Platforms & Anchoring

FOR

IcoPods & DecaPods

V5.0

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# Table of Contents

1. Staking A Pod Directly To The Ground ............................................................3  
1.1. Stakes and Stake Frames ........................................................................3  
1.2. Required Quantities .............................................................................3  
1.3. Installation Methodology ........................................................................3  
2. Designing & Building An IcoPod Platform ...................................................5  
2.1. Specifications & Requirements ...............................................................6  
  2.1.1. IcoPod Base Ring Dimensions ..........................................................6  
  2.1.2. Wood or Concrete (Temporary vs. Permanent) Platforms ...............6  
  2.1.3. IcoPod Materials Purchase List .........................................................7  
  2.1.4. IcoPod Parts List ...........................................................................8  
  2.1.5. Tools You Will Need .........................................................................9  
  2.1.6. How Long Will It Take to Assemble the Platform .............................9  
2.2. Platform Piers ..........................................................................................9  
2.3. Platform Triangles ..................................................................................10  
  2.3.1. Building the Triangle .......................................................................10  
  2.3.2. Bracing the Triangle .......................................................................12  
  2.3.3. Assembling the Triangles .................................................................13  
2.4. Bolting the Triangles Together to Form the Pentagon ............................15  
2.5. Setting the Pentagonal Frame on its Concrete Piers .................................17  
2.6. Building the Platform Steps (Optional) ...................................................19  
  2.6.1. Platform Step Materials Purchase List ..............................................20  
  2.6.2. Platform Step Parts List .....................................................................21  
  2.6.3. Additional Tools You Will Need .........................................................21  
  2.6.4. How Long Will it Take to Assemble the Steps ...................................21  
  2.6.5. Step Assembly Instructions ...............................................................21  
  2.6.6. Bracing Your Steps .........................................................................25  
2.7. Adding the Outer Edge Trim ....................................................................25  
2.8. Installing the Platform Floorboards .........................................................27  
2.9. Protecting your Platform from the Elements ..........................................29  
3. Attaching the IcoPod to the Platform .............................................................30  
4. DecaPod Platform Design ............................................................................31  
  4.1. DecaPod Base Ring Dimensions ............................................................31  
  4.2. DecaPod Platform Design Considerations ...........................................31  
  4.3. DecaPod Design Diagrams ....................................................................32
1. Staking A Pod Directly To The Ground

Any time your Pod will be subjected to wind, it must be firmly attached to the ground. For temporary outdoor installations where a platform is not being used with your Pod, you must stake the Pod to the ground.

1.1. Stakes and Stake Frames

A simple system of stakes and stake frames is used to stake the Pod to the ground. You can cheaply manufacture the required components yourself.

**Stake Frames:** Prepare wood blocks that are 1” x 4” x 16” and have a 1” diameter hole drilled through them 2” from one end.

**Stakes:** Prepare metal stakes. Cut 3/8-inch thick rebar stakes at least 14” long and make a 90° bend 2” from one end to form an “L”. For very soft ground, make your stakes longer.

*CAUTION:* The cut ends of the rebar are often quite sharp. Exercise great care not to cut your self on them. During manufacture of the stakes, blunt these edges for safety.

1.2. Required Quantities

You will require the following quantities of stake and stake frame pairs for a single Pod. **IcoPods:** 5 pairs of stakes and stake frames. **DecaPods:** 10 pairs of stakes and stake frames.

1.3. Installation Methodology

Go around the inside of the Base-Ring and cut small slots 1” x 4” just to the right of each corner. (5 for an IcoPod, 10 for a DecaPod.)
Slide the end of the 1 x 4 x 16” Stake Frame in as far as it will go so that the end of the stake frame butts up against the inside of the outer edge of the base ring. Drive a metal stake through the hole in the wood block and into the ground.
2. Designing & Building An IcoPod Platform

Your IcoPod kit does not come with a platform. The Platform design shown here is only offered as a guide. It was developed for materials testing and reflects one possible platform implementation.

The image to the left shows a short-life IcoPod on this platform. Note that the Base-Ring of the IcoPod exactly fits the surface area of the platform. This is important to ensure that the platform itself does not act as a conduit for water leeching up under the edge of the Pod and onto the floor of the Pod itself.

**Warning:** You must take into consideration the intended use for your Pod as well as the physical requirements of location where your IcoPod will be erected when designing a platform appropriate to your requirements.
Although quite detailed, this document is not presented, nor intended, to provide complete instructions for constructing a safe and useful IcoPod platform.

**Warning:** Icosa Village, Inc., makes no claims or warranties whatsoever about the completeness or the appropriateness of this platform design for your IcoPod application.

We recommend that you consult a professional builder for advice. You are responsible for ensuring that any and all applicable building codes and or regulations are properly followed, and that the structure you build is sound and complete.

## 2.1. Specifications & Requirements

### 2.1.1. IcoPod Base Ring Dimensions

You are building a platform for your IcoPod. Your Pod’s Base-Ring must fit on that platform. The Base-Ring of your IcoPod has a pentagonal shape with each of its five outside edges exactly 98.19” (8’ 2 3/16”) long. Ideally you want to build a Pod platform that is exactly this size. Too small and it will not adequately support the Base-Ring of your Pod. Too big, and the portion of your platform that extends beyond the outside of the Pod Base-Ring becomes a flat surface where rain and snow can accumulate, potentially damaging your Pod by leeching up under the edge of the Pod and onto the floor of the Pod itself.

**Recommendation:** Build an IcoPod platform that is shaped like a pentagon with outside dimensions exactly 8’2 3/16” along each of the five pentagon sides.

### 2.1.2. Wood or Concrete (Temporary vs. Permanent) Platforms

The cheapest and simplest platform you can build for your pod is a poured concrete base. If this is appropriate, construct an appropriately sized pentagonal frame, pour you concrete and voila. Platform built. But unless you add an insulated floor it’s cold. And of course it is rather difficult to remove. And unless you’ve already installed any plumbing and other conduit in the base, you won’t be doing it later.

A wood platform is more expensive and time consuming to construct, but you can easily move it or remove it, the floor is warmer, and it is easy to run plumbing lines and conduit under it.

The remainder of this platform construction guide assumes you are building a wooden platform.
2.1.3. IcoPod Materials Purchase List

The following IcoPod Materials Purchase List corresponds to the IcoPod Parts List on the next page. Not including doorstep costs, the materials cost for the platform we built was approximately $533. Including the cost of a cantilevered double doorstep, the total cost was $576 using new high-grade materials.

*Hint: Efficient use of materials requires cutting the proper parts from the various lengths.*

<table>
<thead>
<tr>
<th>Qty</th>
<th>Size</th>
<th>Part #'s</th>
<th>Material</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>2” x 6” x 10’</td>
<td>1</td>
<td>2” x 6” Rot Resistant Wood (redwood)</td>
<td>$86.15</td>
</tr>
<tr>
<td>25</td>
<td>2” x 4” x 8’</td>
<td>2,3,4,5,6</td>
<td>2” x 4” Rot Resistant Wood (pressure treated)</td>
<td>$99.25</td>
</tr>
<tr>
<td>5 or 6</td>
<td>4’ x 8’ x 3/4”</td>
<td>7,8</td>
<td>¾” or 7/8” Weatherproof flooring material (Only five sheets required if center pentagon constructed from wastage material)</td>
<td>$203.70 (for 6)</td>
</tr>
<tr>
<td>6</td>
<td>Approximately 10 ½” x 10 ½” x 9” tall</td>
<td>9a</td>
<td>Concrete Piers</td>
<td>$17.88</td>
</tr>
<tr>
<td>6</td>
<td>5” x 5/8” threaded post</td>
<td>9b</td>
<td>Adjustable screw posts with 5” x 5/8” threaded rod (Simpson “Strong Tie”) to hold 4” stock</td>
<td>$32.22</td>
</tr>
<tr>
<td>100</td>
<td>3 ½” #10</td>
<td>10</td>
<td>Galvanized Wood Screws</td>
<td>$24.77</td>
</tr>
<tr>
<td>100</td>
<td>2” # 10</td>
<td>11</td>
<td>Galvanized Wood Screws</td>
<td>$15.51</td>
</tr>
<tr>
<td>30</td>
<td>3”</td>
<td>12</td>
<td>Nails</td>
<td>$1</td>
</tr>
<tr>
<td>~60</td>
<td>1”</td>
<td>13</td>
<td>Finishing Nails</td>
<td>$1</td>
</tr>
<tr>
<td>15</td>
<td>4” x 3.8”</td>
<td>14</td>
<td>Carriage Bolts, nuts &amp; Washers</td>
<td>$9.38</td>
</tr>
<tr>
<td>1</td>
<td>Gallon</td>
<td>15</td>
<td>Exterior Quality Water-base Varathane Sealer</td>
<td>$41.97</td>
</tr>
</tbody>
</table>

*Hint: Carefully read this document completely prior to purchasing any materials and beginning assembly. You will gain familiarity with suggestions and the proposed design, and it will help you avoid errors.*
## 2.1.4. IcoPod Parts List

<table>
<thead>
<tr>
<th>Qty</th>
<th>Part #</th>
<th>Part Name</th>
<th>Size</th>
<th>Purpose</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>1</td>
<td>Outer Edge Trim</td>
<td>2” x 6” x 98 3/16” (~8’ 3”)</td>
<td>Outside Edge of Platform frame (hides edges the floorboards &amp; extends below the edge of the platform frame)</td>
<td>2” x 6” Rot Resistant Wood</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>Triangle Leg</td>
<td>2” x 4” x 81 5/8” (6’ 10”)</td>
<td>“Spoke” edges of five triangular frames (each bolts to its neighbor)</td>
<td>2” x 4” Rot Resistant (pressure treated) Wood</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>Triangle Base (Outer Edge)</td>
<td>2” x 4” x 92 3/16” (7’ 9”)</td>
<td>Outer edge of 5 triangular frames (length a function of stock thickness)</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>4</td>
<td>Small Triangle Brace (inner &amp; outer)</td>
<td>2” x 4” x 25 (~2’ 1½”)</td>
<td>Inner and outer components of five paired “4x4” innermost triangular frame braces. Rough 25 ½” long, Finished 25” long</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>5</td>
<td>Medium Triangle Brace</td>
<td>2” x 4” x 47½” (~4”)</td>
<td>Central triangular frame braces</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>6</td>
<td>Large Triangle Brace</td>
<td>2” x 4” x 69 ⅓” (~6’ 1½”)</td>
<td>Outermost triangular frame braces</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>7</td>
<td>Central Pentagon Floorboard</td>
<td>48” x 48” x ¾” or 7/8”</td>
<td>Center floorboard of the Pod Platform deck. (Can be cut from scrap as 5 triangles.)</td>
<td>¾” or 7/8” Weatherproof flooring material</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>Surrounding Quadrangle Floorboard</td>
<td>96” x 48” x ¾” or 7/8”</td>
<td>Platform deck floorboards supported by the platform framing</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>9</td>
<td>Support Pier &amp; Adjustable Screw Post</td>
<td>Pier 10 ½” x 10 ½” x 9” tall</td>
<td>Supports the Pod platform off the ground (5 at the vertices, 1 in the center)</td>
<td>Concrete Piers with adjustable screw posts</td>
</tr>
<tr>
<td>100</td>
<td>10</td>
<td>Wood Screws</td>
<td>3 ½” #10</td>
<td>Screw together 5 triangular frames</td>
<td>Galvanized screws</td>
</tr>
<tr>
<td>100</td>
<td>11</td>
<td>Wood Screws</td>
<td>2” # 10</td>
<td>Screw platform deck to platform frame &amp; Outer Edge Trim to Triangle Bases</td>
<td>Galvanized screws</td>
</tr>
<tr>
<td>30</td>
<td>12</td>
<td>Nails</td>
<td>3”</td>
<td>Nail together “4x4” Small Triangle Braces (Parts #4)</td>
<td>Galvanized nails</td>
</tr>
<tr>
<td>~60</td>
<td>13</td>
<td>Finishing Nail</td>
<td>1”</td>
<td>Temporarily hold frames in place</td>
<td>Metal</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>Carriage Bolts, nuts &amp; Washers</td>
<td>4” x 3/8”</td>
<td>Bolt the five triangular frames together to form the pentagon-shaped platform</td>
<td>Galvanized metal</td>
</tr>
<tr>
<td>1</td>
<td>15</td>
<td>Sealer</td>
<td>Gallon</td>
<td>Exterior-quality Water-base Sealer</td>
<td>Varathane</td>
</tr>
</tbody>
</table>
2.1.5. Tools You Will Need

- Tape Measure
- 5’ Straight Edge
- Level
- Pneumatic Jack (useful for leveling the platform)
- Hammer
- Circular Saw
- Miter Saw
- 5/8” Masonry Bit
- 5/8” Wood Bit
- 3/8” Wood Bit (normal length)
- 9/16” socket wrench (to tighten the 3/8” hex nuts)
- #10 & #12 countersinking drill bits
- 4-6 Bar clamps (preferable but not essential; to facilitate lining up the platform triangles and used to hold the platform together prior to final assembly)
- 1 or 2 Power Drills (it’s a labor saver to work with two power drills)
- Drill Press (preferable but not essential; used to drill into the concrete piers)

2.1.6. How Long Will It Take to Assemble the Platform

With proper tools, a single person can easily build the IcoPod platform from scratch in two to three days.

2.2. Platform Piers

You will need six or seven piers (Part #9) to rigidly support your IcoPod platform, one each at the five edges of the pentagon and one to support the center. An optional seventh pier is recommended to support the cantilevered platform step if it is constructed. In order to facilitate the leveling and occasional adjustment of your platform as the ground or piers settle over time, consider using concrete piers with adjustable screw posts embedded in them. You can use rectangular concrete blocks and embed a Simpson “Strong-Tie” with a 5/8” screw post into the block. Drill a 5/8” hole in the center of the wood block at the top of the concrete block, and then continue drilling into the concrete block using a 5/8” masonry bit to a depth sufficient to completely embed the 5” threaded screw at the base of the Simpson “Strong-Tie”. It helps to use a drill press to ensure these holes are vertical.
Use a large flat washer and a 5/8” galvanized nut to adjust the height of the support.

2.3. Platform Triangles

You will be building five triangular frames that will bolt together to form the pentagonal IcoPod platform.

**Warning:**
Measurements provided in this plan assume that the 2”x4” triangle frame materials has an actual dimension of 1 9/16” x 3 9/16”. Depending upon the finish dimensions of the framing stock you are using, you may need to adjust certain measurements to ensure that overall dimensions of your Pod platform are correct.

2.3.1. Building the Triangle

Each triangle has an outside dimension of 81 5/8” along the two “spoke” edges (Part #2) radiating out from the center of the pentagon, and 96” along the base of the triangle that forms one of the five outside edges of the pentagon.

**Hint:** “Measure Twice, Cut Once” Consider cutting and assembling one entire triangle to make sure your measurements are correct. Then having proved everything out once, “assembly-line” cut the parts for all the other four triangles.
Carefully study the diagram of a single triangular frame below. Note that the 96” total length of the base of the triangle is formed from the length of the Triangle Base beam (Part #3) and the width of the two Triangle Leg edges (Parts #2) that attach to each end of that beam. Therefore the total length of the Base Beam (Part #3) that you will be cutting is dependent upon the thickness of the two legs (Parts #2). For example, if the legs have an actual width of 1 9/16”, then the 54° angle that you cut at the end of these beams (that attaches to the end of the Base beam) adds about 1 15/16” to the length of the Base beam. So two times 1 15/16” equals 3 7/8”, requiring that the total length of the Base beam be 92 1/8” long. (Material I used required 92 3/16” to create a total base length of 96”.)

**Hint:** All angles except the 36° angles at the tip of each triangle are 54°. As you make each 34° angled cut, print the degree of the cut on the angle so that when assembling the parts later you won’t confuse ends.

First cut the ten Triangle Leg parts (Parts #2). Cut the 36° angle for all ten first. Then measuring to ensure that the total length of each triangle-leg is 81 5/8” cut the 54° angle at the other end of each piece.
**Hint:** If you cut all the 54° angles second, you won’t have to reset your miter saw to cut the triangle base parts, since all other angles are 54°.

Lay two triangle-leg parts (Parts #2) and a Base part (Part #3) out on a level surface and ensure that all parts fit together properly and that the outside dimension of the triangle base totals 96”.

**Warning:** Getting the angles and the outside dimensions of the five triangles right is the most critical part of this project. If you get them wrong when it comes time to assemble your five triangles to form the pentagon, they will not fit. For instance, by making the triangle leg parts 1/8” too long, once all five triangles were assembled into a pentagon I ended up with a 1” outer edge gap in an early iteration of the Pod platform.

**Suggestion:** Remember your basic trigonometry and do the math yourself. Each of the platform’s five triangular frames can be thought of as two right angle triangles back to back. The hypotenuse of each triangle is one of the legs of the platform’s triangle frame (Parts #2). The triangular frame’s 96” base (at the outside edge of the pentagon) can be thought of as being comprised of two 48” sections end to end that each form one of the other sides of the two right angle triangles. Now, knowing angle n = 36°, side b (opposite angle n) = 48”, then side c (the hypotenuse) = b / sin n. So, Part #2 (the triangle leg part) = c = 48” / sin 36° = 48” / 0.5877852… = 81.6624” ~= 81 5/8”.

### 2.3.2. Bracing the Triangle

Measure 48” up from the outer edge of the Base part (Part #3), and draw a line through the two triangle-leg parts (Parts #2) that is parallel to the base of the Base part, but 48” away from the outer edge. This is where the inside edge of the plywood floor panel (Part #8) will end up, and is the line at which the butting edges of the two components forming the Small Triangle Brace (Parts #4) meet each other back to back.

You will now cut the four braces that span the inside of each triangle assembly. Note that two components (Parts #4) butt up against each other to comprise the shortest triangle brace forming a “4x4” brace pair. Each brace pair provides edge support for an outer edge of the central pentagonal floorboard (Part #7) and the inside edge of one of the five outer quadrangle floorboards (Parts #8).

To simplify assembly and cutting, these pairs of short triangle braces will be nailed together before the 54° angle at each end is cut off.

Start out by cutting ten 25 ½” lengths of 2x4 framing (Parts #4). Cut five of the ten from the end of five different 8’ 2x4s. (Set aside the 70 3/4” lengths. You will use them later for the five outmost braces (Parts #6) of the five triangles.) Cut the other five of the ten 25 ½” lengths from two 8’ 2x4s.
Nail together five pairs of 25 ½” 2x4s (Parts #4) to create five 25 ½” 4x4s. Use four 3” nails per pair (Parts #12), nailing two nails into each pair from one of the two 2x4s and the other two nails into the pair from the other 2x4.

**Warning:** Make sure your nails will not be cut by your miter saw when you cut each end of these brace pairs. You will be cutting a 54° angle off each end of these 4x4s to create 25” long braces, so be careful not to nail too near each end. Allow at least 3 ½” of material between the nails closest to the ends, and the ends of your 25 ½” uncut braces.

Cut a 54° angle at the other end of each 4x4 brace that you have just made so that the total length of each brace is 25” when measured along the wide side of the brace.

Now you will prepare the remaining triangle braces. You require five each in two lengths. All ends are cut to 54° angles.

- Cut five middle triangle braces (Parts #5) to 47 ½” long.
- Cut five outer triangle braces to (Parts #6) 69 ¾” long.

### 2.3.3. Assembling the Triangles

Congratulations, you have cut all the pieces necessary to assemble the five triangles that comprise the IcoPod’s pentagonal platform frame. Now it is time to assemble each triangle. Each triangle is comprised of

- Two Triangle Legs (Parts #2)
- One Triangle Base (Part #3)
- One Small Triangle Brace (comprised of two Parts #4)
- One Medium Triangle Brace (Part #5)
- One Large Triangle Brace (Part #6)

For each of the five triangles, lay the edge parts (#2 and #3) out together on a flat surface and fitting them tightly together screw them together with countersunk 3 ½” #10 wood screws. Add in the small, medium and large triangle braces (#4, #5, and #6), screwing them into the triangle you have just constructed.
Hint: If you have carefully cut all your angles with a miter saw, everything should line up very tightly. Make sure you install the three triangle braces (Parts #4, #5, and #6) parallel to the triangle base (the outer edge Part #3).

The following strategy for assembling the triangle frames worked well for me. Working on a flat surface with a straight wall at its back,

- Place the triangle base (Part #3) against the back wall
- Place one of the two triangle legs (Parts #2) to each side of the triangle base
- Line up the crown of the triangle where the two legs meet and using finishing nails, “temporarily: attach the crown together.

Warning: Make sure that one of the two faces of the triangular frame is the “top” and carefully line up each side of the triangle and the braces inserted into the triangle so that they all have one edge that lies along the plane of the triangle “top”.

- Line up each of the triangle legs with the base part using finishing nails (Parts #13) to “temporarily” hold them all together.
- Permanently screw the crown of the triangle together with two countersunk 3 ½” #10 screws (Parts #10), one entering from each leg of the triangle.

Hint: It’s a huge time-saver to work with two power drills; one with #10 countersinking bit to drill the pilot holes, the other with a screwdriver bit to drive the screws
• Screw each triangle leg to the triangle base using two countersunk 3 ½” #10 screws.

**Hint:** Buy high quality screws! You will avoid endless trouble that results from using 3 ½” screws manufactured from inferior metal.

• Insert the three center braces (Parts #4, #5 and #6) inside the triangle. Install them even with the “top” face of the triangle, and line them up parallel with the triangle base (Part #3). Temporarily fix them in place with finishing nails and then permanently screw them in with two 3 ½” #10 screws at each end.

• Label the “top” face of the triangular frame and set it aside. Complete the assembly of the other four triangles.

2.4. Bolting the Triangles Together to Form the Pentagon

You are now ready to attach the five triangles together to form the pentagonal frame for your IcoPod platform. The five triangles are placed together so that their bases face out forming the five sides of the pentagon.
**Hint:** If you want to be able to easily disassemble your platform (to move it to a new location for example), then you will want to bolt the five triangle frames together rather than nailing them. (And anyway, bolts are stronger.)

Lay all five triangles out “top” face up in a rough pentagon as shown on the previous page.

**Hint:** It is useful to label the abutting sides of each triangle 1-1, 2-2, 3-3, 4-4, and 5-5 so that in the future when disassembling your platform, it will be easy to identify which triangles abut. This way when reassembling, your boltholes will line up.

Temporarily clamp the triangles together to ensure a tight fit and a symmetrical pentagonal platform. Carefully ensure that all edges line up evenly, and the “top” surface is even from triangle to triangle.

**Hint:** It is very helpful to support the triangles off the ground while connecting them together. Drilling the boltholes is easier if the triangles are off the ground. Having the triangles supported off the ground also allows you to easily shim parts up with blocks to get them lined up correctly.

With each set of two triangles lined up and clamped tightly together, drill three 3/8” bolt holes in each pair of abutting triangle edges.
**Warning:** Locate your bolt holes at each end and towards the center of each triangle leg part, but be careful that they are not located so close to the edges or braces of the triangular frames that it is difficult to insert the bolts in the holes.

The innermost bolt should be located as close to the center of the pentagon as practical. The center bolt should be located just “outside” the middle brace near the middle of the triangle spoke legs (Parts #2). The outermost close to the outside of the pentagon as practical. It may be necessary to drill this outer bolt hole at an angle as shown in the photo at the left so that it approaches closer to the outside edge. If you do so, angle towards the outer edge of the pentagon but level with the plane of the platform. (Do not angle down or up across the beam since later when you install the platform floorboard it would be harder to disassemble a bolt angled up towards the floorboard.)

Attach each pair of triangular frames to each other with three carriage bolts, washers, and nuts. (Parts #14.) Continue to install three bolts along each of the five pairs of abutting triangle edges.

### 2.5. Setting the Pentagonal Frame on its Concrete Piers

Now that your pentagonal frame is largely assembled, it is helpful to set it on its six concrete piers before continuing.
**Hint:** You may want to partially bury your concrete piers so that the deck of your Pod is not too far off the ground. This is especially true if your Pod platform is being built on a slight slope. Bury the uphill piers.

Locate one pier under each pair of bolted triangle legs, as close to the outside edge of the pentagon as practical. Locate the sixth concrete pier under one of the pairs of bolted triangle legs as close to the center of the pentagon as practical.

Level the platform as completely as possible. It is helpful to use a pneumatic jack to help level the platform.

**Hint:** It really helps to locate your Pod platform on as level a patch of ground as you can find. If not, you will have to do a lot of blocking and shimming to level your platform.

Once your platform is leveled, solidly affix the piers to the platform frame.
2.6. Building the Platform Steps (Optional)

You may want to build one or more steps leading from the ground to the entrance of your Pod. Such steps can either be connected directly to your platform, or completely separate from the platform.

**Hint:** When designing your steps, recall that the Pod Door Port includes an additional 12” doorsill up and over the Pod Base-ring and Base Saddle. So for ease of entry and exit, provide a step outside the Pod Door Portal at the same height as the Pod platform so that there is not a long drop from the top of the Pod Base-Saddle to the first step outside the Door Portal.

The double step shown here is 36” wide. One step is at the height of the Pod platform floorboards to facilitate stepping over the 12” tall doorsill. One step is approximately eight inches lower.
Note: This cantilever step design requires that there be a minimum of 6 inches of free space below the Pod platform.

2.6.1. Platform Step Materials Purchase List

The following Platform Step Materials Purchase List corresponds to the Platform Parts List on the next page. The platform step assembly costs approximately $43.

<table>
<thead>
<tr>
<th>Qty</th>
<th>Size</th>
<th>Part #’s</th>
<th>Material</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2” x 8” x 6’</td>
<td>20</td>
<td>2” x 8” Rot Resistant Wood (Redwood)</td>
<td>$13.74</td>
</tr>
<tr>
<td>1</td>
<td>2” x 4” x 10’</td>
<td>21 &amp; 22</td>
<td>2” x 4” Rot Resistant (pressure treated) Wood</td>
<td>$6.37</td>
</tr>
<tr>
<td>1</td>
<td>Approximately 10 ½” x 10 ½” x 9” tall</td>
<td>23a</td>
<td>Concrete Pier</td>
<td>$2.98</td>
</tr>
<tr>
<td>1</td>
<td>5” 5/8” threaded post</td>
<td>23b</td>
<td>Adjustable screw post (Simpson “Strong Tie” to hold 4” stock with 5” x 5/8” threaded rod)</td>
<td>$5.37</td>
</tr>
<tr>
<td>4</td>
<td>10” x 3/8”</td>
<td>24</td>
<td>10” Carriage Bolt</td>
<td>$2.06</td>
</tr>
<tr>
<td>6</td>
<td>8” x 3/8”</td>
<td>25</td>
<td>8” Carriage Bolts</td>
<td>$3.30</td>
</tr>
<tr>
<td>4</td>
<td>5 ½” x 3/8”</td>
<td>26</td>
<td>5 ½” Carriage Bolts</td>
<td>$3.00</td>
</tr>
<tr>
<td>15</td>
<td>3/8”</td>
<td>N/A</td>
<td>3/8” Nuts &amp; Washers for the carriage bolts</td>
<td>$3.21</td>
</tr>
<tr>
<td>3</td>
<td>3” by ¼”</td>
<td>27</td>
<td>Lag Screws</td>
<td>$1.50</td>
</tr>
<tr>
<td>2</td>
<td>5” x 3/8”</td>
<td>28</td>
<td>Lag Screws</td>
<td>$1.28</td>
</tr>
</tbody>
</table>
### 2.6.2. Platform Step Parts List

<table>
<thead>
<tr>
<th>Qty</th>
<th>Part #</th>
<th>Part Name</th>
<th>Size</th>
<th>Purpose</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>20</td>
<td>Step</td>
<td>2” x 8” x 36” (3’)</td>
<td>Two steps up to the entrance of the Pod</td>
<td>2” x 8” Rot Resistant Wood</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>Step-support</td>
<td>2” x 4” x 52” (4’ 4”)</td>
<td>Horizontal braces supporting the steps</td>
<td>2” x 4” Rot Resistant Wood</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>Step Riser</td>
<td>2” x 4” x 8 ½”</td>
<td>Sit atop the Step-Support beams to raise the upper step up</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>23</td>
<td>Support Pier &amp; Adjustable Screw Post</td>
<td>Pier 10 ½” x 10 ½” x 9” tall</td>
<td>Eliminates stress on the platform edge resulting from weight on the step.</td>
<td>Concrete Piers with adjustable screw posts</td>
</tr>
<tr>
<td>4</td>
<td>24</td>
<td>10” Carriage Bolts</td>
<td>10” x 3/8”</td>
<td>Attach top step to the cantilever step support braces</td>
<td>Galvanized Metal</td>
</tr>
<tr>
<td>6</td>
<td>25</td>
<td>8” Carriage Bolts</td>
<td>8” x 3/8”</td>
<td>Attach the cantilever step support braces to the triangle frame</td>
<td>Galvanized Metal</td>
</tr>
<tr>
<td>4</td>
<td>26</td>
<td>5 1/2” Carriage Bolt</td>
<td>5 ½” x 3/8”</td>
<td>Attach bottom step to the cantilever step support braces</td>
<td>Galvanized Metal</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>3” Lag Screw</td>
<td>3” x ¼”</td>
<td>Attach Outer Edge Trim to Triangle Base part</td>
<td>Galvanized Metal</td>
</tr>
<tr>
<td>2</td>
<td>28</td>
<td>5” Lag Screw</td>
<td>5” x 3/8”</td>
<td>Attach Outer Edge Trim to Triangle Base part</td>
<td>Galvanized Metal</td>
</tr>
</tbody>
</table>

### 2.6.3. Additional Tools You Will Need
- 12” x 3/8” (extension) Wood Bit

### 2.6.4. How Long Will it Take to Assemble the Steps

Add three hours to the Pod platform assembly time.

### 2.6.5. Step Assembly Instructions

The two Step Supports for the double step shown here (Parts #21) are bolted to the triangle base (Part #3), and the largest and medium braces parallel to it (Parts #6 and #5 respectively). Carriage bolt holes are drilled completely through these three parallel members and through the pair of 2x4 step-supports that hold the two steps. The two 2 x 8 x 36” steps (Parts #20) will overlap the step-supports 6 inches on each side. The lower step is bolted below the step-support beams. The upper edge of the upper stair lies at the
same level as the top of the Pod platform floorboards and is about 9” above the lower step. It is separated from the Step Supports by additional 2x4 risers (Parts #22.)

1. Cut two 52” lengths of 2x4 stock for the step-supports (Parts #21)

2. Optionally cut a 30° angle at one end of each step-support for aesthetic purposes.

3. At the end of the step-support where you have cut the 30° angle, measure in 17 1/2” and draw a line across each step-support.

4. Select the side of the platform where the Pod door port will be installed. Mark the center point of this edge (48” in from each end.) Draw two lines, one each 12” to the left and to the right of this centerline. These lines indicate the where the outside edge of the two step-support beams (Parts #21) will be located.

5. Using bar clamps, clamp both step-supports under the base of the triangle where the Pod door will be installed. The step-supports will extend out 17 1/2” from the outside edge of the triangle base part (Part #3). The two step-supports should be located so that their outside edges are 12” to each side of a centerline of the triangle base (Part #3). The step-supports will pass under the three outermost parallel frames of the triangle (Parts #3, #6, and #5) and will extend about 2” beyond the innermost of the three frames (Part # 5.)
**Note:** The step-support beams should be oriented so that the 30° angle you have cut is placed so that the longer edge of the 2x4 is facing down and the shorter edge of the 2x4 is facing up.

6. Using a 3/8” extension bill, drill six holes through the three frames (Parts #3, #6, and #5) and into the two step-supports (Parts #21) and permanently install them using 8” long 3/8” carriage bolts (Parts #25). Either countersink or tighten the bolts so that the heads of the carriage bolts do not extend above the surface of the triangle frame where the platform floorboard will be installed later.

7. Study the next section for instructions and cut and install the Outer Edge Trim piece (Part #1) that lies against the outer edge of the triangle base where the Pod Door Portal will be located (i.e. where you are installing the steps.) You will need to notch the lower edge of the Outer Edge Trim piece where it encounters the step-support beams.

**Hint:** It is important for maximal structural rigidity to be careful to only notch the Outer Edge Trim piece sufficiently to clear the step-support beams.

Because of the stresses that will be placed upon the platform from traffic up and down the steps, it is important that the Outer Edge Trim piece installed (Part #1) on this edge of the Pod platform contribute to the structural rigidity of the platform. Therefore, it is recommended that you install five additional lag screws to tie it to the triangle base beam (Part #3) as well as to the two
spoke legs of the triangle (Parts #2). Install three ¼” x 3” Lag screws (Parts #27); one in the center of the beam, and one at each end three inches in. These latter two lag screws will tie the beam into the spoke legs. Install two additional 3/8” x 5” lag screws (Parts #28) at an angle, starting 6” in from the end of the Outer Edge Trim piece but angled outwards to tie through the underlying triangle base part and again into the spoke leg parts.

8. Cut two 2 x 8 x 36” platform steps (Parts #20). Draw a line 6” in from each end of each step.

9. Clamp the lower step below the Step-Support beams, with its front edge even with the end of these beams. Drill four 3/8” holes through the two beams and through the step, and bolt the step to the step-support beams with four 3/8” x 5 1/2” carriage bolts (Parts #26.)

10. Cut two 2 x 4 x 8 ½” riser blocks (Parts #22) and set them on top of the step-support beams butted up against the outside of the Outer Edge Trim part (Part #1) that you previously installed.

11. Set the upper step on top of these two risers with its front edge flush with the front edge of the riser blocks. Install it using four 10” carriage bolts (Parts #24). Since the step width is less than 8” wide there will be a gap between the step and the front edge of the Outer Edge Trim part.

**Hint:** It is important to have a gap between the upper stair and the outer edge of the Pod platform. This gap prevents rain and snow that may accumulate on the step from leaching under the outer edge of the Pod and into the Pod structure.
2.6.6. Bracing Your Steps

You have now completed the construction of your step. If you walk on it, you will find that it is quite sturdy, but that it and the pod platform flex when you step on and off the steps. The flexing is due to the cantilever design of the step, suspending it completely off the ground. Over time this constant flexing would damage the platform and the Pod. It is therefore, strongly recommended that you prop a pier or rock or something under the lower step so that when it is stood on there is absolutely no flexing.

**Warning:** Brace your steps from underneath so that they don’t flex the platform and the Pod when used.

If you want to do the job right, install a 7th concrete pier (Part #23) behind the middle of the steps & directly under the four-inch thick beam formed from the Outer Edge trim and the triangle base part.

2.7. Adding the Outer Edge Trim

The platform Outer Edge Trim (Parts #1) serves several purposes.

- It reinforces the outer edge of the platform creating a 4x4 beam with each triangle base (Parts #3). The five edge Support Piers (Parts #9) of the platform will be located under these beams.
- The Outer Edge Trim also butts up flush against the outer edge of the platform floorboard (Parts #8) protecting and hiding the edge of the plywood.
- The outer edge trim contributes to the aesthetics of the Pod platform.

**Hint:** For aesthetic reasons, you may choose to use redwood, cedar, or some other resistant wood for your Outer Edge Trim, while the rest of the platform frame is constructed from pressure treated wood.

Here are the steps in installing one of the Outer Edge Trim boards.

1. To facilitate installation of the edge trim, lay one of the 4x8 sheets of platform floorboard on top of the triangle where you are going to install the Edge Trim board. This makes it easy to adjust the top of the Outer Edge Trim piece so that it is flush with the top of the platform floorboard. It helps to clamp down the two ends of the plywood so that it is lying flush with the top of the frame.
2. Cut one end of the 2 x 6 Outer Edge Trim board to a 36° angle. Measure along the inside edge of the board from the inside edge of the 36° cut and draw a line at the other end of the board that is the length of the triangle frame base to which you will be attaching this board. So if for instance, you have perfectly built your platform and the outer edge of the triangle frame is exactly 96”, then you will be cutting an Outer Edge Trim board that will have an inside dimension of 96” between 36° cuts and an outside dimension of approximately 98 3/16”.

Warning: Don’t precut all five Outer Edge Trim pieces. Successively measure and cut them as you work around your platform. This will allow you to adjust for slight deviations in your platform size, ensuring a tight fit between the edges of abutting Outer Edge Trim parts.

3. Carefully line up the Outer Edge Trim board end to end (butting it up against its Outer Edge Trim neighbor(s) if they have already been installed) and line it up flush with the top edge of the platform floorboard and temporarily clamp it into place.

4. Nail or screw the Outer Edge Trim part to the triangle base beam (Part #3) as well as to the two spoke legs of the triangle (Parts #2). If you are screwing the boards together, use 2” #10 screws (Parts #11.) Countersink the screws about ¼”.

Hint: Without permanently attaching it, lay a piece of floorboard plywood (Part #8 as yet uncut) on the top of the triangular frame to make it easy to line up the top of the Edge Trim with it.

Hint: If you are not going to disassemble your platform too frequently it is probably sufficient to nail the Outer Edge Trim boards to the rest of the frame using 2 ¾”
nails. If however you expect to be disassembling and reassembling your Pod platform a number of times, you are probably better off screwing the boards together. Use 2½” #12 screws.

**Warning:** Be careful that your nails do not travel through the triangle you are attaching your Outer Edge Trim piece to, and into the adjoining triangles. If you do so, it will be more difficult to disassemble your platform in the future.

### 2.8. Installing the Platform Floorboards

You will be installing a plywood floor on your IcoPod deck. The panels for that deck have the approximate dimensions shown in the diagram to the right.

While you could precut these parts, we find that it is easier and potentially more accurate to custom fit the pieces to the platform frame that you have just built.
Before installing the floorboards, mark lines down the centers of the ends of the various braces so that later when the floorboard parts cover them you will be able to know where the centers of the braces are located. Then transfer these lines to the tops of the floorboards to aid in screwing or nailing them to the braces.

An easy approach to installing the floorboards is one at a time.

- Line the 8’ edge of a floorboard (Part #8) up against the edge of one of the Outer Edge Trim boards (Parts #1).

- Using a 5’ straight edge, draw a line from the corner of the board nearest one of the points of the pentagon towards the center of the pentagon. Draw a similar line at the other side of the board.

- Cut the board so that it fits onto the triangle below it.

- Nail or screw the board to the triangle at the four corners of the floorboard. (You will complete the nailing later once all the floorboards are in place.)

**Hint:** Consider screwing the platform floorboards to the platform frame instead of nailing them. That way, if you ever need to remove a floorboard (for example removing the central floorboard to access the central pier), it is easy to do. Be careful to countersink the 2” #10 screw heads (Parts #11) so that people don’t cut their feet on them.

- Transfer the lines you drew at the end of the braces to the top of the floorboard you have just installed.

Repeat the process successively for the remaining four outside floorboards. Successively place each board up against the Outer Edge Trim board that borders it. Mark it for cutting, cut it, insert it and partially screw it in place. Then transfer the lines from the braces below it to the top of the floorboard.
Once the five outer floorboards are in place, you need to install the floorboard(s) at the center. You have two options here; install five triangular pieces one for each triangle in the floor, or install a single pentagonal central floorboard (Part #7.)

**Note:** The benefit of constructing the central pentagon from five triangles is that each triangle is screwed to a unique triangle frame below. So if you are able to access the central pier and the triangle bolts from below, you should be able to disassemble the platform into its constituent triangles without removing any of the floorboards.

If you use five triangles to create the pentagon, you can cut them from the scrap wood you cut off the outer five floorboards. If however, you choose to cut the center piece as a single pentagon, then you will need to cut it from a piece of stock roughly 43” square.

A simple way to trace out the pentagon is to use a straight edge to extend the lines of the edges of the pentagonal hole in the floor out so that they extend beyond the edges of your piece of rough stock. Then setting one edge of your square stock along the edge of one face of the pentagonal hole, use the extended (red) lines to trace out the two edges on each side of the edge that you squared up. Cut those two faces. Place the partially cut pentagon back into the center, and using extended (blue) lines, mark the final two faces of the pentagon. Cut them and voila, your pentagonal piece should fit like a glove.

Once all of your floorboards are in place, completely screw (or nail) all the floorboards into place.

### 2.9. Protecting your Platform from the Elements

Consider painting, varnishing or otherwise protecting your Pod platform from the elements and dirty feet. This is especially important for the plywood sheets that form the platform floorboards. A gallon of exterior quality water-based Varathane sealer will do an excellent job (Part #15.)
3. Attaching the IcoPod to the Platform

The Base-ring of the IcoPod should line up exactly with the outer edge of the platform. You can glue your Base-ring down, clamp it down, or otherwise attach it.

To prevent rain and snow melt from seeping under the Pod Base-ring, apply a line of tape completely around the Base-ring sealing the joint between the Base-ring and the edge of the Pod platform.
4. DecaPod Platform Design

4.1. DecaPod Base Ring Dimensions

You are building a platform for your DecaPod. Your Pod’s Base-Ring must fit on that platform. The Base-Ring of your DecaPod has a decagonal (i.e. a ten-sided polygon) shape with each of its ten equal outside edges exactly 96.984” (96 63/64”) long. Ideally you want to build a Pod platform that is exactly this size. Too small and it will not adequately support the Base-Ring of your Pod. Too big, and the portion of your platform that extends beyond the outside of the Pod Base-Ring becomes a flat surface where rain and snow can accumulate, potentially damaging your Pod by leeching up under the edge of the Pod and onto the floor of the Pod itself.

Recommendation: Build a DecaPod platform that is shaped like an equilateral decagon with outside dimensions exactly 8’ 63/64” along each edge.

4.2. DecaPod Platform Design Considerations

Unfortunately, the DecaPod section of this version of the Pod Platform manual is still incomplete. Please note the warnings that were discussed in the IcoPod platform section of this manual. In particular,

Warning: You must take into consideration the intended use for your Pod as well as the physical requirements of location where your DecaPod will be erected when designing a platform appropriate to your requirements.

This document is not presented, nor intended, to provide complete instructions for constructing a safe and useful DecaPod platform.

Warning: Icosa Village, Inc., makes no claims or warranties whatsoever about the completeness or the appropriateness of this platform design for your DecaPod application.

We recommend that you consult a professional builder for advice. You are responsible for ensuring that any and all applicable building codes and or regulations are properly followed, and that the structure you build is sound and complete.
4.3. DecaPod Design Diagrams

The diagrams below illustrate one possible platform design. You will note that at the center of this DecaPod platform design is the framing for an IcoPod platform without the Outer Edge Trim parts (Parts #1) attached. So if you intend to implement this design, please refer to the IcoPod platform sections of this design document for instructions for building the central pentagonal portion of your DecaPod platform.

*Hint:* Remember that the central pentagonal section of your DecaPod platform is an IcoPod platform WITHOUT its Outer Edge Trim Parts (Parts #1) attached.

**General Framing:** The pentagon whose center is indicated at “A” is identical to an IcoPod platform with its Outer Edge Trim Parts removed and replaced with frames that make up one face of the five connected rectangular frames.

*Warning:* While the outer dimension of each of the ten sides of the decagonal DecaPod platform should exactly 96.984” (96 63/64”) long, none of the internal dimensions provided below have been verified to be accurate. They are dependent upon the thickness of framing stock used. Verify your dimensions!
**Rectangular Frames:** Five rectangular frames are attached to the outer edges of the central pentagon.

The approximate dimensions and quantities of lumber required for these rectangular frames is shown in the next diagram.
**Outer Triangles:** Build five outer triangles similar to the five inner triangles that form the central pentagon.

**DecaPod Platform Floorboards:** Floorboard panels are installed similar to those of the IcoPod platform. Around their edges, ten DecaPod Outer Edge Trim boards frame the perimeter of the platform.
Note that the floorboard layout on the previous page is different from that used for the IcoPod platform. The ten five-sided panels facing in towards the center pentagon extend over the edge of that pentagon. Their inner edges rest upon the outermost inner brace (Parts #6) of the triangles of the central pentagon. If you choose to use this floorboard layout, approximate panel sizes are shown below.

Deca Pod Deck