Build yourself a portable home - a mongolian yurt
by davidbuzz on November 16, 2007

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Intro: Build yourself a portable home - a mongolian yurt

Yurt/Gher Construction 101

A guide to Building Yurts...or more specifically, how I built mine!

Based on Knowledge Gained from "Doing it Myself", and reading about it on-line.

I've now built three yurts, for myself and friends, and we go camping in Luxury in these a few times a year.

If you like the outdoors, but you hate having to crawl around in pokey little tents then this one's for you!

We sleep two of us in luxury in this tent, in a full queen-sized bed! Of course, sleeping on the floor, like a plastic tent, you could probably sleep 20 people, easily!. :-)

We have dedicated hanging space for our clothes so they don't crumple or anything, and lockable boxes for our belongings (or a lock on the door works too!)

When we invite other camping-inclined friends over for a party in our tent, we can confortably fit 15-20 people in, sitting around on cushions and lounging on the bed and on the rugs on the floor... now that's what I can a party tent! :-)

If you like pictures, please be sure to have a look at step 9 - it's got over 50 assembly photos on that step alone !



Image Notes
1. this is a yurt made by real mongolians! (not by me). You can see mine in the instructable!



Image Notes
1. half-way through the assembly of the finished yurt. This is just a sample of what my yurt/s look like inside!

step 1: Overview of the parts and process.!

I'm going to cut right to the chase, and assume you know the following (in principle):

1) What a yurt is, and what it's made from.
2) How all the components should look when together.
If you've ever seen a yurt in the flesh, or photo's, or read a bit about them, that's enough.

As you can see from the photo/s, there are a few major components, so I'm going to write about each of these in turn, with some background info, and how to make them, and after that I'll show you how it all comes together for the assembly!

- Dimensions and background.
- Timber Components

- wall
- roof
- door.

- Metal Components

- roof hub
- bolts, pins, pegs.

- canvas components

- wall
- roof
- roof cap

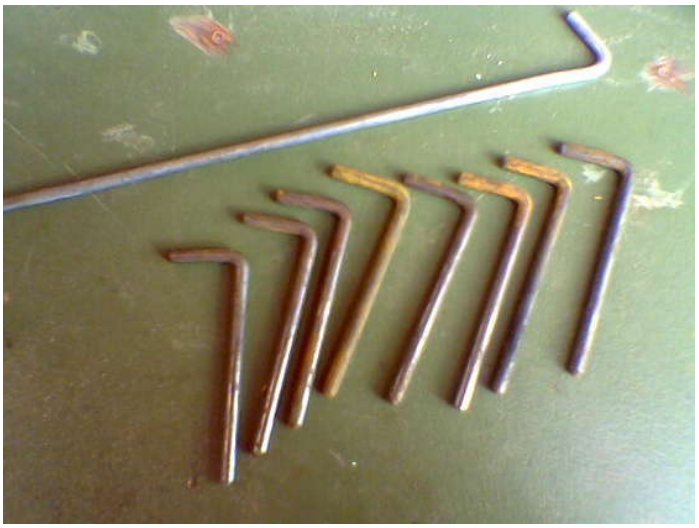
- Assembly!

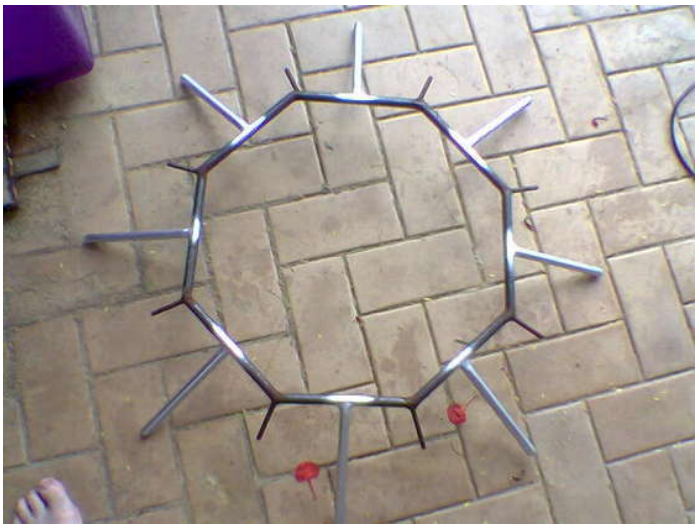
below are a few sample pictures of some components, just for intereste sake:





Image Notes
1. 8 large roof timbers, spraypainted to make it more obvious which end goes to the centre
2. 8 small roof timbers, spraypainted same as the large ones - the cord wound (and glued) round the end is a little reinforcing to stop the timber splitting





step 2: Dimensions and background

Over all DImensions:

Tent Diameter: approx 15' (5 meters) across.
Tent Height: approx 10' (3 meters) in the centre, and 5'6" (1.6m) at the edges.

My Yurt Components (A reference guide for later) :

Wall Timbers: 8'(2400mm)long x 6mmx35mm Slats (see below) Quantity: 70ish

Wall Bolts: 1" or 1&1/2" long x 1/4(6mm) bolts Quantity: almost 300

Main Roof Supports: 8'(2400mm) x 45mmx35mm Beams Quantity: 8

Secondary Roof Supports: 8'(2400mm) x 45mmx16mm Beams Quantity: 8

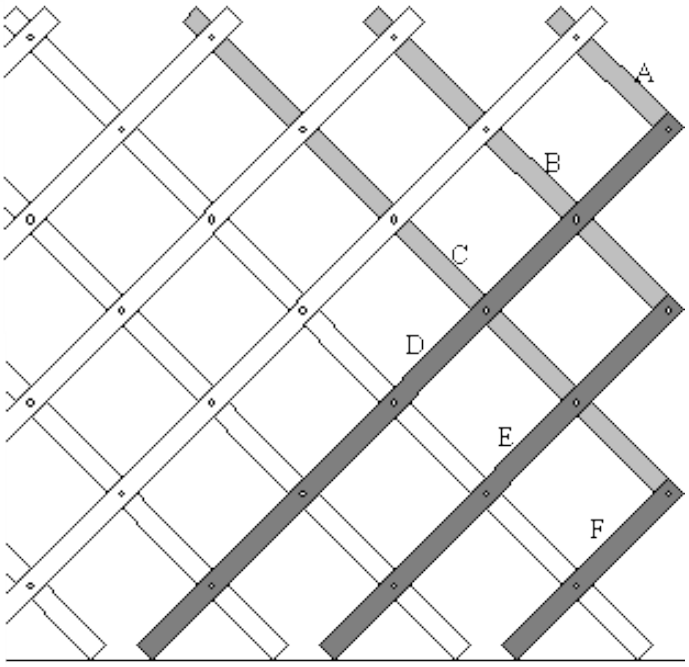
All roof supports and wall slats are cut-down from 90x35 F8 or F12 pine framing timber - see below for details.

Roof 'HUB': Constructed from metal (see later steps)

Wall Canvas: 8oz canvas - preferably "proofed", but I used untreated and unbleached canvas and treated it myself (see details in later steps)

Roof Canvas: 12oz canvas - MUST be "proofed" (water proofed, and anti-mound treated) ...don't use 8oz or you'll regret it. If you can find a really strong and properly treated 10oz canvas(I couldn't), then that will probably do, but it might sag a little.

UNRELATED ASIDE: If I was going strictly "traditional" I wouldn't be using zinc plated bolts (or any bolts), I'd be lashing saplings together not using machine-sawn timber, I'd be using natural felt made from sheep and yak fur mixed and pressed with oils (linseed and boiled animal fats) not water proofed and anti-mould treated canvas. I wouldn't have a tarpaulin on the floor, it would be dirt, and there would be a rock-surrounded fire-place inside the tent for warmth (and smoke). The door would always point south, the north inside wall would have a religious idol/importance. The men and visitors would always sit/sleep on the west, the women and children on the east, you would always stop for a meal when passing, you would always ask 'How are you?' '..And your family?' '..And your flock is fat and well?' (and the answer would always be yes even if it's not true) I'm not THAT anal about "traditional" form nor am I a "historical" nazi.



LATTICE ASSEMBLY

step 3: Timber Components - the wall

How I decided on the size:

Some designs I saw specified 1&1/2"x1/4" OR 1"x1" OR 1&1/5"x1/2" sizes.

I figured that the smallest size would be lighter and would be strong enough if I had the slats "overlap" enough, and I saw at least 3 sets of plans that used 1/4" thick slats, so I used that size.
As it turns out, the flexibility of the thin slats is really good for portability as it allows the yurt wall to be rolled-up rather than split into sections and layed out flat.
I thnk 5-6mm is OK, but only if your timber is not prone to breaking, and has natural flexibility in it. Other timber batches do require 7-8mm. In all three tents that I've made, I've always used pine, because it's easily available, and cheap, but there are differing qualities, and using the lowest quality pine (once, in my second tent) did result in more damage occuring, more easily, so I prefer the higher grade/s now.
The extra 2mm might not sound like much, but it'll make a big difference while still giving the flexibility...or you could leave it that thin and use a slightly harder timber than pine (eg meranti)...pine is probably as soft as it comes, so anything comercially available will be stronger than pine. If you don't have pine locally, use whayever softwwood it is that your house frames are normally made out of.

What size I ended up using:
I used approx 6mmx35mm (1/4"x1&1/2") cut from 90x35mm pine construction timber.
Using a "thin kerf" saw blade in a standard circular power saw I was able to cut 9 or 10 slats from each 90x35 length, so I cut up 8 lengths into about 80 slats, and this gave me some spares to allow for the more than occassional knot in the timber which weakened the slat and/or caused it to snap. Don't throw out broken slats as these are used around the door where the slats must be shorter.
The structure is quite flexible with such thin slats ..it's quote strong enough tho, so if you are after a LIGHT and easy to carry wall structure then go for 6mm, a reasonably sized guy (me!) can easily carry my entire wall structure when it's rolled up into one 8' long 300mm across cylinder.
I've seen other designs that said when they rolled their walls up they rolled up to 2' (600mm) across, so either mine is more flexible/lighter or I rolled it tighter, or both.
Length of timber was 8' because the slats are angled at 45 degrees when setup, giving a wall height of approx 5'6", which is adequate for anyone 'normal' (if you are 6'6" tall u might like slightly taller walls).
My timber yard is aimed more at the commercial market, and they sell in 3.0,4.8 or 6.0 metre lengths only...which is great, I just bought the 4.8 lengths and asked them to cut them down the middle (to 2.4m or 8') "so I can transport them easier in my car".

How I cut it:
I mounted the circular saw upside down (with the blade parallel to the wall) onto a "saw table" which I made up temporarily from a few scraps of timber I had lying around. The table top needs to be almost twice as long as the timber you are cutting "longwise". The table I jigged up

was about 4 meters long.
I then screwed a "running board" to the top of the 'table', parallel to the saw blade, so that it was 6mm (or your prefered slat width) behind the saw blade.
Remember that the saw itself is actually underneath the table, and has the blade sticking up through a slot that you sawed in the table just for this purpose!.
Don't use your dining table for this! DANGER: dont ever try this at home! ;-) Using an exposed saw blade like this is a definite danger. If you like your fingers DO NOT go anywhere near the saw while it is running.
In order to switch the saw on/off and keep it on without holding the trigger in all the time, I plugged it into a powerboard that had built-in switches, and used these to switch on/off, I then used a "zip-tie" around the handle to keep the trigger "on" permanently.

In order to keep the timber that is being cut hard up against the timber running board(and hence make sure that the slats are consistent in width - which is important), I added a little swinging pivot to the table near the saw blade, and hung a heavy weight off the pivot with a piece of thin rope.
It was arranged such that the strip of timber that made up the pivot pushed up against the front edge of the timber being cut, and the counter-weight (in my case a large lump of hardwood, but a house brick or 2 would also do) pulled on one end of the rope with the other end tied to the pivot.
The overall result is that the weight on the rope pushes the 'pivot' timber, and that in turn holds the timber being cat hard against the running board. If none of this makes sense to you, thats OK, don't worry about it, just find a willing volunteer, give them a "push stick" and charge them with the responsibility of holding/pushing the timber hard against the running board while you feed it along the length of the timber being cut.
See the picture below if this is all still to much. It really quite simple, it's just hard to describe.

(SIDE NOTE: a "push stick" is a piece of scrap timber at least a metre long (or 2) than anyone working with a table saw should be using at all times that they are anywhere near the saw. It is used to push the piece of timber that is being cut, so that you can push it right up to and through the saw blade without worrying about things like loosing fingers, etc, having your grip on something slip and 'whoops there goes that hand'. The end of the 'push stick' is sacrificed to the god of the power-saw as it becomes sliced and diced up...better it than your fingers!)

Calculating the Quantity of slats required:

A number of factors are involved... 1) how many bolt holes (ie overlapping slats) you have in each slat. 2) how big you want the finished tent to be, and 3) how many roof supports you want to have.

1) number of bolt holes can be between 5 and 10 per slat. I have seen examples of 5,7, 8 and 10. The person/plans I saw that said they used 5 later said they had modified their plan by adding intermediate holes, and converted the 5 to a 9 hole. I figured that I'd pick a middle figure out of 5,8 and 10. I used 8 holes, layed out thus:

first hole : 3"(75mm) from one end (the top)
next 7 holes: 1'(300mm) in from the last
leaving : 9"(225mm) between the last hole and the other end (the bottom)

This gives a "grid" when assembled whose sides are 1' (300mm) in length.

My finished tent is approx 15' diameter. It seems that most designs I could get my hands on a based around a 15" tent (or close to) as it is quite large enough to normally sleep say 6 or 8, and
this makes it perfect for two or three and leave lots of room to spare.

Some maths: lets assume we want a tent of around 15'(4.5m) diameter, and we are using 8 bolt holes separated by one foot into an 8' slat as described above. When the slats are assembled we will also assume that they are angled at 45 degrees. This results in a wall height of around 5'6" with the slats at 45 degrees.
The angle of the roof will mean that the centre of the tent is over 7' tall (more on that later), so if you are more than 5'6" tall, don't worry, youll only have to duck when going thru the door.
If the slats are at 45deg. then they will be forming diamond shapes in the wall grid that are actually completely square. the width of these "squares" across the diagonal (ie horizontal to the ground) is (using pythagoras) square-root of 2, or 1.41' (424mm).
In order to get a tent that is 15'(4.5m) round you need a circumference of 3.14x15' (3.14x4500mm) ie: 47.1' (14.13m). with each 'square' being 1.41'(424mm), that means we need 33.65 of them to go the entire way round the circumference.
Each square takes two slats, so we need 67.3 (must be multiples of 2) rounded to 68 slats for the entire tent. That said, we haven't allowed for the door yet, or taken into consideration how the roof sits on the top of the walls, but you get the idea....next, the doors etc....

If we make the door 2x1.41' or 2.82' (846mm) wide, then it's an nice even figure, and we can simply reduce the number of required slats by 4 to 64. (the door taking up the space that those slats would have take up).
Since the roof supports have to have their lower end supported onto a point where the slats intersect, then we must be able to divide the number of 'squares' around the tent evenly by the number of roof supports we decide to use.(or suffer un-evenly spaced roof supports - eek!)

When building my yurt, I forgot this next bit of the step, so every time I put the roof onto the walls, the roof suports never quite sit right as I have to put them onto the nearest intersection , which isn't exactly spaced out. Oh well, it still works well, just not quite as neat.

The neat way: Lets say we decide the roof is to have 8 primary supports that hold up the centre ring, and 8 secondary(smaller cross section) supports that are for stopping the canvas sagging, so we end up with 16 supports.

In order to divide the number of roof slats up evenly into the number of wall 'intersections', we must have either 16,32,48,64 or 80 'squares' around the yurt (counting the door as two for the sake of the math). Since we figured that we we going to have '33.65' (rounded to 34) squares (see above), then we were pretty close to the required 32 that we have just said we must use. Of course, you could also change the number of roof supports to match the walls, rather than change the number of wall slats to match the roof supports. Say you've done what I did, and built your walls, then realising that the number of roof supports you cut is wrong, it's easier to cut another roof support or two than it is to change the wall structure...so long as you haven't built your center 'hub' yet, otherwise it's easier to add or remove a few slats from the wall.

So, the decision I made was to have 16 roof supports, meaning 32 'squares' (two of them

are the door), so with 30 actual squares (32 minus two for the door), we should need 60 slats (plus or minus a few to be cut up either side of the door), and have a resulting tent size of just a smidgen smaller than we originally said.

The final size is 32x1.41' or 45.12'(13536mm) circumference, and 14.37'(4310mm) diameter if you keep the "diamonds" perfectly square. Just push the walls out a little more, and make them a couple of inches shorter, and you still have the 15'-16' tent you started with.

Phew!.

SIDE NOTE: other plans I've seen vary the roof supporting structures from 5 to 45, so there is a lot of variation here. The upper end of the range is most likely for areas that experience snow, or that are using extremely thin roof supports, or that like the idea/neatness that comes from having a roof support on the top of every single wall 'intersection' - ie where two wall slats join at the top hole, the lower end is possibly for those using a very heavy canvas, or a smaller tent size that doesn't need as much 'support' to stop sagging) My original planned roof used 8 as I was goinf for maximum portability, minimum weight, but I modified the roof before I had even finished building the yurt to be 16 as stated above, and this is a much better result for minimal weight gain - the secondary supports don't really have to hold much weight at all, just some canvas. It's the primary ones that hold up the ring. Some other plans don't use two types of roof support, but instead opt for all of them to be load bearing. This works too, and will probably give you a roof ring that you can do chin-ups from without any problems. I hang entire wardrobes of garb from mine with no problems.

Drilling the holes into the slats:

Use a drill press, or be VERY careful to make sure you drill straight thru.
Every plan I read said that a drill press was a good idea. I didn't use one, I was just really careful, and mine worked, but if you are "powertool-impaired" like some of my friends (hi Wolfe!) then you must use a drill press, or get one of your non-impaired friends to do it.
Because the timber I'm using is soft (pine) and gives a bit due to how thin it is, I was able to get away with the holes being up to 3 or 4 mm off center by the time they came out the other side of the the 90x35 (drilled thru the 90), but I really strongly recommend taking your time and getting the holes really straight as it makes lining up the bolts so much easier.
Be accurate and consistent in your measurements when marking them onto your timbers before you drill too as this is also really important.

Assembling the walls:
I've seen plans that specified rivetting, tying with cord, cotterpins, and bolts.
Bolts are so much easier then rivets, and so much stronger than cord or cotterpins. Just make sure that you either use self-locking nylon nuts , or deliberately damage the end of the bolt thread after putting the nut on (this stops the nuts coming off in-transit and getting lost).

I just hit the thread end of the bolt with a hammer a bit as it's cheaper than nylon nuts (go to the hardware store and check the price difference for yourself - if you are on a tight budget you'll do what I did).
If you are building a yurt/ger then you've obviously seen how the walls are put together so I wont bore you any more. It's just a case of inserting 300 odd bolts thru the right holes, putting all the nuts on (no need to tighten them - actually tightening them is very bad!), and then making sure the nuts won't come off easily after you damage the thread a bit.

The only assembly point that is ESSENTIAL is that all the slats angled one way are *inside* the circle, and all the slats angled the other way are outside the circle, otherwise the frame won't fold-together in a scassor-like fashion.

Like I metioned, my holes were sometimes up to 5 mm off in places, but the timber has plenty of 'flex' in it so I just encouraged it a bit with a hammer where necessary, and made it fit. ;-)
(don't hit the timbers to hard or you'll break the slats before you even start).

Near the doors, the slats must get shorter by one hole at a time, I fiddled with the shape of the timbers where they joined onto the door frame, just because I wanted a neat finish. Everyone does their doors differently as it depends what you want.
Traditionally (in the 1600's and earlier) the monguls would have just had felt 'flap' doors, not solid timber hinged ones, but I've seen quite a few that go the solid door (and it's popular in mongolia nowdays!) as it makes for a very secure structure, and is pretty cool.

Mine is a extremely simple frame made from (suprise suprise) 90x35mm pine framing timber. Two lengths the height of the finished wall (5'6"), and two of the desired door width (2.82' or 846mm). I made the simplest possible door frame, and the door is a canvas drapery that I hang over the space. I did that because I wanted portability, and a big solid door seemed like a real pain to carry around. To do similar, I suggest using a large timber screw called a coach screw, two in each corner of the door, , and drill a hole through them, and screw them together.

Other options might be :
1) a 'door' that is still canvas/cloth covered, but is actually made of lattice like the walls, this is portable and secure, I'm sure you could make a lock for it somehow.
2) on one plan I saw recently on the web (it might be in the URLs listed below, I don't remember) had a "double" door, by that I mean solid "french" doors. Two half-width doors with one hung from each side. It's more portable, and still solid. I'll probably do this way eventually.



Image Notes
1. circular saw aka saw table for cutting 90x35 timbers into strips.
2. uncut timbers
3. slats that were not good enough (ie I broke them)
4. lots of sawdust!
5. this is a long plank and rail that keeps the timber aligned while cutting it.
6. pivot timber, to assist pushing uncut timber up against the rail on the saw table.
7. random large lump of hardwood timber acts as a counter-weight - the cord is tied from the above pivot timber onto this weight. a couple of bricks also work well. For a weight that is easy to calibrate, use a 10liter bottle, and fill it with as much water as necessary.
8. the bench/frame is made out of whatever I have handy. some random square tube, and some old wood bits weleded and screwed together - very dodgy, but it's only temporary.



Image Notes
1. saw blade sticking thru
2. counterweight lifted onto the bench for the photo, normally hangs off the back of the bench out of sight.
3. pivoting timber. the end closest to the camera actually swings all the way around to just in-front of the sawblade, and the counterweight holds it there.

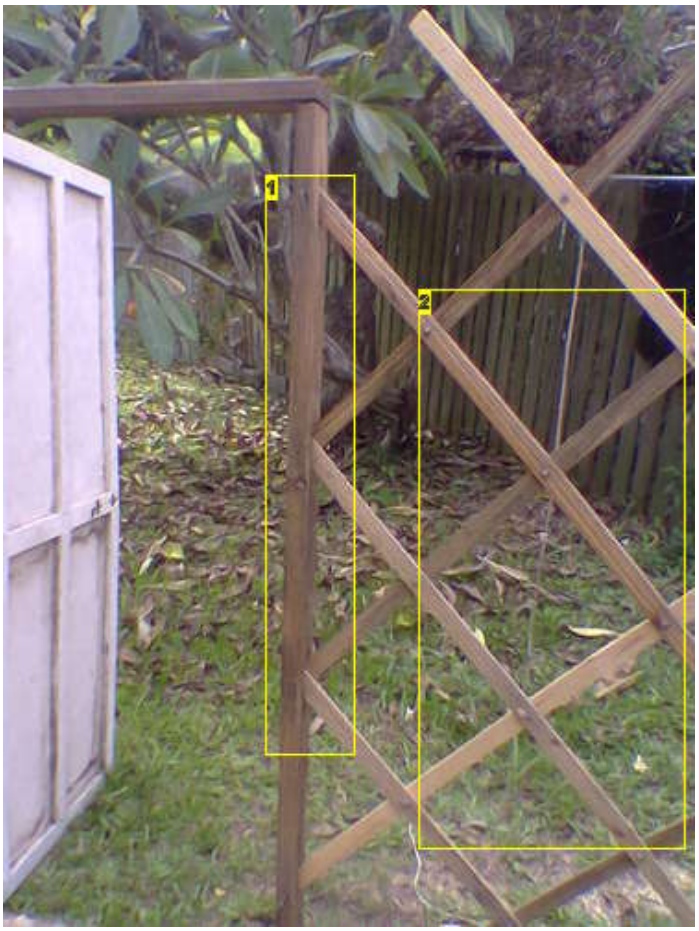


Image Notes
1. align and fit ALL other wall timbers to door, and peg top fitting
2. assembled lattice-work wall, fully opened.

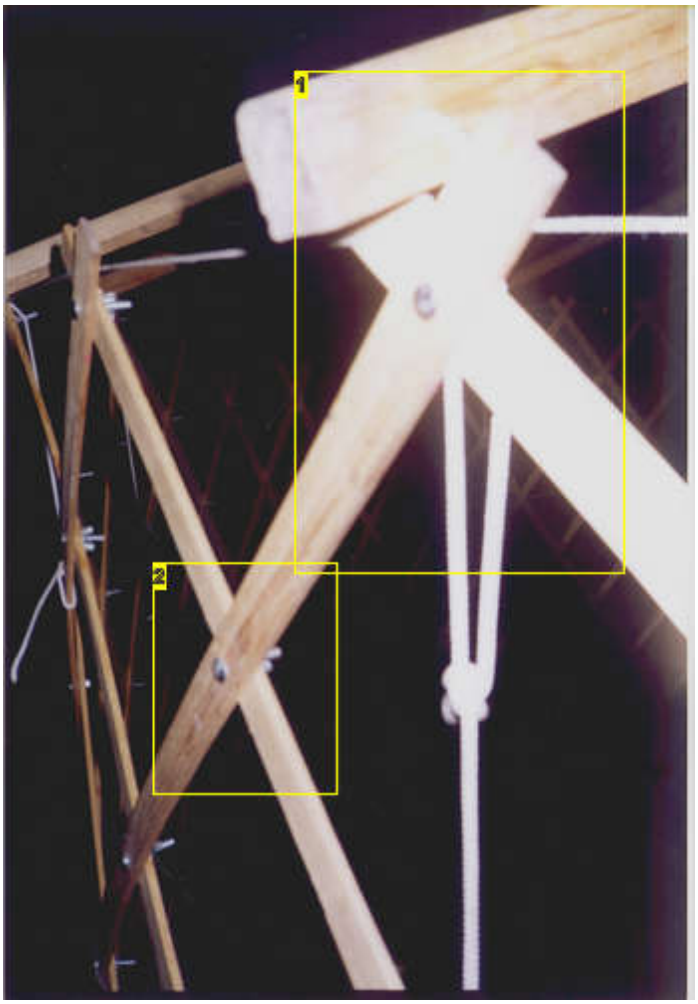


Image Notes
1. the old way of tying the roof to the wall with cord, no-longer the preferred way of doing it, but still works.
2. see how each of these joints is bolted together. don't tighten these bolts, as they need to act like pivots.

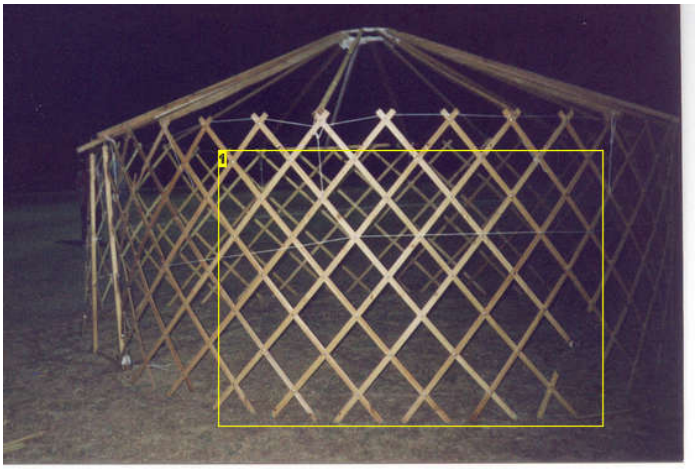


Image Notes
1. fully assembled frame, there are a number of minor errors in the way I've assembed this, can you pick them? Even so, it actually doesn't affect the overall strength of the structure significantly because there is a LOT of redundancy.

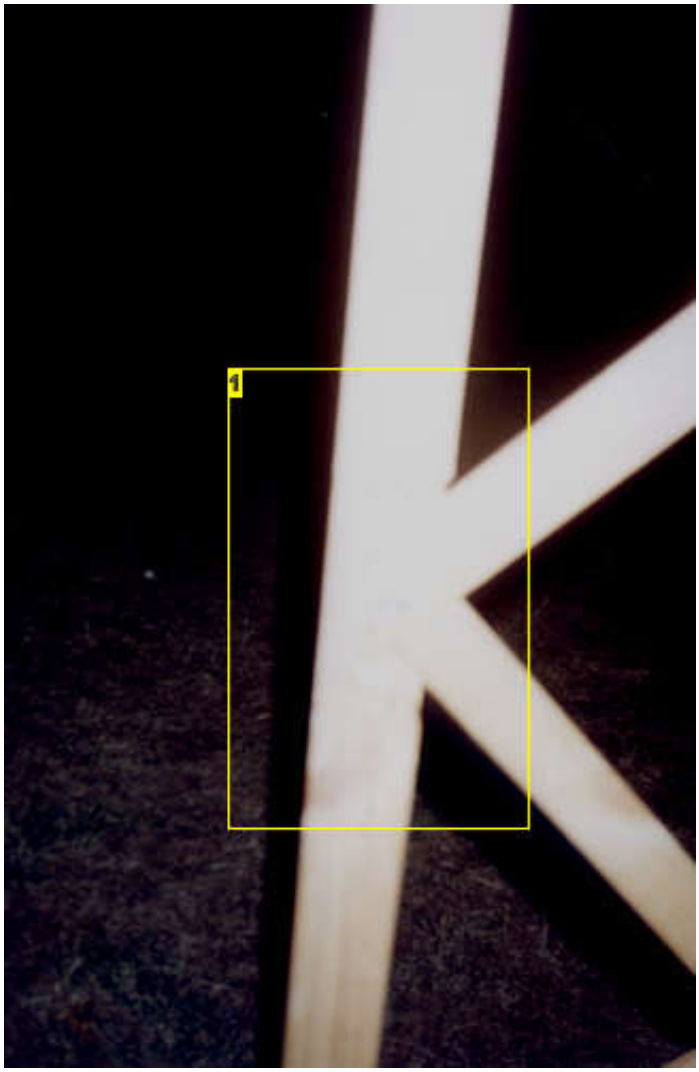


Image Notes
1. bad photo, but it's the wall->door joint, just gives you an idea.



Image Notes
1. underbench photo of my circular saw . I screwed it to the plywood sheet in 4 places.

step 4: * Timber Components - the roof!

Main roof supports:
Cut up the roof supports from 90mmx35mm (just like everything else).
4x2400mm lengths, each cut down the middle makes the 8 primary supports.
2x2400mm lengths, each cut into 4 makes the 8 secondary supports.

I live in a snow-free zone. If you are going to be snowed on you'll probably want a greater roof pitch (eg make them 9' or 10' long instead of 8' long) AND stronger beams.

Roof/height Support lengths/pitch/angle:
A 15' diameter tent has a radius from the centre of 7&1/2' (which is shorter than the 8' length of the recommended roof supports), When the roof is angled, the pitch is slightly longer than the straight radius, so with a bit of math, depending on the actual pitch and size you choose, you might find that 8' is actually to short to reach the centre, or perhaps a bit long. That's ok because it doesn't have to reach the centre. The centre contains a 'hub' that can be anywhere from 1'(300mm) to 3'(900mm) across.
I could say I figured out the exact roof pitch I wanted, used some more math to get the required length of the supports, then used that to figure the size of the ring I needed if the supports were 8'(2400mm) long, but I didn't. I decided I wanted a 1&1/2' (450mm) ring, and that I didn't care what pitch the roof ended up at, so long as it wasn't flat.
I stood in the back yard with a half-assembled yurt and no centre ring, put a ladder in the middle, and propped the top ends of the roof supports on the top of the ladder (a 10' ladder I think), and guestimated that it would be fine.
I built the ring and I put it together, and it's close enough. I could increase the pitch a little, but heck it works the way it is, so why change it?

You do it however you like. :-)

My First yurt was assembed this way, and it assembles fine, but it's more of an art to put together than a science. The next two yurt/s actually turned out a bit smaller (13-14' foot diameter), so I actually found it was necessary to cut up to a 20cm(6") off the roof timbers, so that they don't hang-out-over the edge of the yurt. That's OK too, and I find these are actually easier to assemble!.

Roof Support Connections:
Joining the roof supports to the centre 'hub' is detailed in the hub section, but joining the bottom of the roof supports to the top of the walls can be done in a number of fashions:
1) the first method I used, and the one I currently still use on my first yurt (but don't recommend) involves tying them down. Drill a 6mm hole thru/across the bottom end of the roof supports about 30-40mm (1&1/2") from the end, and tie a loop of strong woven cord (eg 4-5mm nylon venetian blind cord) that is about 150mm (6") across through that loop. The loop can then just be tied around top of the wall , when the support sits on the wall. I currently do that, and also extended the loop with about 450mm (1&1/2') of cord that can be lashed to the wall further down so the joint is secure (this bit works well enough).
2)What I did on yurt numbers 2 and 3 was to use a steel "pin" on the top of the wall, and have a holedrilled into the rool timbers at an angle matching the pitch of the roof. the steel pin on the frame goes into the hole on the roof timber, and creates a joint. have a look at the pictures, and you'll see what I mean.



Image Notes
1. 8 large roof timbers, spraypainted to make it more obvious which end goes to the centre
2. 8 small roof timbers, spraypainted same as the large ones - the cord wound (and glued) round the end is a little reinforcing to stop the timber splitting

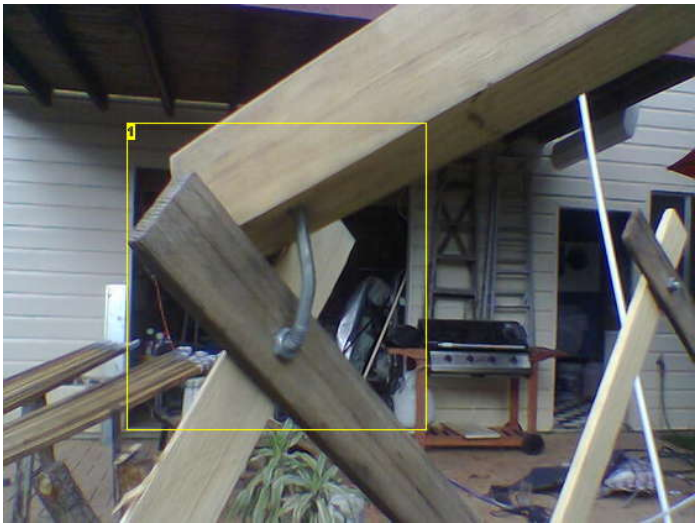


Image Notes
1. close-up of roof-wall fitting, prior to marking with paints



Image Notes
1. the roof timber, currently being drilled.
2. my drill.
3. this a spade-bit, and a shank-extension onto the spade-bit, so that the hole/s can be drilled deeper than the length of the drill bit.
4. very old clamp I bought for $2 about 10 years ago. It's covered in paint, and rusted. I think I need a new one.



Image Notes
1. in this pic, three timbers are not touching wall, because the ground is VERY uneven!
2. like here!





Image Notes
1. same joint, roof timber removed, shows how the joint pins are made from a bolt

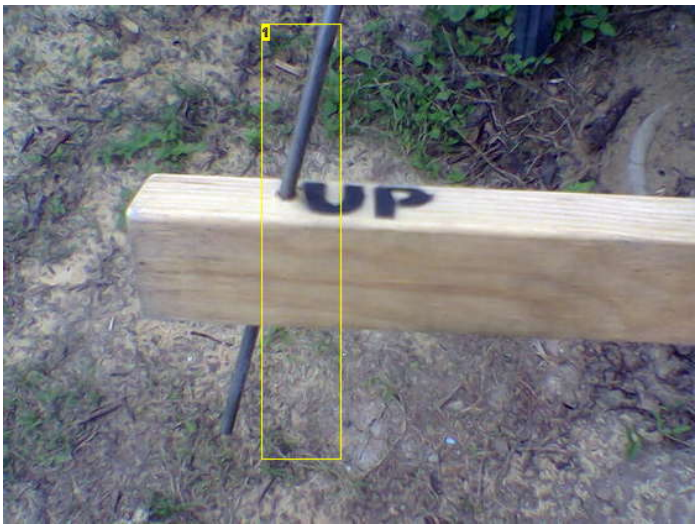


Image Notes
1. this photo identifies the angled drill-hole through the roof timbers, and the reason they have UP

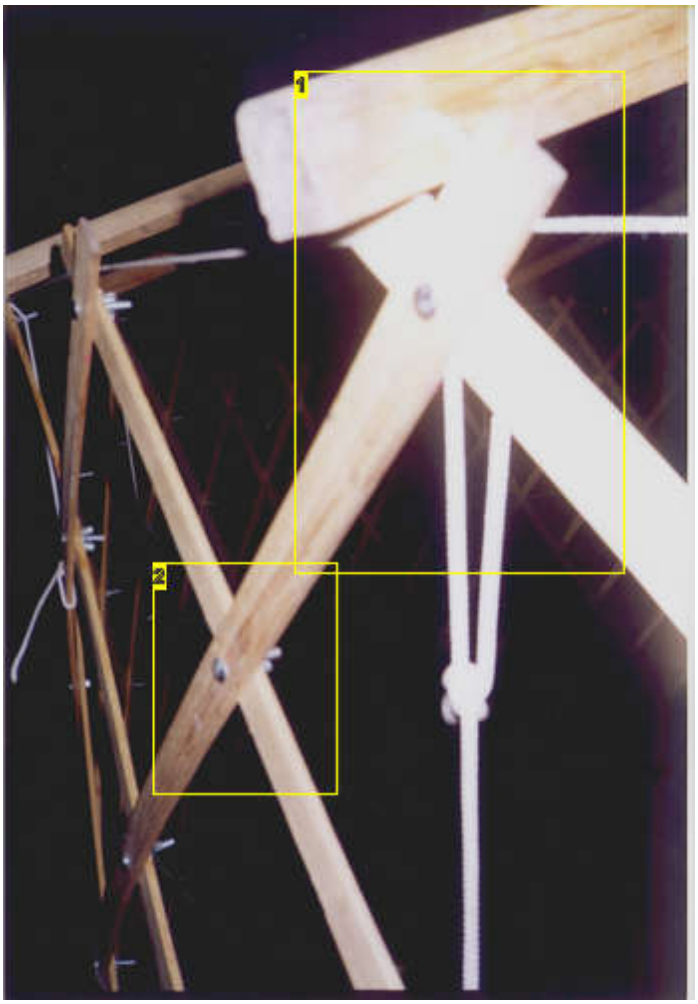


Image Notes
1. the old way of tying the roof to the wall with cord, no-longer the preferred way of doing it, but still works.
2. see how each of these joints is bolted together. don't tighten these bolts, as they need to act like pivots.



step 5: Metal Components - the roof hub

Roof Hub Options:

The whole purpose of the 'hub' is simply a way of connecting the centre of the roof all together while also giving a centre 'vent' or 'port' for circulation/ventilation/smoke/watching the stars.

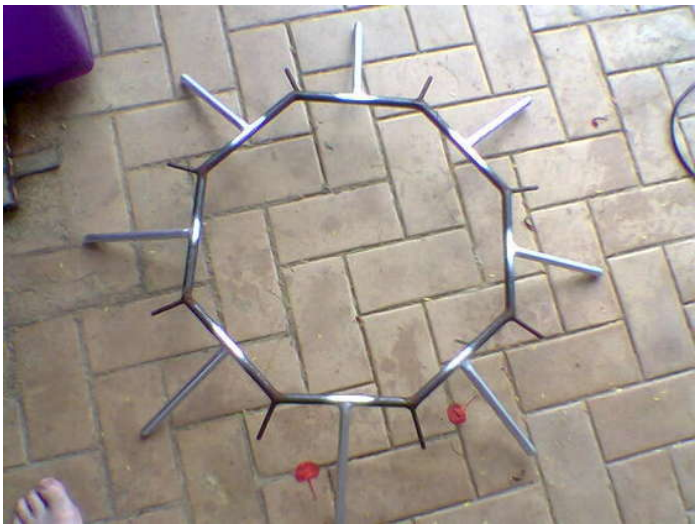
1)Traditionally it would have been a ring of saplings that the roof saplings were lashed to, but that's not something that's easy to dissassemble, and reassemble.

2)Today the most common form (I've seen it in other yurts) is a 3 layer "laminate" ring made of two layers of ply and a middle layer of wedge shaped timbers, the result being that there are squares to push the roof poles into. (the roof poles need to have an angle cut into them to use this form). I have seen this form work well and would recommend it if you have timber skills,but not metal working skills, but I did not use it myself.

3) A timber "ring" formed by building a vertical laminate up from long thin lathes of timber which are steamed and bent into a ring, and glued and clamped together, with more lathes of timber being added into the inside of the 'ring' until it has a thick-enough profile/width.
This is lighter than 1), doesn't require the roof supports to be weakened by cutting onto an angle, (only rounded off to fit the large holes that are then drilled into the ring laminate), and is probably the best form to use if you ignore the construction. It's just really hard to make and get it to work right.

4) Finally, The form I ACTUALLY used: I own a welder, and have reasonable metal working skills, so I made a 450mm (1&1/2') ring from solid metal 15mm rod (actually an ocatagon, but it looks like a circle if you don't look to closely!), and off of that I welded 8 large (15mm round) 'prongs', and 8 smaller 8mm round 'prongs' (one for each of the 16 roof supports), I arranged these so that they were angled down at the same pitch as the roof is supposed to be (whatever you worked it out to be for yout tent, I just guessed).
To join the roof timbers to this steel "star", I then VERY CAREFULLY drilled a very deep 16mm or a 9mm hole long-ways straight into the end of the roof supports/timbers. (I bought 2 spade bits(16&9mm) and a "spade bit extender" in order to drill a really deep hole.
I drilled about 200mm into the timber end for the large supports, and made the large 'prongs' 220mm long, and 100/120mm for the smaller 'prongs').
The idea is that the roof supports slide over the 'prongs', and produce a very strong joint. This works really well, and I found it easy enough to make.

I made this joint up..I've never seen anyone else use this method on their yurts/plans..I just guess no one's thought of doing it this way before...or they don't like it because it's not "traditional" enough for them.
My 'hub' (the first yurt) is really rusted - because it was recycled steel in the first place, but the newer yurts I made were painted with zinc-impregnated (rust inhibiting) paint, which keeps them looking reasonable.



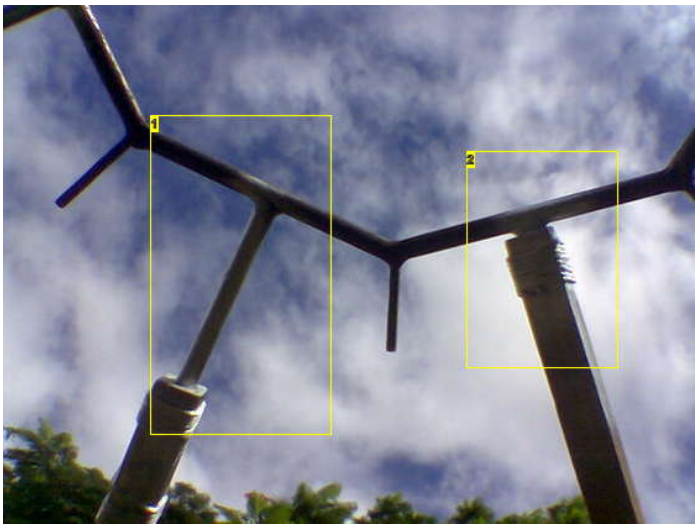


Image Notes
1. if roof timbers dont fully slide in then wall is not circular. This one indicated here is badly fitted.
2. timber roof and metal hub fitted together well.

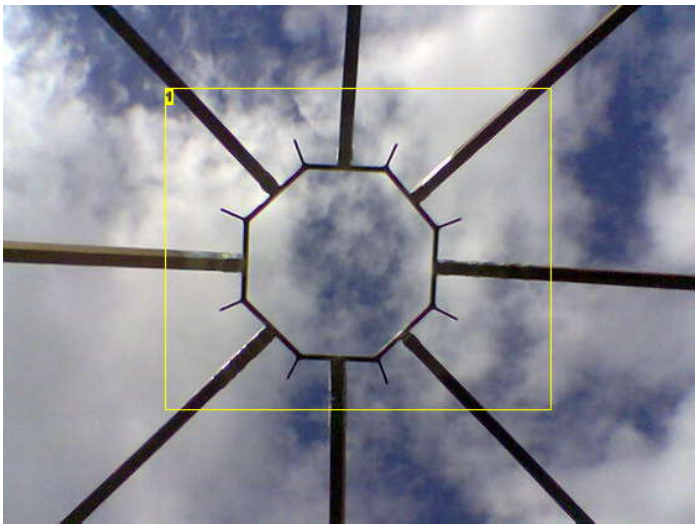


Image Notes
1. all 8 large roof timbers now fitted

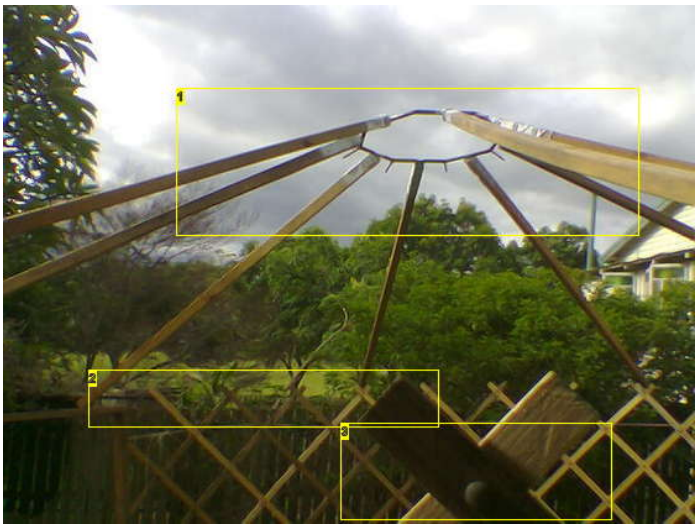


Image Notes
1. all 8 large roof timbers now fitted-side view
2. top edge of wall makes row of X's, after final assembly, timbers are fitted to every second one of these.
3. close up of the top of wall.

step 6: Metal components - - bolts, pins, pegs.

The remaining metal components that need to be manufactured in some way or another are:

Metal Pins
- for pinning the doorframe to the wall lattice. these are just bent steel 6mm (1/4") rod. they need to be removable so that the yurt can be dis-assembled, and re-assembled easily. I made the ones in the picture from a piece of mild steel 150mm long, with a 50mm (2") handle/bend at one end.
Newer ones I actually make by purchasing galvalised tent pegs (just like the one shown), and cutting them in half. It's easier, and they don't rust so much.

The 3rd picture shows a close-up of the pin assembled through part of the wall lattice and door frame/s.

Bending them is actually really easy with one end in a bench vice and hitting the other end with a hammer (start lightly, don't rush it, or you'll create cracks).

Roof Eyelets, and Hooks.
- the hooks are actually an option, but something I find makes it easier to assemble the finished roof.

At each of the 16 points around the roof edge where the timber/s point to (ie equidistant), your should put a brass "puch-through" eyelet which is large enough to lace your cord through.

Every second of these should have an "S-hook" fitted (see the second picture for mine) so that you can easily hook tie-down rope through it when you are assembling the yurt. I custom-made mine out of large calvanised nails, bent into a funny U shape, such that the head of the nail will not fit through the brass eyelet in the tent, but the shank will.
Bending them like this, I can permanently fit them to the roof, and not lose them, but can still lace the rope around the open end easily.

Pins for connecting walls to roof
Look closely at the last picture in this set, and you'll see that the vertical part of the "pin" appears to join onto the nut/bolt that goes through the wall lattice X. It's actually all the same bolt, just a long one, with the head cut off.
The bolt is a 1/4"(6mm) diameter, 120mm long bolt with thread on about 1inch of the shank.
By threading a nut on as far as it will go, and bending it almost exactly where the thread stops next to the nut, you get a L-shaped pin which is threaded on the short-section, and has the nut permanently locked into the "corner" (due to the distortion of the thread that occurs while bending the bolt right next ot it).
It's actually quite easy (just bend a bolt)...it's just hard to explain.

These special L-shape bolts are used in-place-of the short bolts at the top edge of the roof, but only on every second joint. (where the timbers sit).

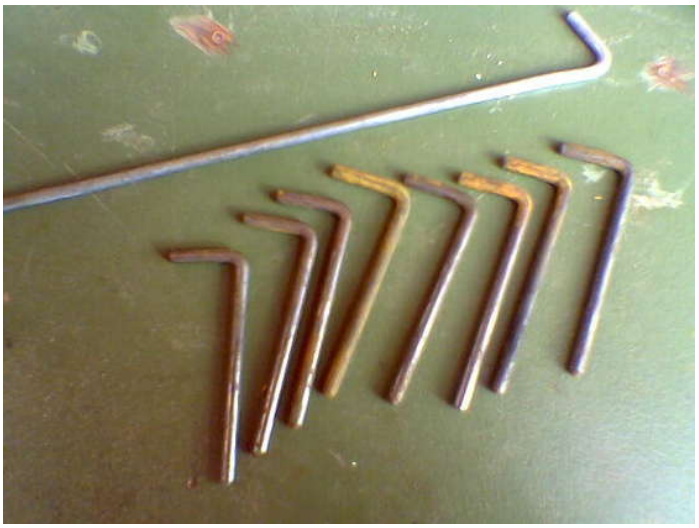








Image Notes
1. same joint, roof timber removed, shows how the joint pins are made from a bolt

step 7: canvas components - the wall!

Buy a piece of canvas that's as long as your tent is round, including the door, plus a bit spare - perhaps 30cm(1').

The simple version (my first method) :
I didn't have to do anything else to mine apart from hem the two raw ends, and put a few brass eye-lets into the hemmed ends. To keep it up, it just has the top few inches hung over the wall,
and held in place by the weight of the roof supports (bull-dog clips during assembly).
At the door, the canvas end is just taken thru the door, and string/light rope is used to lash
from the eye-lets in the end seam back to the lattice on the inside of the wall, which holds
the canvas tight around the outside of the wall when these are tightened a bit. The wall itself
can then act a little like a "tension band" ..the tensioning ropes are still a must though!.

The longer version (my perferred method now) :
background: my yurt's are constructed such that when all the timber frames are together, and the roof timbers are fitted, the top edge of the wall/lattice has a roof timber fitted on every second X joint. This leaves every second bolted joint free, and accessable for hanging the wall from.

To do this, I sew a reinforcing to the canvas just below the point that would be matched onto the joint in the wall, and sew a wodden "toggle" , via a strong nylon cord into the reinforcing. The wall canvas can then just be hitched-up onto the wall timbers, and hung there from the wooden toggles.

This gives a result that is invisible from the outside of the tent, easy to erect in a repeatable way, and still within the spirit of the construction.

Note about Tensioning ropes:
These tension ropes/cords (I use two bands, each of 3mm woven venetian blind cord) must be
permanently fitted to the timber walls before the camvas walls and roof are put on. I will go into how these cords are tied to the wall at the end of the Instructable. During test assembly though, you can just wrapt them round the whole yurt, and at least the top one must be partially tightened, or the timber lattice walls will fall down. This must be done before any weight is put on them like when you put the the roof timbers us, or the wall canvas is put on.

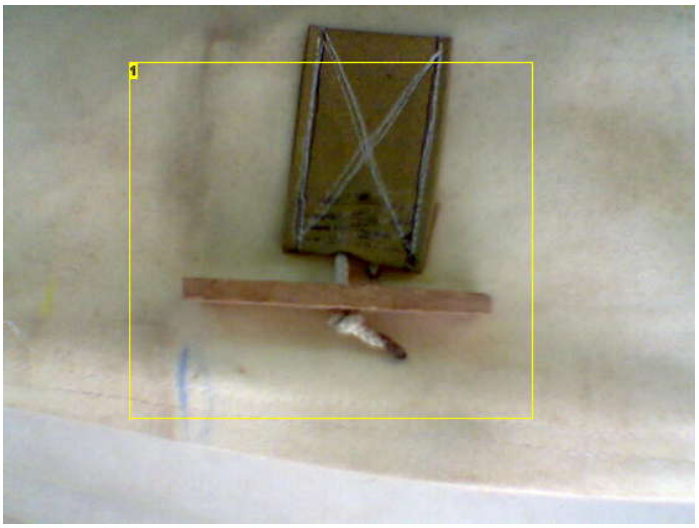


Image Notes
1. these toggles hold the walls up. They go on the inside of the wall canvas

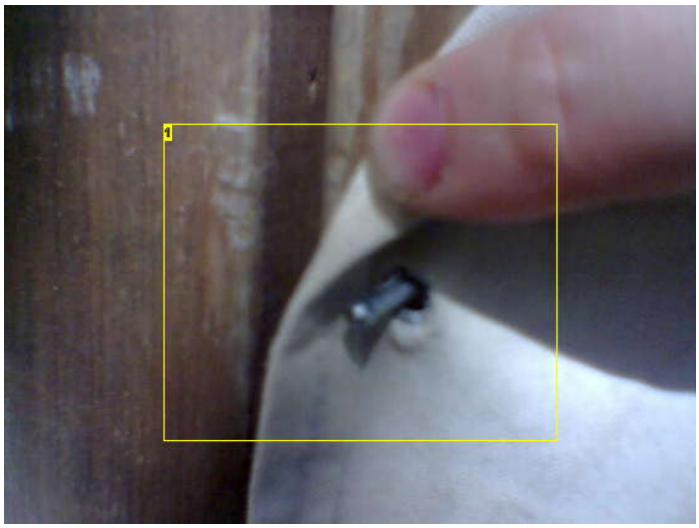


Image Notes
1. Here's a closeup of how the eyelets in edge of canvas hook onto nails in the timber door frame. Note how the nails are slightly bent to prevent the canvas coming off. the canvas is stretched slightly, so it doesn't come off.

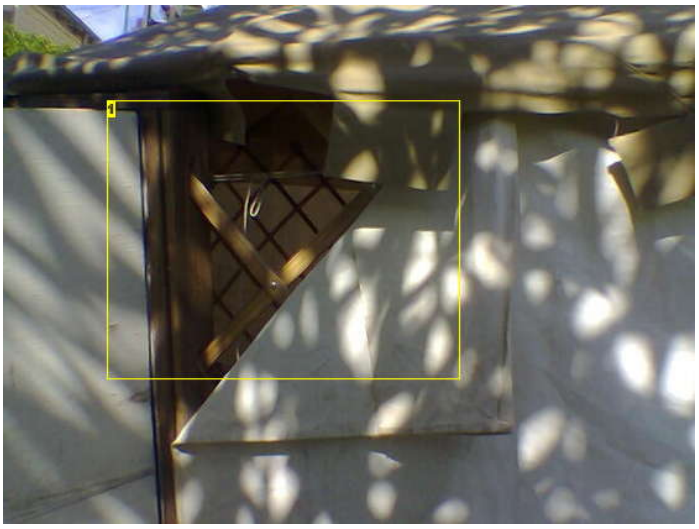


Image Notes
1. starting from the bottom, working up, same as when fitting the timbers to the door frame

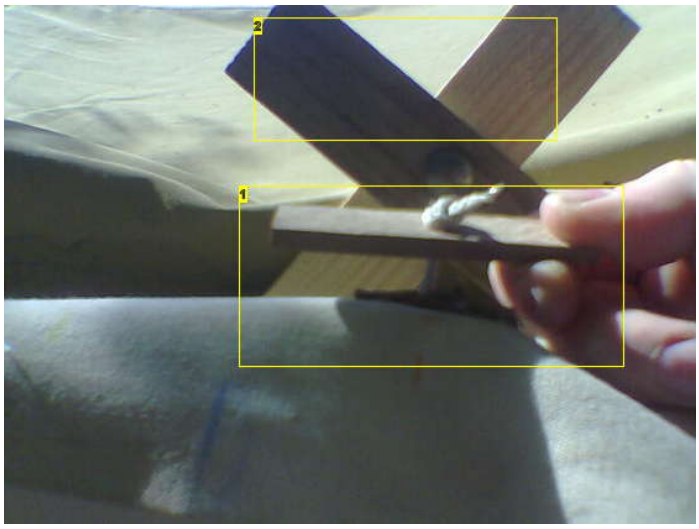


Image Notes
1. pulling the wall up into place - the toggles go on the top joints of the wall, the ones WINTHOUT roof timber on. this is the timber toggle
2. this is where the toggle is about to be put.

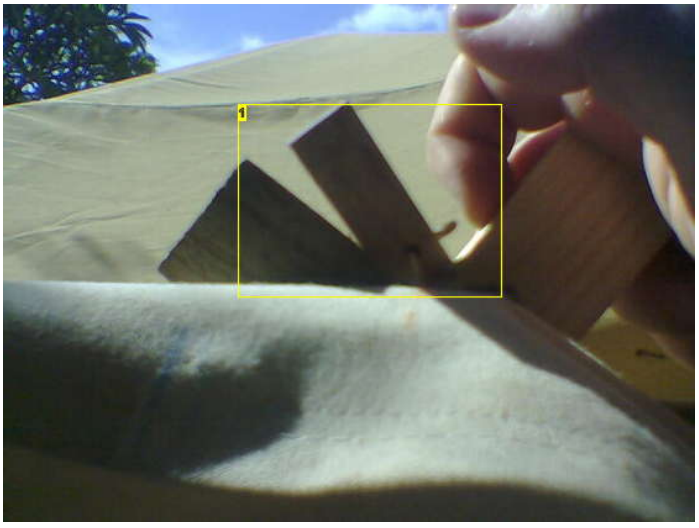


Image Notes

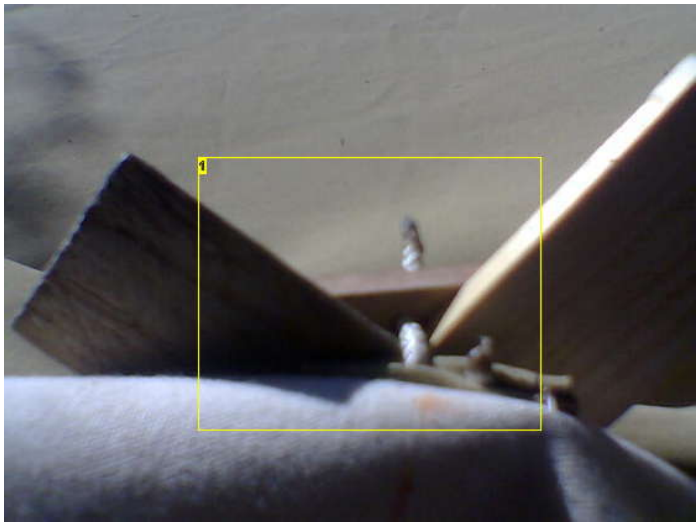


Image Notes

1. toggle is partially in place, do not leave like this.

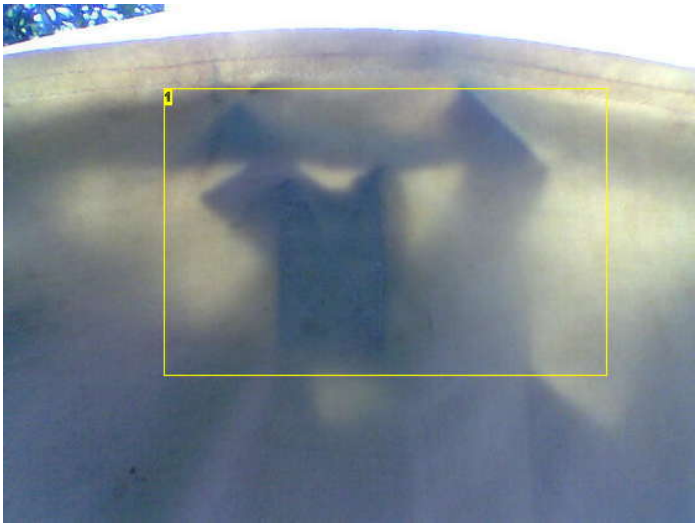


Image Notes
1. view of toggle from outside tent once fitted. sun is shining thru a little in this pic.

1. toggle is correctly positioned



Image Notes
1. partially hung wall round the back
2. not yet hung up - obviously.

step 8: canvas components - roof

Roof Canvas Construction:
Buy 16 metres of roof canvas at approx 6' wide, and cut/sew it as per the picture below.

Notice how there are two sections 1800(6') wide, these are the full width of the canvas. The two smaller rectangles (top, and bottom) are from the same length of canvas, just split down the middle to half their width.

The "wedge" that is shown missing needs to be cut out and sewn up so that the roof canvas becomes "cone" shaped. to match your roof pitch.
I actually find it easier to just assmemble the whole timber structure in the back yard at this point, and hang the completed flat circle onto the framework/roof. Using a stepladder, and lots of strong pins, I can then pin the roof so that it's clear exaclty how much canvas (the wedge shape) needs to be removed, leaving the roof as a "good fit".

For the simple version:
Do a final Trim, and hem of the outer edge only after you have removed the "wedge" and sewed that bit up, located the roof on the structure again, and finally walked round the outside with a piece of chalk drawing a line where you think the hem should go. I didn't, and no matter how I tried to make it an exact circle, the hems are still a bit uneven. Oh well.

For the more complicated (but preferred) version:
I sew a flat and straight "band" of canvas, about 20cm (6") wide, all the way around the roof edge. This fabric is deliverately NOT curved to match the roof, it is instead straight to match the walls, and it hangs from the bottom of the roof, down the walls, and fully covers-over the wall->roof joint making is really wind/rain/sleet/bug/insect proof.
This also gives a nice professional finish to the outside of the yurt.
I only did this in my 3rd yurt, for which I forgot to take pictures, but believe me, it's really good having a nice air/wind-tight seal there (my current yurt, the oldes one doesn't have this, and gets a bit drafty). Most of the pictures in this instructable are from my second yurt, which has "dagging" (ie zig-zag square shapes) around the roof edge, this was at the request of the "new owner", and is a bit prettier, but also less traditional, and not as airtight as the 3rd yurt with a solid band.

FINALLY: Don't throw out that "wedge" that you cut out from the yurt.... Cut the biggest equilateral triangle or circle that you can from it, and use that as the "cap" to go over your vent hole.
You'll need at least 24' (8m) of cord/rope to hold that 'cap' in place (three ropes that go from
the tips of the triangle or edge of the circle out to the the walls to be tied off.)

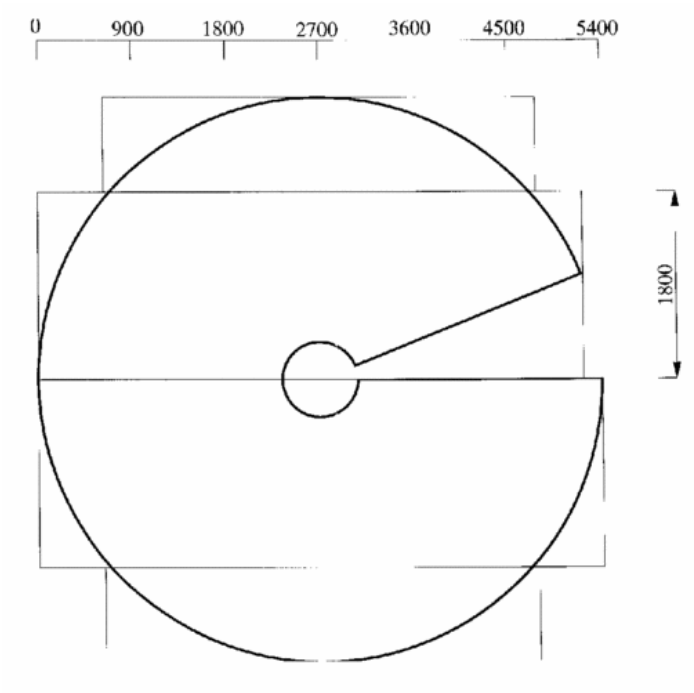




Image Notes
1. fitted roof canvas done! (inside view)

step 9: Assembly - putting it all together/up

The best way is to just give it a go and try putting it up. Expect the first few times you do it to take quite a while. You'll need two or 3 people, but no more. I can do it on my own now, but it's still easier with two.

Follow along through the pictures below for a detailed step-by-step pictographic guide with text hints. Seriously, looking at all the pictures is worth it - there are about 50 of them on this step! That's gotta be worth more than 1000 words. :-)

Hints:
*) You'll need a "tension" cord/band (or even two) to go right round the top (and optionally the middle) of the wall. It's important that you put this in place before you put the roof supports on. Some people use a band of canvas that is a few inches wide, I use a 3mm venetian blind cord round the top and middle of the wall (a thicker slat might not need two tensioners). I use two tensioners just to reduce the slight "bow" in the walls after everything is in place. I bought a complete 100m roll of cord and it was cheaper than buying 40m at the by-the-metre price, so I have plenty for things like tying the roof down.

- you can fit the tensioner cord permanently to the timber walls, by tying it onto each bolt-head all the way round the wall, which is a great idea, and makes putting it up so much easier too! See the pictures for details.

*) put(or keep) the tensioning cords/ropes in place before even getting the canvas out of the car. I always forget them, and then have to take the wall canvas off again in order to put them on. You can put them under, or over the wall canvas, I always prefer under, but others use over, it doesn't really matter, and is just cosmetic.

*) If the wind is light, hang the wall canvas over the walls before putting the roof supports on, and hold it in place with bull-dog clips (or stitch little pockets for the canvas to hang from). If the wind is strong, the wall canvas can act like a sail, and blow your tent away, so leave the canvas untill you have the weight of the roof timber/s to hold it down.

*) Put the centre ring up by putting in 3 opposing main supports first, the ring will then hold itself up, and the person who was holding it up will not get such sore arms. Try not to stand under the centre-ring very much while assembling it, because getting hit in the head with a large heavy object (if it falls down unexpectedly) is unpleasant and dangerous.

*) Start to pull the roof canvas over the roof, and at the same time have one or two people inside the tent with long poles (borrow a couple of minor roof supports for this if necessary), get them to use the poles to push the canvas up and over the roof. It's easier than trying to just drag it over with ropes.

*) Get a tarp, or large black-plastic dropsheet for your floor, you won't regret it. Cut a circle about 3/4-1' (~200-300mm) larger all round than your tent, and fold the sides up inside your tent to prevent water getting into the tent. I origninally used 2500mm wide black-plastic "concrete underlay" plastic sheet (as it was cheaper than a 15' square tarp) and joined it together down the middle with that wide-brown "duct-tape". It sticks to that black plastic like glue, and is waterproof enough to survive a month underwater if necessary. The longevity of the black plastic isn;t great though (a dozen uses or more over 5 years) before the ground/rocks tear it up) , so having a tarpaulin floor is good, which is what I now use - I found a local canvas and tarpaulin supplier who made it to-measure for the circular shape for only $AU100 (about $US150) .

*) In anything except nil-wind conditions you definitely will want to take along a few tent pegs, I use 8 or them, placed in the ground directly as the bottom of the walls, and roped to the roof. (ie tie the edge of the roof canvas to the tent pegs) by putting the eye-lets and S-hooks every so soften around the roof hem, and zig-zagging the tie-down rope between these eyelets with the S-hooks and the tent-pegs set at the same spacing around the bottom of the wall. You end up with this nice regular tringular pattern visible around the edges of the yurt.

*) Otherwise (ie in nil-wind conditions) you can hold the roof canvas down with a noughts-and-crosses # pattern of ropes across the roof.

*) take three times as much 'cord' or 'rope' as you think you'll need, use it for:
- tensioning rope/s (about 15m per tensioner - I use two, so 30m)
- zig-zag tie-downs (roughly every meter round peremeter means 35-40m) or # roof ties (roughly 25-30m)
- cap ties (about 8m or more)
- tying wall canvas in place (either side of the door) (about 5 m)
(I bought 100m and use just about all of it somewhere. I even managed to not have to cut it, so it's still useful for other things for the other 350 days of the year)

Now, the assembly pictures! There are a LOT of these, in the order of assembly, so just have a look!



Image Notes
1. 8 large roof timbers, spraypainted to make it more obvious which end goes to the centre
2. 8 small roof timbers, spraypainted same as the large ones - the cord wound (and glued) round the end is a little reinforcing to stop the timber splitting

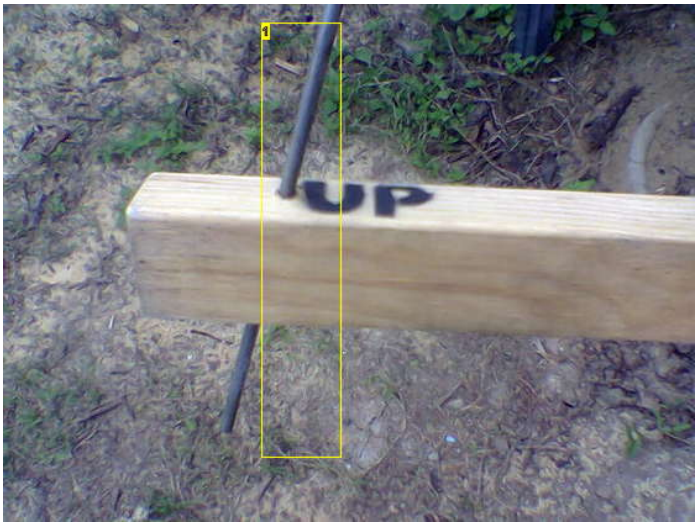


Image Notes
1. this photo identifies the angled drill-hole through the roof timbers, and the reason they have UP

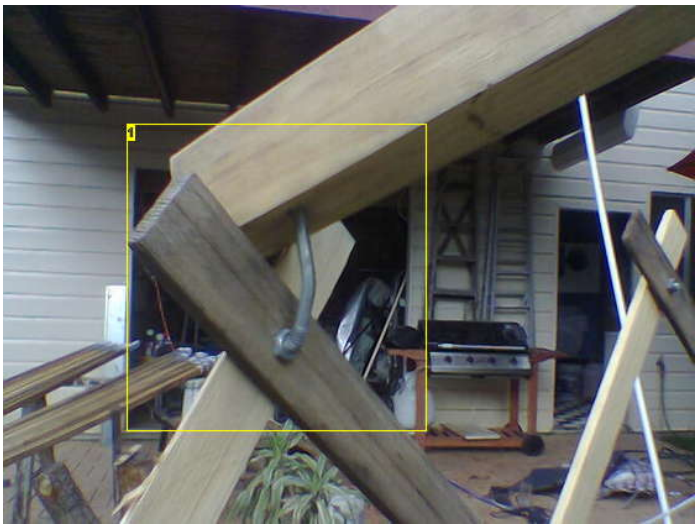


Image Notes
1. close-up of roof-wall fitting, prior to marking with paints



Image Notes
1. same joint, roof timber removed, shows how the joint pins are made from a bolt



Image Notes
1. inserted psteel peg in door frame.

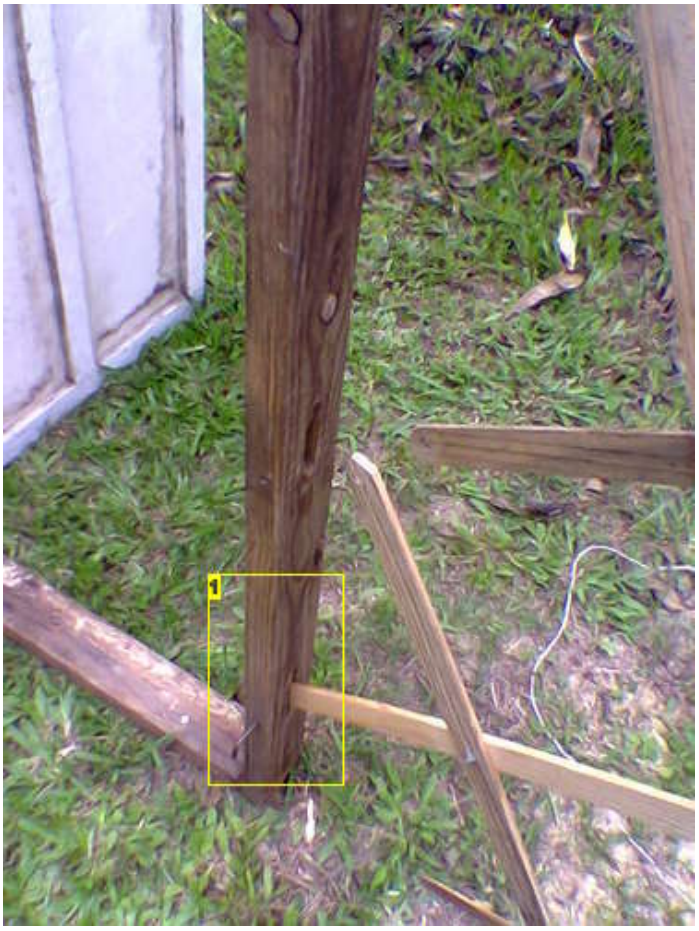


Image Notes
1. peg door frame to wall, at lowest point first



Image Notes
1. align and fit ALL other wall timbers to door, and peg top fitting
2. assembled lattice-work wall, fully opened.



Image Notes
1. fully pegged-door frame

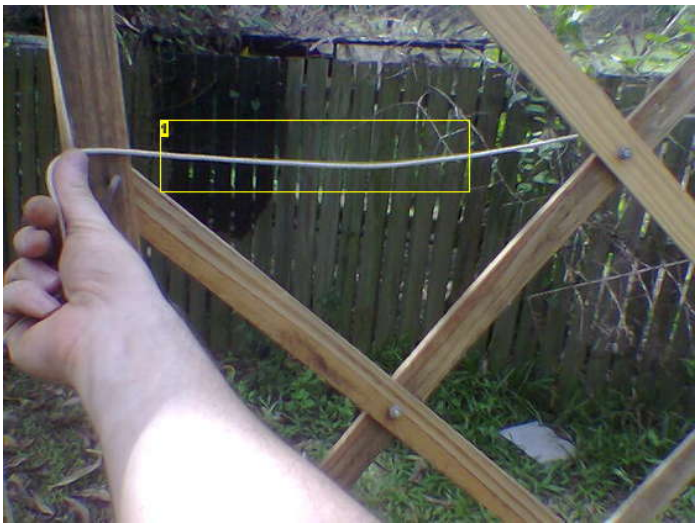


Image Notes
1. 15-tensioner ropes

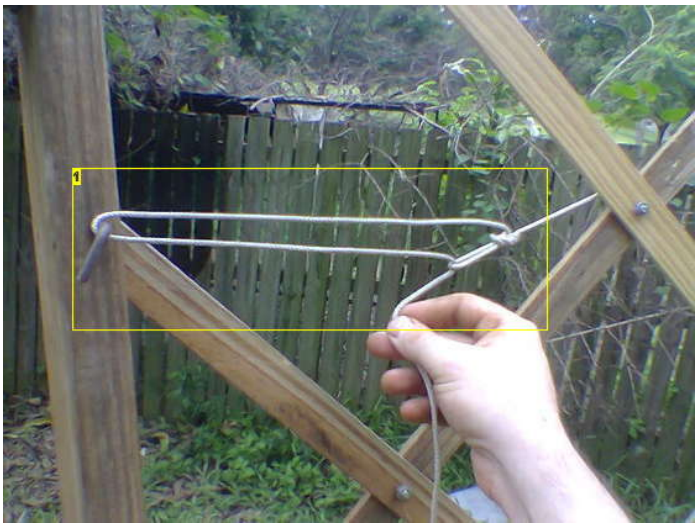


Image Notes
1. tensioner ropes - this is a nice easy way of tying a knot to apply tension to the cord.

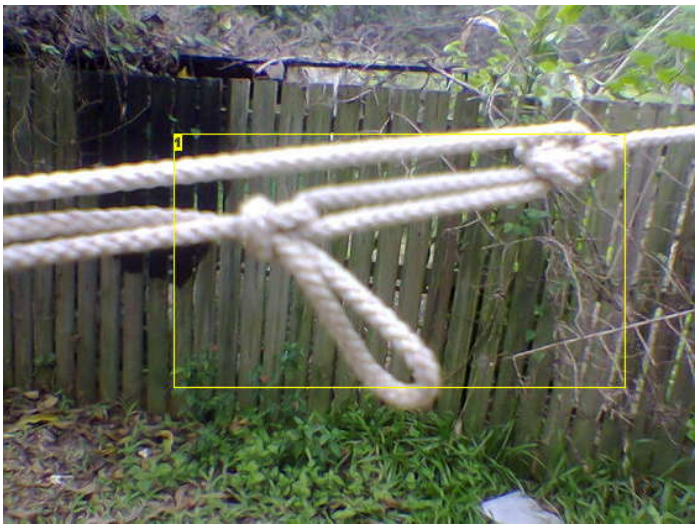


Image Notes
1. tensioner ropes-closeup of my final knot

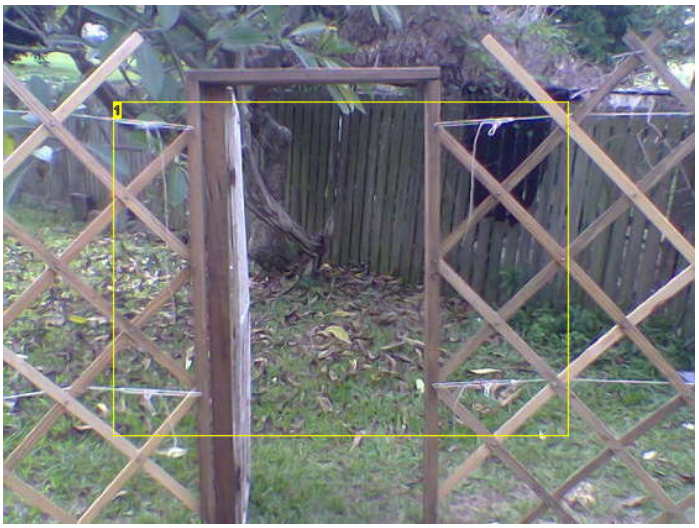


Image Notes
1. all 4 tensioners fitted, and tightened

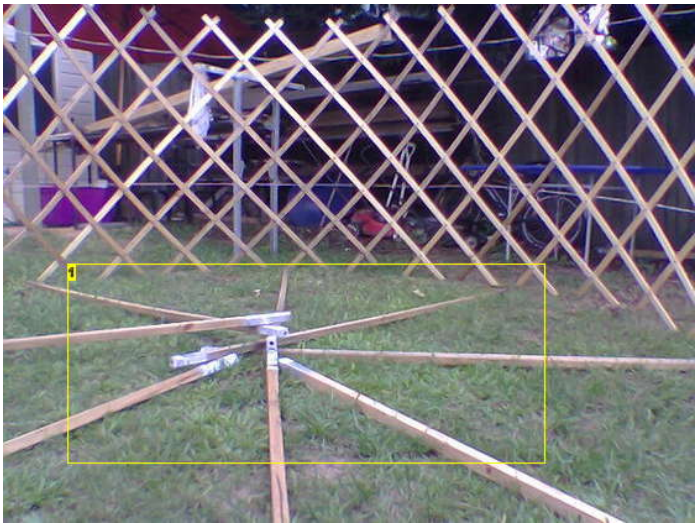


Image Notes
1. preparation - layout large timbers in approx positions inside yurt

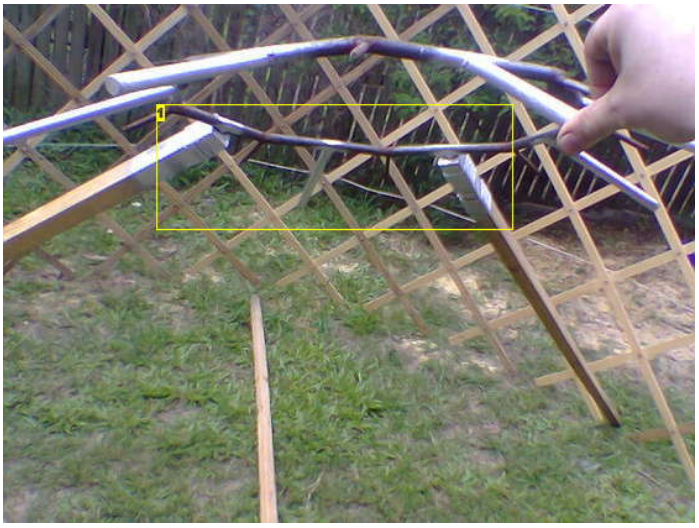


Image Notes
1. fit 2 non-adjacent timbers to roof hub, third will be placed where thumb is



Image Notes
1. balance two timbers (this is 1, and 2, not in the picture) onto approximate wall positions (in this case, on the door, but that's not necessary)



Image Notes
1. fit third timber to hub, keeping other end on ground initially - for simplicity
2. first timber fitted
3. second timber fitted

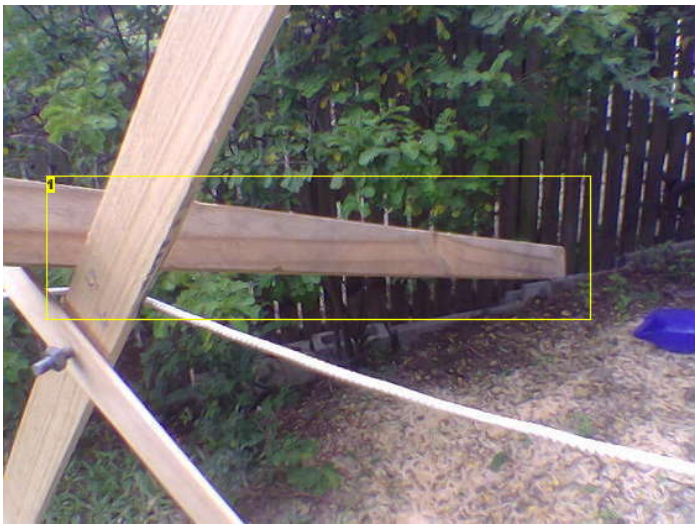


Image Notes
1. timbers 1 and 2 (see previous pic) MAY hang out up to 0.5 metre during next 2 pics.

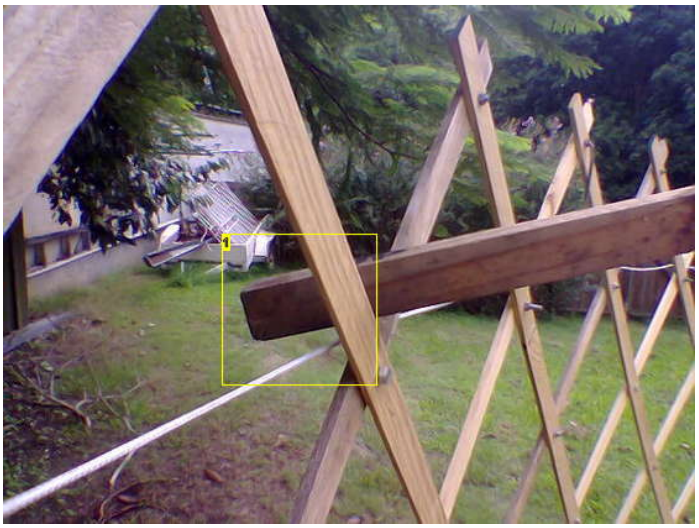


Image Notes
1. or they might not stick out much.... They should NOT be so close to the end that they risk falling off.



Image Notes
1. lift lower end of 3rd timber approximately into place. none are on top of wall yet, just approximately located.



Image Notes
1. adjust all three GENTLY into place ontop of wall, on those pegs that are made out of bent bolts.

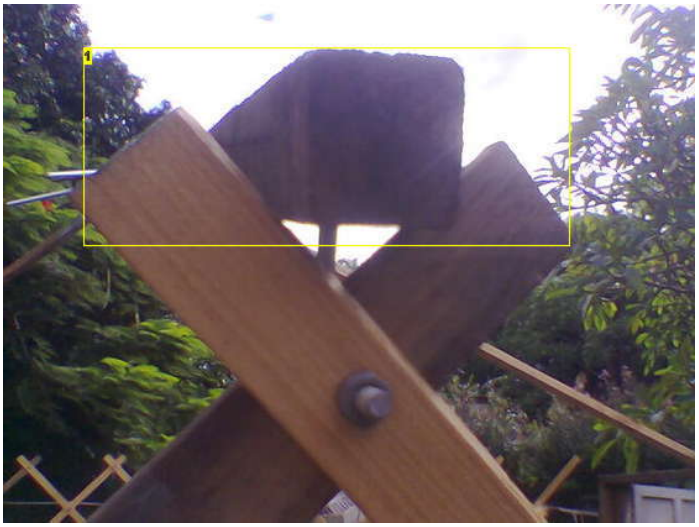


Image Notes
1. closeup of wall->roof joint from outside yurt

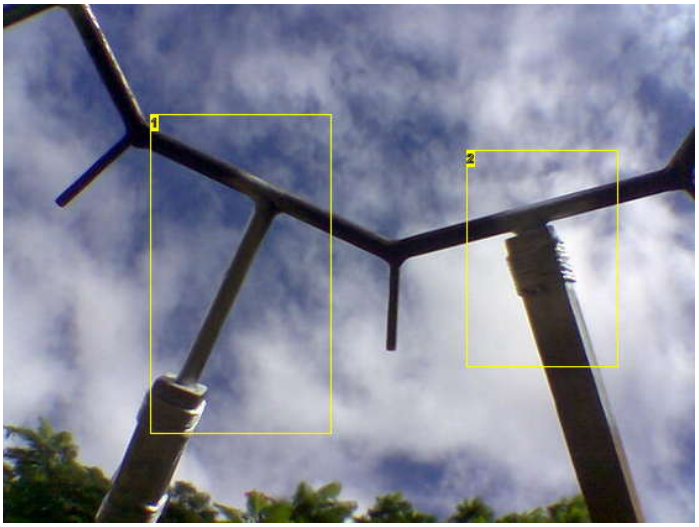


Image Notes
1. if roof timbers dont fully slide in then wall is not circular. This one indicated

here is badly fitted.
2. timber roof and metal hub fitted together well.

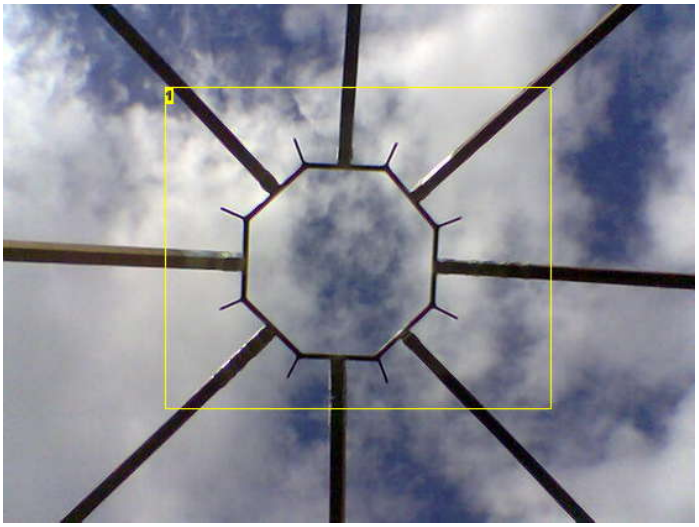


Image Notes
1. all 8 large roof timbers now fitted



Image Notes
1. all 8 large roof timbers now fitted-side view
2. top edge of wall makes row of X's, after final assembly, timbers are fitted to every second one of these.
3. close up of the top of wall.

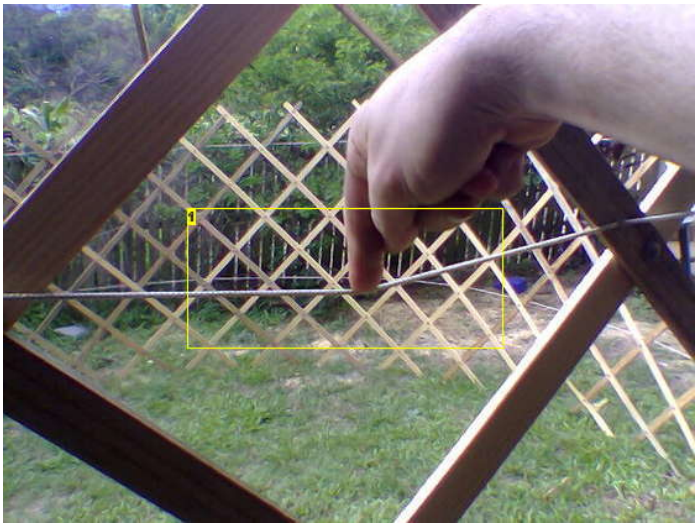


Image Notes
1. you will now find that tension cords are tight all-way-round, if not , tighten them more, or the tent will sag!

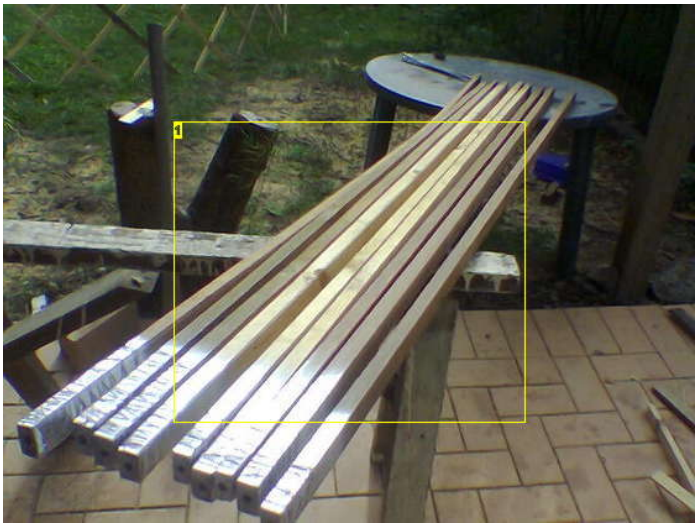


Image Notes
1. next fit these smaller roof timbers onto the yurt.

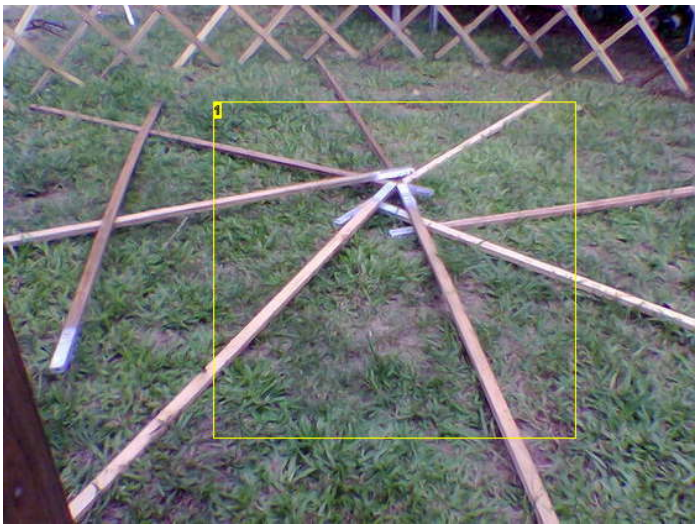


Image Notes
1. layout the smaller timbers on ground as you did the larger ones earlier

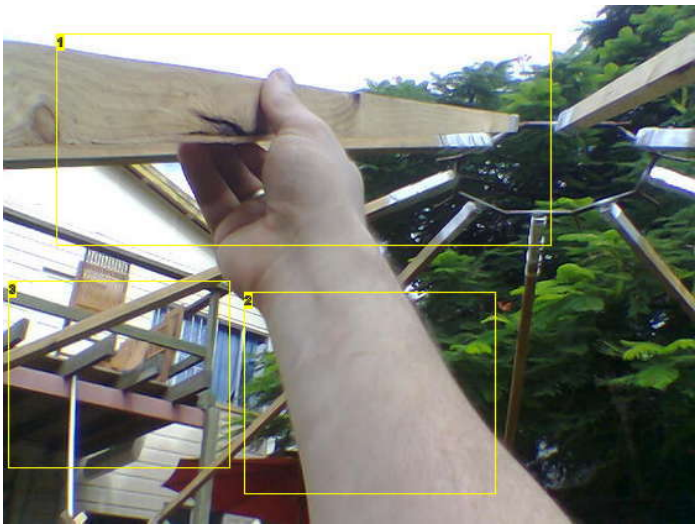


Image Notes
1. fit the small timbers like the large ones, one at a time, as before.
2. my arm, not very interesting.
3. my back deck, also not very interesting, apart from the fact that it's not 100% finished yet.





Image Notes
1. This is the same as the previous picture, but now I have fitted the lower end to the steel pin fitting on wall.



Image Notes

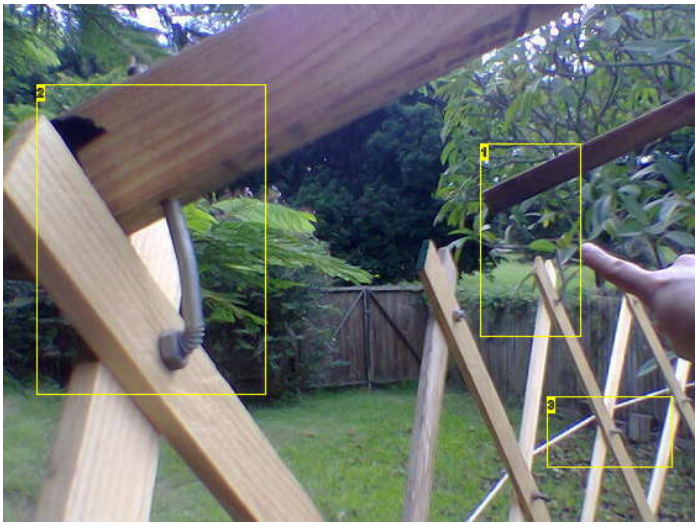


Image Notes

1. 42-make sure the timber is the right way up, or it won't fit.

1. 43-uneven ground may cause some roof timbers to not touch the wall, that's OK.
2. a well-fitted joint
3. tensioner cord



Image Notes
1. in this pic, three timbers are not touching wall, because the ground is VERY uneven!
2. like here!

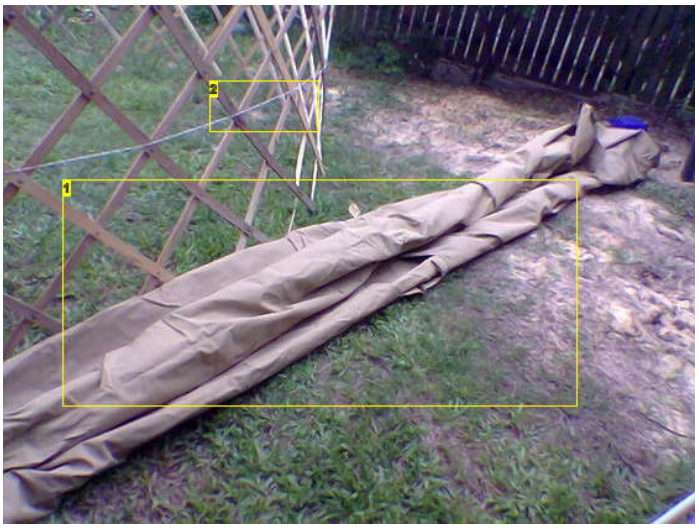


Image Notes
1. unfold roof canvas, and roughly roll half of roof (other half is folded below in this pic)
2. lower tension cord is seen here, upper one is out of the picture



Image Notes
1. To put the roof on, start by lifting the rolled half of the roof canvas onto lower edge of roof - outside view.



Image Notes
1. lift rolled half onto lower edge of roof - inside view



Image Notes
1. using a spare roof pole, place as seen in picture, and lift straight up, allowing to tilt toward hub - see the sequence of the next few pics!

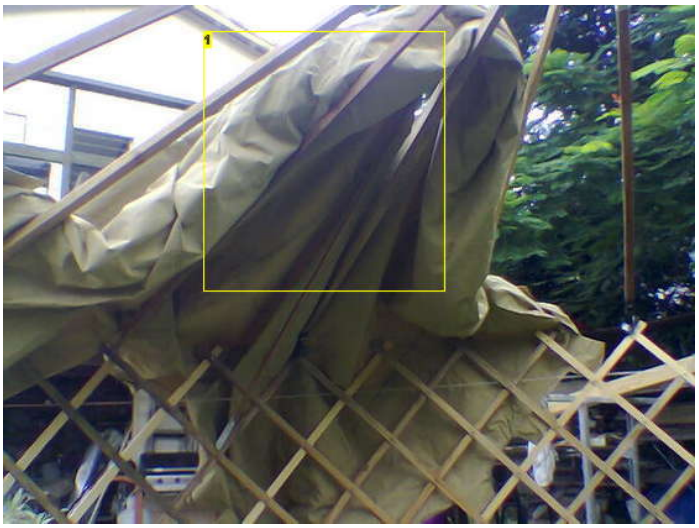


Image Notes
1. THis is the result of previous step. it looks messy, and scrunched up, but note that canvas centre- hole is now nearer to roof hub (thats the aim)- next use pole to even it out. (see next pics)



Image Notes
1. sides of canvas are now spread out, and centre hole is still not far from correct place, looking better, but still in-progress! (see next pics)

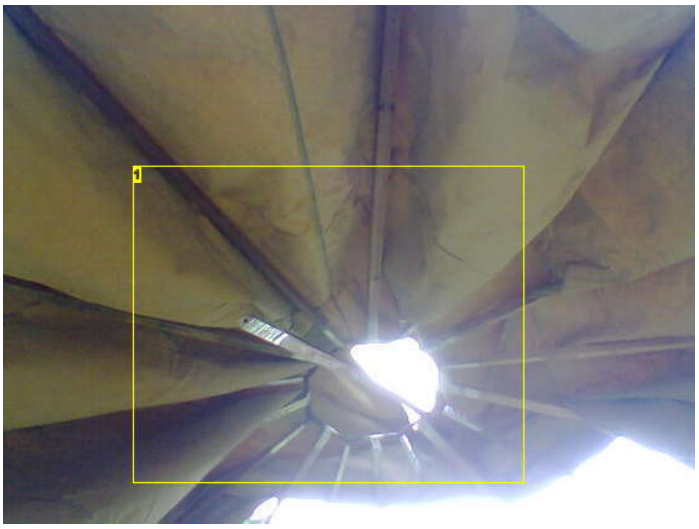


Image Notes
1. Use a spare pole to push rolled canvas over to the centre hole, and fully align hole and hub, once the canvas hole is aligned, it geats much easier!







Image Notes
1. fitted roof canvas done! (inside view)



Image Notes
1. loosely fitted roof canvas. (outside view). still a bit crumpled, but this comes out quickly.

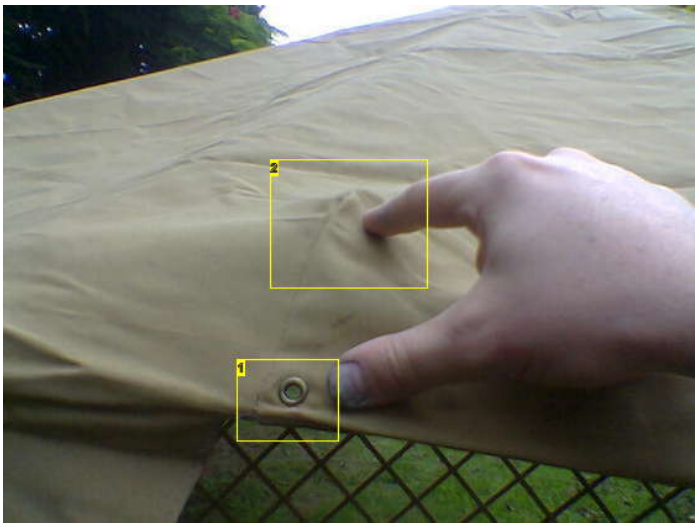


Image Notes
1. a smooth roof to wall transition needs brass eyelet points placed roughy inline with large timbers .
2. this lump is the roof timber poking through, directly above the eyelet, so it's well located.!

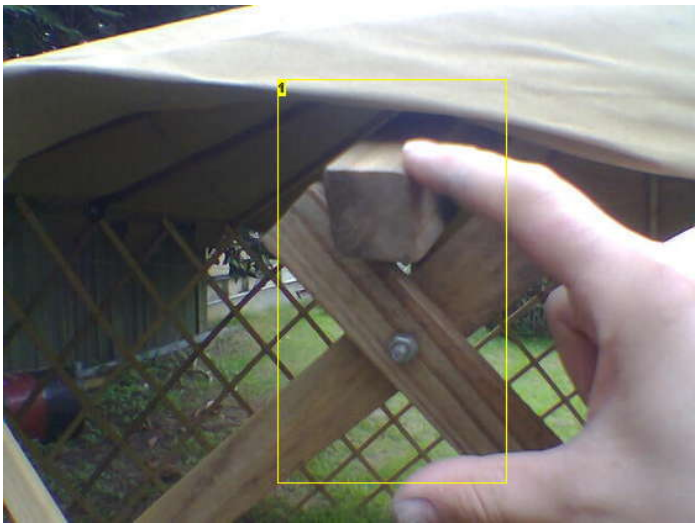


Image Notes
1. this is the same as the previous picture, but I flipped the canvas back to show where the eyelet should finish up (near my thumb, below the end of the timber)

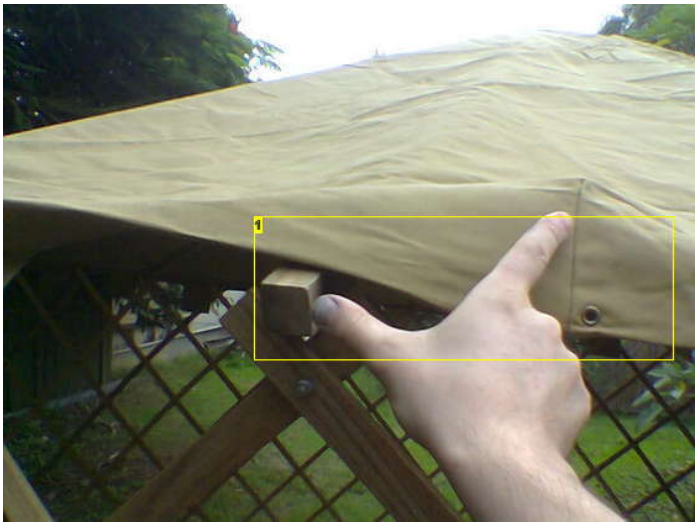


Image Notes



Image Notes

1. the alignment here between the timber and the eyelet is BAD, and the roof canvas needs to be moved to correct this alignment.



1. ahh shade, have a lie down, and a drink

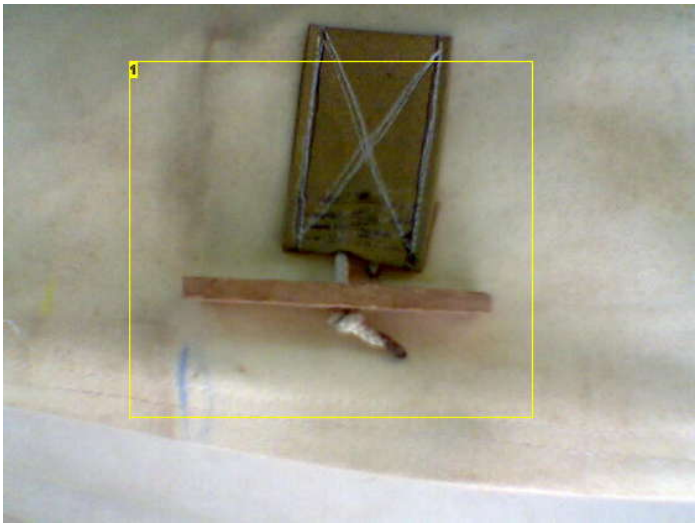


Image Notes
1. these toggles hold the walls up. They go on the inside of the wall canvas

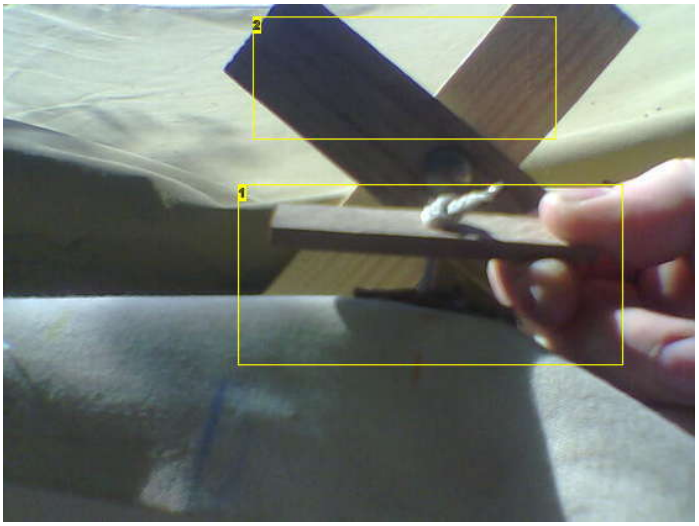


Image Notes
1. pulling the wall up into place - the toggles go on the top joints of the wall, the ones WINTHOUT roof timber on. this is the timber toggle
2. this is where the toggle is about to be put.

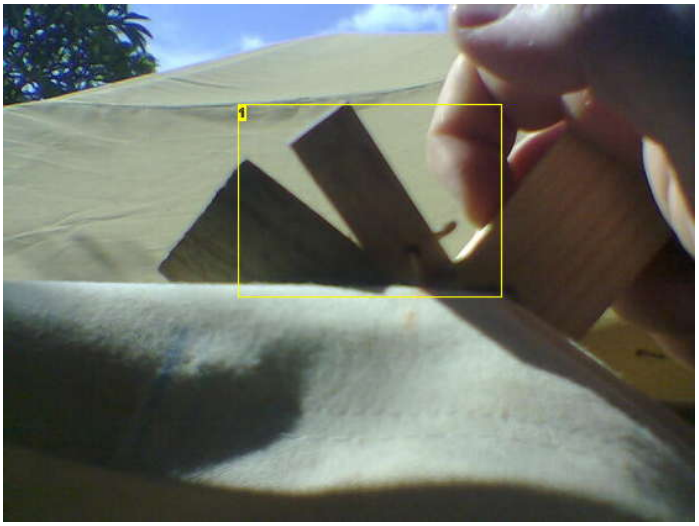
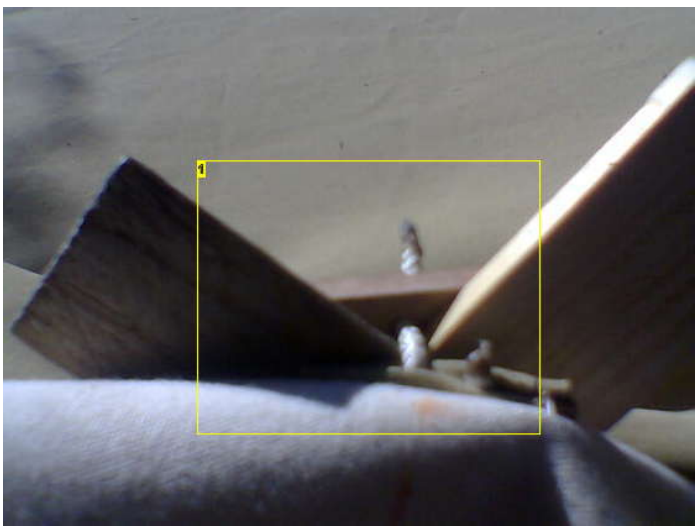


Image Notes
1. toggle is partially in place, do not leave like this.



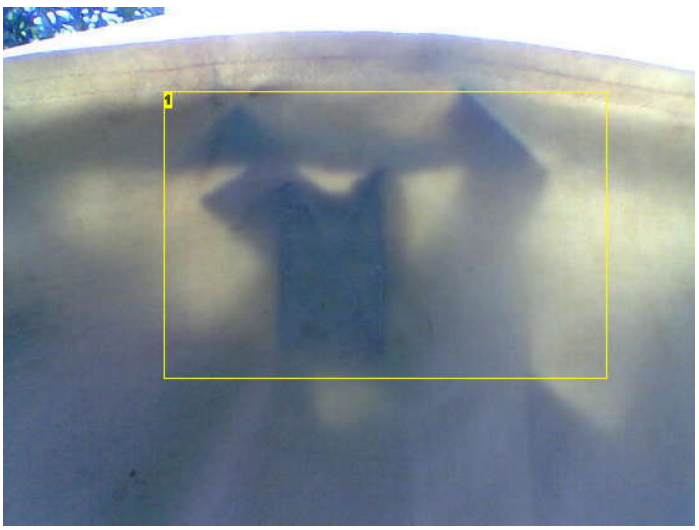


Image Notes
1. toggle is correctly positioned



Image Notes
1. then bring roof edge down over wall



Image Notes
1. partially hung wall round the back
2. not yet hung up - obviously.

Image Notes
1. view of toggle from outside tent once fitted. sun is shining thru a little in this pic.



Image Notes
1. starting from one end next to the door, work your way around the yurt, fitting toggles as you go

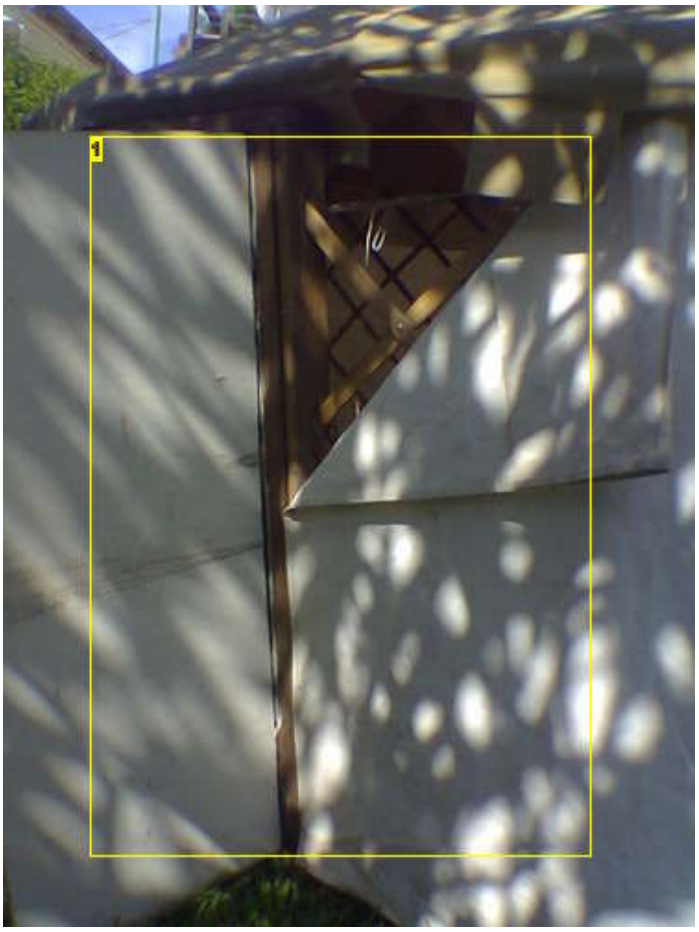


Image Notes
1. when fitting wall canvas to door frame, ensure the edge lines up with the door, and hook it to the frame, using brass eyelets and small bullet-head nails.

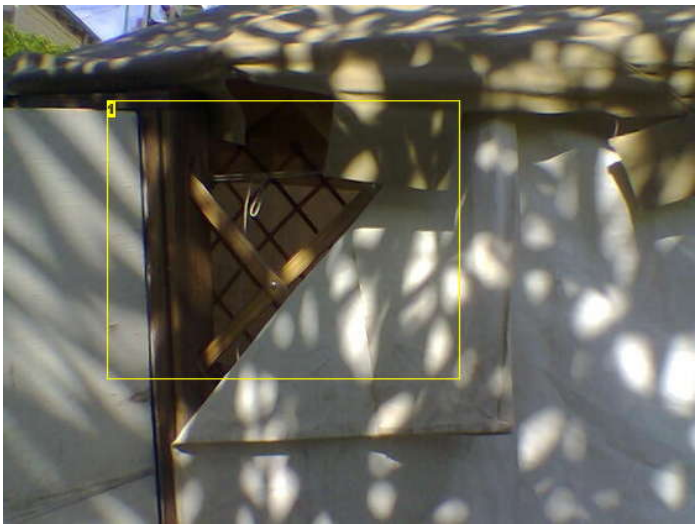


Image Notes
1. starting from the bottom, working up, same as when fitting the timbers to the door frame

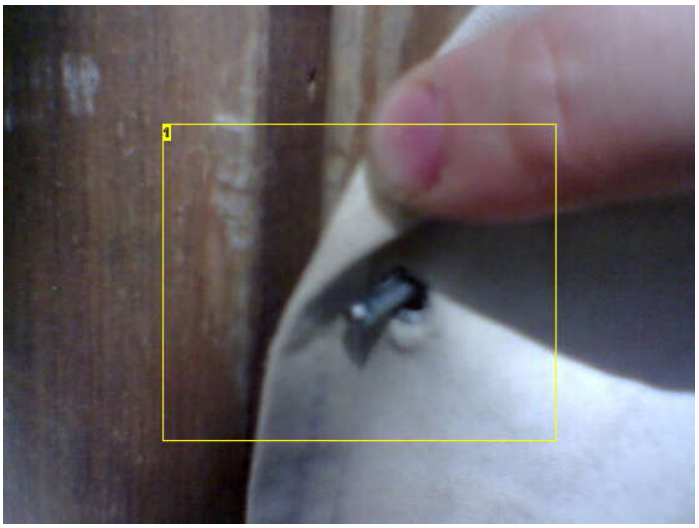


Image Notes
1. Here's a closeup of how the eyelets in edge of canvas hook onto nails in the timber door frame. Note how the nails are slightly bent to prevent the canvas coming off. the canvas is stretched slightly, so it doesn't come off.

Related Instructables



GerTee - Portable tent home made of recycled materials by AlaskanTentLady



Yurt Without Steel by TimAnderson



Building a new 20 foot gertee (slideshow) by AlaskanTentLady



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The Near-Perfect Tent: Design and Build a Recycled Tent by bentm



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Comments

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Philthy.Sohoza says: Aug 11, 2010. 3:57 PM **REPLY**

great instructable! withw great pics. i was planning on building a yurt a few years back, but life got in the way. i was planning on useing ab old army tent i got at a reuse center where i live. it's about 20ft to a side and 16ft in the center. i'm now planning on selling it because i dont have any room for it. anybody interested? email @ phil.sohoza@gmail.com subject: yurt.

TinkerWorkshop says: Aug 8, 2010. 7:55 AM **REPLY**

FYI, the yurt in the presentation image (the one with an orange door), and the one described in the tutorial are not the same. The yurt with an orange door, the professorially made one, uses completely different technology to be built. The yurt (ger) with an orange door uses two-poles-ring setup, the traditional Mongolian way. Would it not be more useful to have an image of your final product instead of a yurt not made by you?



davidbuzz says: Aug 8, 2010. 7:21 PM **REPLY**

All images in this instructable have mouse-over text that tell you precisely what it is, including the picture you mention. Yes, that's built by mongolians, in mongolia, and it's purely so peoplke can see that their finished product *should* look like when they are finished. It's for inspiration and motivation.

hannahelastic says: Aug 11, 2010. 6:12 AM **REPLY**

I gotta agree with tinker, using that image as the very first photo is misleading. It's cool you included it for inspiration, but maybe right there isn't the best place for it.

TinkerWorkshop says: Aug 8, 2010. 8:12 PM **REPLY**

With all do respect... Your tutorial does not describe the way to build the yurt in your title image, building process is quite different. The reason I've looked a the tutorial is because of the first image. I found it quite misleading after looking through the tutorial.



davidbuzz says: Aug 8, 2010. 11:26 PM

(removed by author or community request)



TinkerWorkshop says: Aug 9, 2010. 7:34 PM **REPLY**

Great reply. All your "professionalism" just went out the window. Congratulations.



cyprian916 says: Aug 8, 2010. 10:27 AM **REPLY**

agreed it would be better and also i see no image comparable to the real yurt's picture I.E. a nice picture of the finished product.



makalove says: Aug 8, 2010. 11:36 AM **REPLY**

[nods] what they said. using somebody else's finished product for your lead picture is misleading. then to discover that you don't even have a picture of your finished product at all was disappointing. please consider revising your instructable.



davidbuzz says: Aug 8, 2010. 8:58 PM **REPLY**

I agree that not having a picture of my version of the 100% assembled "finished product" is unfortunate, but the simple reality is that I don't have a good one to upload at this time. Attached is a small picture, of a "tent city" with my most recent your (red roof, white walls) on the left.





tim_n says: Aug 9, 2010. 12:17 AM **REPLY**

Appreciated to see your Yurt, but all in all it's a circular folding tent which to anyone else looks like a Yurt, but obviously you've attracted some Yurt experts. Shame they didn't post an instructable on Yurts first showing their take. Very much appreciated, ignore the negative comments, I'd prefer to see the lattice bits because that's the most complicated bit to make. Good 'ble and remember guys there's a 'be nice' policy!



keebmn82 says: Aug 8, 2010. 9:55 PM **REPLY**

I take loads of pain killers and even I understood your point. So I dont think its misleading at all. I think some people are overly critical. Great Instructable! Thanks for posting it.



luvit says: Aug 9, 2010. 5:48 PM **REPLY**

dear sir, please make me one in mine town. i will be greatly greatfully grateful. i will need an alarm system.



msemtd says: Aug 9, 2010. 1:03 AM **REPLY**

Thanks for doing this instructable David. You have put a lot of work into this project and doing the extra work to produce an instructable for it is very much appreciated. I liked how you had lots of pictures of fitting the roof canvas: a roof over one's head is a major step in any building project!



Honora says: Aug 9, 2010. 12:42 AM **REPLY**

I spent the odd day or night in gers when I went to Mongolia in 2005. I stayed in Kazak gers which being a Turkic nation, they would call a yurt. I can't recall any smell of yak felt or intestinal waterproofing. It is indeed an incredibly practical type of portable housing. They weighed about 250kg (I guess the felt made it heavy) and this could all be carried by one Bactrian camel as has been said on this blog. Regarding the ability to bear snow on the roof: Mongolia is a desert and the rain/snowfall is very low so there is not much snow on the ground. Because of this, some animals (e.g. horses) are liberated in the winter to fend for themselves as they are able to scratchdown through the snow to forage for grass etc. Whatever survives is rounded up after the winter. This may be one reason why horses are given no names. If there is an unseasonably heavy snowfall, lots of animals die and you will see plenty of corpses come the spring. The year I visited, they'd had a mild winter and the animals were in good condition. It is a fantastic place to visit and the people are the salt of the earth. There are no fences. Unfortunately now there are all sorts of unscrupulous foreign NGO's poking about and the wealth difference has escalated, all because there are lots of minerals there e.g. lithium. The general population are experiencing a dire period as none of the wealth will trickle down to them.



Kryptonite says: Aug 9, 2010. 12:10 AM **REPLY**

I once went WWOOFing on a yurt farm. Good times.



jimmiek says: Aug 8, 2010. 9:33 PM **REPLY**

I like this .... always wanted to build such a thing ..... I'd like to see how it is dismantled and packed for moving ..... i.e. the lattice work .... does it need to be totally unbolted ..... with 70+ bolts, it doesn't seem that this would go up very fast! Thanks, nice instructable ..... may try it myself!



davidbuzz says: Aug 8, 2010. 11:33 PM **REPLY**

here's some pictures of the timberwork being folded up, so you can see that no bolts at all need to be undone. It's like 100 pairs of blunt wooden scissors all attached together. (yes, you can get your fingers stuck!)





mista.v says: Aug 8, 2010. 8:19 PM **REPLY**

If we can't exactly weld or anything, is it best to try to go through all the work of a wood hub or to make one with PVC or other pipe?



davidbuzz says: Aug 8, 2010. 11:24 PM **REPLY**

[sarcasm] If I can't fly an aeroplane, is it best to have someone else fly for me, for me to learn to fly, or for me to take the bus? [/sarcasm] Please just think about what you are asking before you type them, alright?



zipknitter says: Aug 8, 2010. 3:42 PM **REPLY**

Great project. I want to build one of these really bad as hubby says he wants to be single again after 40 years, but my being on a tiny($400. a month) income, makes it nearly impossible. Being way out in the country doesn't help much either, but my daughter in law has given me access to 20 acres to build it on. Have gotten enough pieces of canvas to make a yurt 20 ft across, but am wondering just how rigid the upright poles need to be as we get a LOT of snow here and don't think pvc would withstand the weight of snow even with a pitched roof. I would like the top hole covered to keep out mosquitos, or at least shielded, in winter. Could I make a upper canvas circle and raise it a bit above the hole so that the smoke from my stove would waft out without being blown right back down to me? Could it be lowered at night? Have many questions that I just cannot find on the websites that talk about yurts. I helped Dad build houses years ago and have done a lot of remodeling, so at least I am not a novice who doesn't know which end of a hammer to use and have all my own tools.



davidbuzz says: Aug 8, 2010. 7:27 PM **REPLY**

All your ideas seem reasonable, but you're the one who will need to try, and then tell us for sure. As for the "will it hold up in a LOT of snow", the important thing for you to do is to do an analysis of (a) how much snow cover you get at the worst time of year on a similarly angled roof (b) figure out how much that amount of snow will weight (c) make sure that whatever structure you build is strong enough to withstand at least 3 times that amount (or whatever safety factor makes you comfortable) (d) enjoy.



zipknitter says: Aug 8, 2010. 9:46 PM **REPLY**

You came up with a good idea. Last winter we had 8 ft snow drifts piled against the sheds with temps that dipped to -63 here in central So Dakota. Was thinking they would act as insulation during the worst weather. It gets colder in Mongolia but the yurts work great according to a friend that grew up there. With the various types of roofs in this area, figuring out the weight will be a bit of a problem, at least for me. Most have steep pitches that flatten out, as ours does. I called a local college and tried to talk to a dept head about building a yurt and he acted like I was totally joking. Took nearly a dozen calls just to find him, so don't know where to go next. Could not get any answers at all. Think I will need to put aluminum screening across the vent hole to keep skeeters and other bugs out. Have seen yurts on the Oregon coast that had a 2nd canvas cover about a foot above the hole that protected the vent hole from rain, so was hoping that might work here.



davidbuzz says: Aug 8, 2010. 9:01 PM **REPLY**

...ohm, and don't forget, it's really not about what *my* finished product ended up looking like, it's about how *yours* should look when you make it (ie the result you are targeting), and the process I followed when I made mine, both of which I have supplied in intricate detail here.

smeeves says: Aug 8, 2010. 3:17 PM **REPLY**

Simple way to fix the hole in the roof, is to put and umbrella through! Then you can hang a little bag of rocks from the handle so it doesnt blow away. Then the bugs stay out, and its easily removable to look at the stars

amatureartist56 says: Aug 8, 2010. 2:57 PM **REPLY**

I dont see a picture of the triangle or circle that is left over after you cut the wedge so Im not sure how it is put on or tied. Im assuming it is the last step (and covers the hole in the roof) however you did say you look at the stars through that also. Around here it would let in the bugs especially the blood thirsty ones. So did I miss that step somewhere? Maybe its there but I didnt realize that is what you meant. I was also wondering how both a circle or a triangle worked for this, unless the circle was esentially cut by taking the corners off the triangle, which is probably what was done. I loved your instructable- and thanks for taking the time to do it as well as all the pictures.

relliotm87 says: Jun 25, 2010. 9:14 PM **REPLY**

Hey Mr. Buzz, Im currently attempting a yurt made almost fully of bamboo. Our crop of polystachys vivax(think like 5" bamboo canes) is pushing up through the ground now. Thanks for your thourough tutorial, help alot with the big picture. I will be taking a pictures when completed. I have a question however about your process for "waterproofing" the canvas, i did not see it in your tutorial though i know you mentioned it at the beggining. Ive been experimenting with beeswax but it seems far too energy intesive for how long it lasts and sun will affect it. Thanks again. Rem



makalove says: Aug 8, 2010. 11:37 AM **REPLY**

what about using linseed/flax oil painted on your canvas to make oilcloth?

meowtigora says: Jun 3, 2010. 9:21 PM **REPLY**

i had seen a show about bamboo being used as building supports and being filled with concrete i wonder if maybe as a more permanent dwelling if maybe this would be a good solution or if pvc could be filled with concrete for strength and durability. there are lots of links i have seen for pvc construction being used as hand rails and trellises. Pvc is very pliable when heated and solid when cooled off afterwards which makes it a versatile and cheap building material. i have also seen a lot about earth ships and packing plastic bottles with earth and using them as though they were bricks packed in soil to make a wall. i don't know if this would be helpful to anyone but maybe can incorporate a few ideas together.

AntonioMDC says: Aug 8, 2010. 10:15 AM **REPLY**

aside from being greener, bamboo has much more tensile strength than PVC. PVC could work for some small garden projects, but to actually build with it re-bar or other reinforcements would be needed whereas with the bamboo it could be the re-bar.



Nyckname says: Aug 8, 2010. 7:47 AM **REPLY**

After helping set up a few of the traditional ones, I'm in love with your metal centre ring. That would be so much easier than trying to get the ends of all the poles to stay in the little holes.



bjurt says: Aug 8, 2010. 8:55 AM **REPLY**

I use a metal ring in my bjurts too. If anyone would like to try building a more conventional yurt with one of those rings, I'd be happy to hook you up. If you promise to take pictures and report on your progress, I'll give it to your for free. Of course, I can only do that for one or two people, but check out my hardware at http://bjurt.com and let me know what you think. Direct link to products is: http://www.bendersbjurts.com/products/ but go to the main page with the first link to see my pretty face... ;->





Jim_dJ says: Aug 8, 2010. 7:39 AM **REPLY**

Good job on both the yurt and the instructable - but dang that looks like a lot of work!

redpyxll says: May 19, 2010. 4:18 PM **REPLY**

That's awesome, thanks for the tutorial. This would be great for tent cities and American nomads...sadly our nomadic population doesn't regularly hit the internet.

Great semi permanent structure though. Kudos!



pteranosaur says: Jun 11, 2010. 1:42 PM **REPLY**

...and then again we nomads are able to access the web-what is an issue is that most if not all urban and rural fringe areas have laws against 'camping' unless in designated areas (requiring a fee,usually),and then being able to haul a ger from here to there is a major issue.Is there anywhere known that does not persecute us nomads,or decry 'tent cities' ?

ac7ss says: May 21, 2010. 11:09 PM **REPLY**

I was going to reformat my old web page http://www.connectcorp.net/~str8jkt/yurt.html into an instructable, but yours is nearly what I would have done (Better descriptions on yours!) Good `ible!

I like the steel ring, but it seems too rigid in my opinion. My version (very similar in all but the roof ring) has withstood 60+ mph winds in the Nevada high desert with only 4 ground stakes placed on the edge of the yurt!

TheMarchingNerd says: Feb 19, 2010. 11:53 AM **REPLY**

Heh. This is a great Instructable. Although technically it isn't a yurt. It is a ger. The term "yurt" is a nomadic Turkish foldable tent. If it is a Mongolian tent, then it is a ger. Just thought I would let you know!



davidbuzz says: Feb 19, 2010. 7:06 PM **REPLY**

Actually, since this *IS* a completely foldable tent suitable for nomadic use, it's fair to call it a Yurt. Since it's a predomanently Mongolian design, it's also a Ger. It's OK to be called two things.
http://en.wikipedia.org/wiki/Yurt

P.S. 'Ger' is actually Mongolian for the Turkic word 'Yurt' .

irm224 says: Feb 17, 2010. 8:18 PM **REPLY**

Sorry but this sounds really confusing. I thought it was easier to put yurts together, and I know there are more ways to put one together so what way is easier??



SlashmasterAeoniX says: Feb 1, 2010. 10:08 PM **REPLY**

You mention "portable home" but can it really be portable? Is there any way of making this so it can just fold up on the go and be taken places?



davidbuzz says: Feb 2, 2010. 11:45 PM **REPLY**

Yes, it all folds up, and will fit comfortably on either two donkeys, or a car with a roofrack.



tulekah says: Feb 3, 2010. 2:05 PM **REPLY**

one camel (bactrian) works too (i hear you'll got a bunch not earning their keep)

ravenbird says: Dec 6, 2009. 7:25 PM **REPLY**

Hi,

I'm going to be building a yurt this spring out of 1/2" pvc pipe. Do you make these center hole pieces for sale? I figure that the ends of the pipe would fit perfectly on the spikes and make the job incredibly easy. Also, how wide is the hole?

Thanks,
Raven



davidbuzz says: Feb 2, 2010. 11:48 PM **REPLY**

the holes I use are approx 12mm (1/2") diameter, and no I will not sell the centre sections separately, and also I'm probably in a different country, making shipping problematic. I suggest you visit a steel-works, with pictures, and ask them to cut 16 lengths of 12mm steel rod at 150mm (6") long, and then have them weld 8 of then into an octagon. the final 8 can then be welded onto each of the points of the octagon, and angled down at the pitch/angle you want the roof to be.

ravenbird says: Feb 3, 2010. 9:50 AM **REPLY**

Thank you very much for your generosity in giving me the dimensions that I will need to have that center ring created.

I am building 2 x 16' Ger this spring. One as storage and one for a workroom. The workroom will be fully insulated. We get a lot of snow here. I have decided on wood instead of pvc. Collecting stuff and looking forward to it.

Buying stuff on sale, new, and $300 worth of tools included in the pricing (wanted them anyway) the two Ger are less than $1,000 for both of them - less than $500 each.

Again, Thank you very much,
Raven

ajn142 says: Aug 6, 2009. 9:47 AM **REPLY**

I was wondering, could you construct the lattice out of some kind of metal banding instead? if so, what kind would you reccomed, i don't have much experience in building this kind of thing, although i find it very interesting



davidbuzz says: Feb 2, 2010. 11:54 PM **REPLY**

whatever you pick, it must be light, and flexible, and not degrade badly in UV light. I'd think that thin aluminium stripts, or even fibreglass rods might work, but have never used either of them. I'd avoid plastics like PVC unless they are explicitly "UV Safe".

skipernicus says: Aug 9, 2009. 7:36 PM **REPLY**

I suppose you could, but there wouldn't be any real advantage - it would be heavier, and more expensive, but structurally you wouldn't get that much of a boost - the lattice is pretty strong. I'd be concerned too, that I was making a giant lightning rod...



Calis says: Jul 22, 2010. 11:22 PM **REPLY**

Or perhaps a Faraday cage?

ajn142 says: Aug 20, 2009. 7:49 AM **REPLY**

I was just thinking that metal might be a little more durable, I'm a boy scout and I'd bet that somebody in my troop would manage to break it a piece of it. As for lightning rod, that would depend on your surroundings, but it's a very valid point. Thanks for the advice.

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