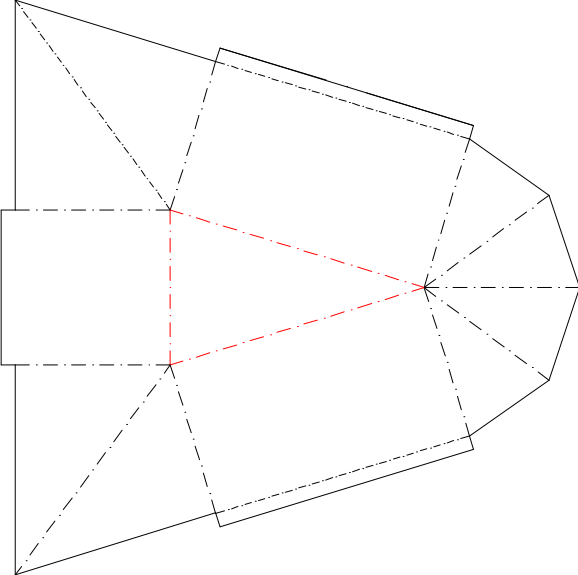


Figure 48 - You will be making folds along the dotted lines.

**Install the Canopy**

The canopy is installed using pop rivets and pop rivet back-up washer. Use a common awl to make holes in the fabric. To create finished edges, roll a flap to hide the cut edges prior to installing the pop rivet.



Figure 49 – Cover the inside wall first



Figure 50 - Drape a 15' wide X 25' long piece over the center as pictured and cut and tuck prior to fastening to the Middle Circle. The door is to the far left in this picture.



**Figure 51 - Place a piece of fabric over the feed storage area and rivet it in place.**



**Figure 52 - The fabric wraps around the doorframe and creates a fabric door to cover the grain.**



More Detail of Canopy



**Figure 53 - Create the door by bending a rectangle 26" X 48". Preinstall two 1 1/2" Galvanized rings to use as door hinges. They will attach to a door jam placed inside the inside wall.**



**Figure 54 - The door hinge is on the left and the door swings open toward the outside. This prevents it from interfering with organic material in the floor of the coop.**

## **Last Remarks**

This coop will hold 2 small pigs and 15 chickens. If you constantly add green or dry organic material, it will not smell and you will be making wonderful compost.

If you do not add organic materials, it will smell and you will not create bio-fertilizer.