Here’s a not so clear picture of a finished bamboo backed static Recurve... if everything goes well we're hoping to have one turn out like this:)

Here’s another unstained static
These 2x2x36” osage orange billet planks are edge grain and quarter sawn, I've marked off a straight line and will start with a 1/2” slat... when all the Bandsaw marks are sanded off it will be around 7/16”

Here I have the splice marked on the billet slats... I use a 4” long splice by 1.5” wide on 36” billet slats, when glued up they will be 68” long most will be cut to 65” for a 64” ntn bow... the z-splice is very easy to draw out as you first get your centerline then 3/4” on each side... doesn't matter which angle you take when drawing the z-splice as long as you start at your wide end 4" in and then draw from the middle and side to a point towards the butt end... you should have 3/4” wide marks and tapering to a point...whats penciled out is what gets cut away... clear as mud... right:)
Here is the end butt of the billets that I'm splicing

I'm checking to see how the fit is... dry run as they say... when pushing the two together use gentle tapping, if you apply to much pressure they sometimes will split at the pointed area, middle of the splice... usually that's no problem as you will be covering one side with bamboo and the other with your osage handle cap.

Here I've glued the splice using Nelsons Urac-185... it comes in a two part mixture, dry and wet... I use one part dry in a plastic spoon:) and two parts liquid... make sure you have both parts mixed
well, no dry stuff and also its good to have a temp of 70 plus in your work area... wife's kitchen will do:) I use 4-3" c-clamps, hard pressure is not needed... let dry for 24 hrs at room temp or like me I use a hot box set at 120* and leave it in for 3 hrs.. be careful when taking the clamps off as the glue seems to always have sharp edges and believe me they do cut:)

Ok here's the same splice only I've cleaned it up using my belt sander... most anything will work, sanding block tothing plane, I just like using the sander, it's quick and precise :) 

Here's the bow template that I use to shape the osage slat, ala Dean Torges style:) I will trace the shape and band saw out even to the tip area... unlike my Phenom R/D flatbow where you can leave the slat full width, a Recurve requires you to narrow the tip area to around 1" once the bend has been achieved and the bamboo glued on, you can narrow the bend more
another picture of the template that I use

Ok here's the metal strap that I use to hold down splinters from lifting during the sudden bend... it
made from a aluminum yard stick cut in 3 pieces

It's important that you clamp the strap on before you boil or steam... the reason is that it gives you more time to quickly clamp the slat to the form instead of clamping the strap on and letting the wood cool down... also it doesn't hurt the strap at all, once the wood has dried you can take the strap off and straighten it with a hammer

I'm ready to steam boil the tip, notice that I have the tip angled down into the water, if there was water in it:) doing this will get the area that bends the most submerged in the boiling water softening it even more
here it is all ready and boiling... I will steam boil the tip for about 45 minutes, because it only 7/16" thick it doesn't need a long boiling time unlike a selfbow static which would be 5/8" thick at the tips
bending, notice the cut out area about 3" beyond the bend, its there to let the c-clamp lay below the straight line when bending

view of the metal strap that I use to hold down the osage from lifting when bend is applied
I do the bend in one quick motion and add the 9" c-clamp first then the last one down past midlimb...also having the metal strap clamped at midlimb will cause the strap to tighten when the bend is performed I leave the slat in the form about 10-20 hrs.

your right, I'm adding dry heat to the bended area... I do this after the slat has been in the form 8-10 hrs. From my experience in steam boiling, your slat will lose some of its Recurve when you take it off the form... by using dry heat ala propane torch you re-heat it and it seems to temper the wood and most always will not lose any Recurve coming right off the form.
ok here’s a recurve that’s been took off the form without adding the dry heat as shown in the previous picture, notice that its lost some of its recurve

now this is more like what I'm looking for, just a little past 90° by adding the dry heat after its been steam boiled it really does keep all of its
recurve... and you thought I was just pulling your leg :)  

... pictured is how I draw the shape of the bow on the bamboo... I've highlighted the bamboo's nodes to give you a more detail on how to align the nodes with the handle, limbs and most importantly the last 6-8" of the bending area... it's very critical that you try and avoid any nodes in the sharpest bending area, it will be a stiff spot and not bend when gluing to the osage slat... by the way I had to go thru around 10 pieces to get the right node alignment for midlimb and tips... the pieces of bamboo that I get are 8' long, that helps when you can move the template a foot each way.

Here's a closer picture detailing what I said about keeping your nodes away from the bending area, the nodes are black lines on the bamboo
here I'm band sawing close to the line that I have marked using the template... I stay about a 1/16" away from the line

here I'm sanding the edges flat once I've cut the bow shape out using the template... its critical that you get the sides square as
the next step is reducing the belly boo off with the bandsaw

as you can see once that I've cut the bamboo out to shape its very thick, now I need to trim the belly scrap off keeping a thickness of 3/16" from middle to tip

now you see why I need the bamboo flat on the edges... it helps make the cut straight without any waving from the bottom edge to the top... its also important that your bamboo is fairly straight without any undulations from side to side
Here's a picture showing what the belly scrap looks like once it's been bandsawed off... the softer bamboo always takes a major set with the harder power fibers staying more straight.

Here's my high-tech way of thinning the bamboo to
the desired thickness for glue-up... I start at the tip and move towards the middle while I hold it down with a belt dressing block... I use a sanding belt that is 36 grit it hogs off skin and all:)

I'll taper the bamboo to 3/16" in the middle to 1/16" at the tips. I have the bamboo center marked and will periodically hold it in the center to see if the bamboo is balanced... I also do this with my osage slat
Here I'm using the same strap as I do on the osage slat... I clamp it at midlimb and add heat bending the bamboo as I go, once its bent to the form I clamp it up with a 6" c-clamp

Here's a close up view of the 6" c-clamp... I let the bamboo cool down about 1hr. being that the bamboo is 1/16" thick at the bending area helps with the ease of bending and it will loose some recurve shape but will have memory of the bend and will conform to your osage slat during glue-up
here it is off the form... its lost about an inch of the 90° bend, like posted earlier it will bend easily to the shape of the slat during glue-up

Here’s a dry run of the bamboo on top of the osage slat... it was a tight fit that’s the reason the bamboo has more recurve than the slat... when I put the bow and bamboo on the form it will all come together
this is the form that i use, its a 2x6x70" ok guys don’t laugh, I know it needs cleaning up, it real hard to do, I just use a hammer at the glue and it flies off, better have some safety glasses on though :) 

this is the center portion of the form... the post are as follows, if this looks familiar it is, I use the same technique as he does although his form is much cleaner and more precise:) I start with a 4" center post going 13" toward midlimb with a 2.5" post, the tip post I'm using are the post that I use for my R/D flatbow there 7" I just turn them on there side and it come to around 4.5"
Picture of the center 18" lam this happens to be rosewood... I mark center where its 1/4" and taper straight to a feather edge.

Here’s the finished tapering of the 18" center lam.
I store my Urac-185 in the icebox in the shop that is:) along with the dry powder... first thing I do when I receive a new supply is always take it out of the can and that dang zip-lock bag they send it in:)

scientific way of measuring... 4spoons level of the powder to 8 spoons of the liquid
here I'm getting it ready for glue-up

full view of the test run
notice that I have a thick piece of leather strips laid on each limb and a 1/16” thin piece if aluminum stock on the belly doing this on top and belly will help speed up the process... for the guys like ME earlier in my glue-up days I would use little square cutouts and have to put them on the top and bottom, that really sucked and slowed everything down

here I've glued all surfaces and am clamping down with spring clamps... you can use tape but I find it quicker just using the spring clamps
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the first c-clamp is a big one:) 10" lightly tightened at the center
Next step is adding the c-clamps out to the mid limb post, remembering to stagger as you go, if not you can get a twisted limb from weight on one side.

Here I've added the 6" c-clamps, slowly pushing down on one limb at a time... also not in the picture is that I don't add the end post until I've clamped down both mid-limb post.
once the mid limb has been clamped down I will add the end post and finish clamping.

just a close-up view of the recurve area, the thin belly strap will bend easily with the static tip.
picture of my old reliable hotbox

Small fan and space heater for additional temp.
There's my baby all ready to sleep... I will get the hotbox up to 130-140 degrees... Letting it cure for 3 hrs then letting it cool down for another hr.

Here's a picture showing how much reflex was lost after its cooled and taken off the form... around 3/8"
Side profile in the ruff, now it needs to be cleaned up on the edges.

Remember me warning you earlier about the glue being sharp; razor sharp is a better word:) there like warts sticking out:)
here I'm sanding the edges flat and removing all glue from the side

just another picture showing what it looks like with sanded edges, there flat at this point but will be trapped from the bamboo to the belly... it has 3.5" of reflex straight out of the form.
Just showing the tip alignment... looks pretty straight from here.

After cleaning up it looks even and has good glue lines.
Pictured is the one side of the 18" middle lam. It's critical to get a paper thin taper at the end and always position your clamp at the end of the taper during glue-up at both areas on each side... light pressure is all you need, you don't want to starve where it feathers.
I'm fixing to trace out the handle on some ruff osage my handle template is 13"x1.5"

I'm tracing the handle... bow and handle are positioned at the center marks, just leaving about 1/2" at the flares when its cut out
here I've got the handle marked, one thing you also need to do is mark the belly of the bow with some kind of mark and also mark your handle on that side, if you don't once you cut the handle out you can get it mixed up on which side is which

I'm cutting the handle out, always make sure the sides are square so you'll get an even cut from top to bottom, also leave about 1/16" for sanding to the line
Just showing what it looks like once it cut out... I'll sand on the belt sander to the pencil lines.

I've got the handle on with a spring clamp the shadows make the left side look like it has gaps,
It pretty tight though.

Here I'm using a toothing iron to etch grooves in the handle piece. I do this on all the handles, doing this seems to help on not getting handle pop off.

I do the same with the bows belly area.
I've got both pieces buttered and ready to put together. Start clamping in the middle and rotate from each side until I'm at the handles edge... also you can see that I use a 1"x13" piece of...
heavy leather under all clamps helping not to damage the bamboo

dehere is a finished handle for another customer, hopefully this one will mirror it

dhis is the tips of the finished bow mentioned above, you can see its more of a working recurve... I call it the Phoenix curve
right after the c-clamps were taken off

cleaned up for tracing side profile
handle marked 4" with 1-3/4" flares

here I'm about to cut the belly wood off of the handle cap
here I've sawed the waste wood off, looks like I got off abit at the top:

[Image]

template that I use to outline the bamboo handle cutout
cut to rough shape will sand the edges on belt sander... notice that I've flattened the node at the handle area, I do this on all the bows where the node lays at this spot if you don't you'll have a uneven spot when you add your handle material

edges sanded and ready for the #49 to clean-up
here I'm shaping the handle to limb flare, I use the flat side of the #49 and lightly go from limb into the handle

useing the scraper to clean up the tools marks
Handle should come to a semi pointed taper into the limbs... no square edges in my shop:)

As the title says, I'm scraping the sharp edges smooth on
the bamboo handle area.

I like to trap my limbs, it seems to help keep its reflex better... more osage, less bamboo :) also its very sexy looking... I start at the flare and trap all the way up to the start of the recurve here I'm showing both side how the trapped shape should look, I'll trap a little more upon final tillering
rounding the edges... I like a semi radius belly. not quite as radiused as Deans

once the edges are rounded, I use a vixen file to take wood from the middle and edges
Here I've got my tillering string on, ready to start checking the bend.

got it pulled on the long string to 24" I have a longer string attached with small spring clamps it shows that I really have it braced to 3.5" doing this gives me a better view of what wood
needs to be removed before I brace it

Close up view of the tillering string... simple leather sock attached to nylon string... I like getting the bend even before I file string grooves
Here I've got the bow pulled where its a 5" brace height... left mid-limb is stiff.

markings for nock grooves, I start 3/4" from tip and mark side, back and belly doing this insures that I get the side nocks even

I start filing from belly to back, then turn over and do the same thing... when filing string grooves always make sure you file in the same motion, if you file from back to belly on one side and reverse on the other your grooves will sometimes not match
each other

penciled mark to keep myself in the center while filing the string groove

string groove, now I need to attach the side grooves with the belly groove
Start from the belly groove and slowly file to the side, making one nice string groove... man I'm saying groove to much :)
pulled to 19" still a little stiff on the right side

still needs a little more scraping on the right side
Braced to 6" looks more even... right?

getting close, its 45#@22" needs to be 45#@25"
very close, it still needs tweaking some at mid-limb on both limbs

the string is tracking really good on the bow, also it started at 3.5" reflex and is holding 2-3/4" when rested
finally finished tillering the bow, stands at 47#@25" when broken in should be around 45#

final bracing... 6" from back of handle to string
Now that the tillering is finished, I'll scrap the rind off the bamboo... I start my scraping at the handle and travel towards the tips.

Here it shows what the bamboo looks like with the rind scraped off to the first node... cleaner looking with a light tan color.
here I'm showing what
the node looks like
before I sand it down
some

same node but the sharp edge has been sanded smooth
I've got 3 pieces of 9oz latigo leather glued together... the start of my rest that will be covered with the handle wrap.

Here I've sanded the area where the arrow will rest on... I like to bevel it high in the middle instead of a flat surface, the least amount of the arrow touching seems to make for a better arrow flight.

trimmed and cut out... ready to glue on bow
I use a thick super glue to attach the leather rest, once in position I wrap it tight with 1” masking tape... using tape will let it conform to any curves, as the handle has a slight roundness instead of being flat.

Glued and ready for shaping, ugly isn’t it, so is the guy in the background:)
for the first shaping I use a box knife and cut from the high end towards the handle area.
Once I've gotten all the bulk cut off towards the handle area I'll get the dremel tool out and shape with the drum sander attachment.

Yours truly shaping the rest with the reliable dremel tool:)

Almost ready, its just a little bit proud and needs some final shaping to get it to around 1/4" thick.
I'm checking to see if it has any spots that I can feel with my hand... that's one thing I try and eliminate, when you grip a bow you don't want to feel the rest sticking out, should be a smooth transition from handle wrap to rest.

I've got the edge marked for flattening the bamboo, getting ready for the tip overlay work.
Finished product after band sawing needs smoothing some.

here I'm using the toothing iron to etch marks where the overlay will glue to... will do the same to the overlay that will be glued to this area.
Here I've got the components stacked but not ready to glue up just yet... I need to taper the rosewood to a sharp point.

Got my taper in rosewood, and have glued the osa to it.

once its dried, I make marks about 3/8" and cut into 4 pieces, I can use the other two on another bow
Here's a slab cut off

sanded and ready for shaping
before glue up

Here's the four 3/8" slabs
I've belt sanded the left two and have the right two marked for future shaping.

Here I'm showing that the front tip needs just a bit taken off, so all the surface will be in contact.
I mark the center and side, it helps with alignment when you’re gluing it on.

I use two spring clamps, no need for c-clamps... I use a thick gel superglue for the glue up.
I've got the side marked which you can't see:) and will follow it with the band saw cutting away the waste wood on the tip overlay.
rough pic of what it looks like once the excess wood has been band sawed off

I use the sander to shape the sides... shaping them into a semi pointed tip

I've gotten it shaped and have added the string groove
I like to taper just below the tip overlay making the back of the overlay and belly have the same look.

Ok guys here's the wrap that you wanted to see...
leather cutting it 20.5" and 1" wide, that size will
of my narrow handled bows... I use a metal strap box knife to cut it out.

cut and ready for the belly tapering.

Here I've got 5.5" cut to taper, make sure you do the same side on both ends.

start at the ends and use a belt sanding clean up eraser as my top pressure point contact, I apply steady
pressure just at the edge making sure I don't burn through the leather, I flatten about 6 inches at a time and then turn it around and do the opposite end once one side is sharp at the edge from end to end I do the other side

here I've skived the first 6 inches going slowly towards the other end

Its hard to see but the left side is the one that I've taken leather off and is sharp at the edge
side view of the taper, from my hand toward the camera about 6 inches is the sharp edge.

ok guys here’s the finished underside of the wrap, the dark color in the middle is the high unsanded area from the middle it tapers to a sharp point... I taper both edges and if you’ve done the job right the leather strip will have a crown in the
middle of the side that your sanding... I use contact cement on all surfaces and start my gluing at the rest area... do a test run like I show in the last picture, gluing your wrap at a certain spot will tell you how it will feel when you grip your bow, I like my left pointing finger to be in a groove in front... kind of like having 4 finger grooves... you can tell if you need to start your wrap at another spot because it won't feel right in the grip.

close-up picture showing high point in the center
I've taped the handle on just to show how it will look once the bow has been stained and sprayed.

I've got the bamboo all sanded and ready for the stain job.
Here's the dye that I use, it's a wood stain powder, it takes very little its highly concentrated... the Co. that makes it is: W.D. Lockwood & Co. you can get it at www.binghamprojects.com

I wear gloves and use a cloth rag for staining... you get this stuff on you and it will have to wear itself off :)
I start at the tip and make a quick swipe towards the handle, stopping in the middle, I do one limb at a time.

Once the first coat is dry I wet the tip of the rag and add one more coat, the more times you rub up and down the limbs the lighter it gets, your basically taking stain off of the bamboo... so just lightly go over once or twice.
Here I'll start my tiger stripe pattern...only when the basecoat is dry, which I use the heat gun to help dry it along :) I'll pull the rag really tight with my thumb tucked underneath and start dabbing with just the finger, if you have to much stain on the rag it will bleed and not get the sharp detail that is needed, I've done it both ways but prefer it to have a sharp edge to the pattern
picture shows the pattern, kind of a burl tiger stripe look, once the finish has been added it will bring it out even more

I keep doing this pattern out to just the edge of the overlay, going for the fiddle back pattern

I've added solvent over the stain to enhance the look
another pic with it wet from solvent... using solvent will not take any of the stain off... keep your bow away from acetone and all means water, as both products will melt and screw up the stain job
showing how I end the stain at the tip, I stain up to the edge then steel wool right at the ending, it looks like the stain feathers away

not a good picture and I'll get one better, handle wrap is on just for looks

Once the stain job is completed I use the scraper to remove any stain on the bamboos edge.
Pictured is some older bows with the stained fiddleback look.

Tip area showing more different stain jobs.
bow on form

pictured is a dry run of a "Phenom R/D bamboo backed osage bow.... the base is a 2x6x72" the middle post is 4" center post are 2.5" end post are 7" the middle post are 13" measured from the middle of the center post... the end post are 30.5" from the middle of the center
4 bamboo and osage bows
unfinished blanks left to right: Phoenix Static R/D, Phoenix Curve R/D, Phoenix Duoflex, Phenom R/D