Building two drums from one barrel*

Documentation of the project made possible by the 2018 Taiko Community Alliance mini-grant awarded to Simpson Taiko

* and a cow

Introduction

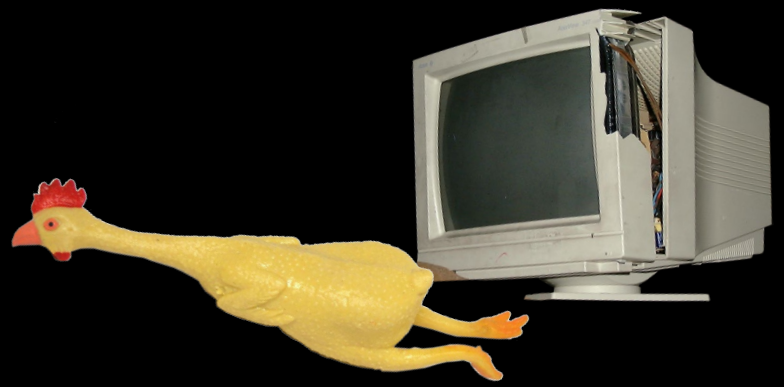
Simpson Taiko is a relatively new taiko group. We have a few “real” drums, but not enough for all of our members, so like many groups, we get creative:

- Remo

- Gomidaiko

- Taped buckets

- Gomi



It worked for a while, but before long there was trouble . . .

Introduction

Introduction


We want drums!

Introduction

This presentation documents each step used to make the drums shown on the intro screen. There are many ways to overcome the challenges of making drums and each process has pros and cons. While this process doesn't necessarily result in drums of commercial quality, they do look good and sound great. Also:

- They are relatively easy to make.
- They are very inexpensive when compared to buying new, and even used, drums.
- The result is two different, useful drums: one hiradaiko, one chudaiko
- The procedures can be scaled up or down based on your skills and tools.
- The timeframe can be scaled up and down to match your schedule. I needed to fit my drum-making between other obligations so these two took about six months. If you have the time and want to finish more quickly, you could do it much faster.
- All of the steps can be accomplished by one person.

There are many great drum-making resources available on taikosource.com and the Taiko Community Facebook page. I recommend researching the options, mixing, matching, and experimenting to come up with what's the best for your group.

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There are many great drum-making resources available on taikosource.com and the Taiko Community Facebook page. I recommend researching the options, mixing, matching, and experimenting to come up with what's the best for your group.

If you are new to the process, this presentation will be most helpful if you watch it from start to finish first. That will give you a foundation from which you can improvise techniques as needed.

One last note before we begin—because the techniques shown are very non-traditional, I've opted to use the word "drum" in place of "taiko" throughout this presentation.

Questions? Contact me at marc@marcsteuben.com

Implements of construction

- Electric hand planer
- Drill, several 1/16” bits
- Electric pad sander
- Duct tape
- Jigsaw
- Two sawhorses
- Hammer
- Sharp scissors

- Latex gloves (for handling glue and stain)
- Eye, ear, hand, breathing protection
- Leather gloves

- Ratchet straps
- Drum lift (this presentation includes a section on making the drum lift)
- Other miscellaneous items you’ll see in the video

Ingredients

Barrel

- Used wine or whiskey barrels (oak) work well. Liquor stores, distilleries, and garden centers are good sources. Try to find one that's still banded with metal rings and has a top and bottom. Staves that have been separated too long may have warped which will make reassembling them difficult. If there's no top or bottom, use a ratchet strap to keep the staves together.
- Extra staves—individual staves can be bought online. It's usually best to have an extra 4-5 of similar shape and size—there's more information on this near the end of the barrel assembly section.

Cowhide

- I buy full cow (or bull) hide. Most of it was used for these two drums.
- Ask for as thick as possible, with no brands if possible

Misc

- Upholstery tacks
- Wood glue
- Duct tape
- Carbon fiber or fiberglass cloth / epoxy resin and hardener

drumsource.com and the drum Community Facebook page have details on vendors and sources.

Barrel prep

Barrel

The staves should be as even and unwarped as possible. But they don’t have to be perfect. This barrel had some dirt and rot inside and the individual staves had started separating—it worked fine. Don’t worry if it has a hole, we’ll deal with it later.

Barrel prep

Barrel prep

Number each stave and add an arrow to remember the proper numbering direction—reassembling the staves in their original order is easier and results in a better shape

Barrel prep

SAFETY FIRST!

Wear protective gloves to avoid splinters and painful, costly, tetanus shots after getting poked by rusty nails.

- Loosen the metal rings with the hammer claw and remove any nails
- Gently tap the rings up or down to remove

Barrel prep

Remove and dispose of all nails ASAP. For the safety of you and your car tires if you’re working in your garage like I am.

Barrel prep

Its not necessary, but with two of the metal rings, some spare boards, and some duct tape, you can build a simple bin to hold the staves as you build the body.

Barrel prep

If your barrel has a top or bottom, gently knock the boards out (you may need a saw if they're stubborn. If your barrel has a hole on the side, save one of the top or bottom boards—you can use it to fill the hole later. With the top, bottom, and rings off, the staves will separate. Line them up in order.

Barrel prep

Most whiskey and wine barrels are charred on inside—it adds a delicate smoky taste that pairs well with creamy cheeses like brie. Anyway, that char, and any other gunk that's accumulated inside the barrel, needs to be removed or it will slowly dislodge and bounce around inside your drum.

Set things up like in the photo to the right. Remember to use gloves, eye protection, ear protection, and a mask.

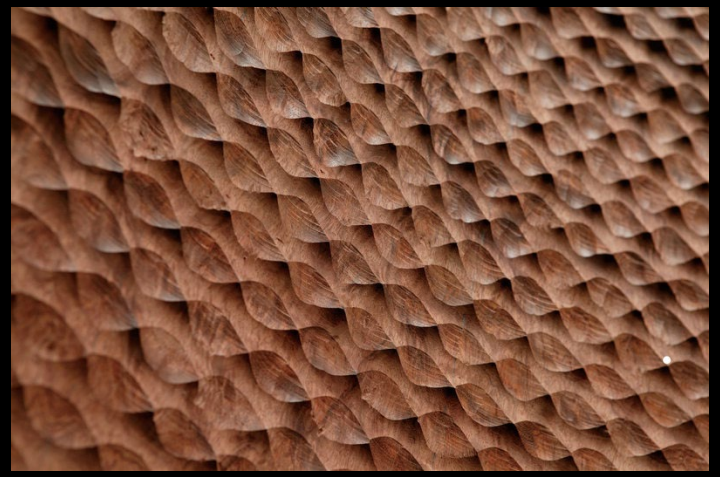
Barrel prep

If you haven't used an electric hand planer before, they're simple to use. But read the instructions. They can be dangerous. A blade on the bottom spins and will remove layers of wood (and flesh—be careful!). In the photo below, the left side of the stave has been planed, the right side has not.

- Set the planer on the lowest setting at first to avoid removing too much wood—you can go over each section more than once if necessary.
- Leave the surface slightly rough, don't try to make it smooth.
- Move from end to end in one direction, then go back over it in the other direction to create angled hash marks.
- Don't plane the tips of the staves—those tips will be the rims of the hiradaiko.
- Only go deep enough to remove the char l
- Remember to dump the discharge bag when it's full.
- **Plane only the inside of the stave, don't plane the sides, outside, or ends.**

Barrel prep

Besides removing the loose crud from the staves, planing does two other beneficial things: it makes the final drum lighter, and the rough pattern makes the staves vary in thickness and provides surfaces that will propagate sound waves inside the drum to make it more resonant. The surface of the final, planed stave
should look something like this:



Never mind, that's actually the inside of an Asano drum, and they're working on a whole different level. But the concept is the same. For our purposes, this is fine:

Now do the same for all of your staves. This is a good task to spread out if your time is limited or your arm gets too tired, which it will. Keep it fun.

Barrel prep

Put the staves back in order as you finish each.

Barrel rebuild

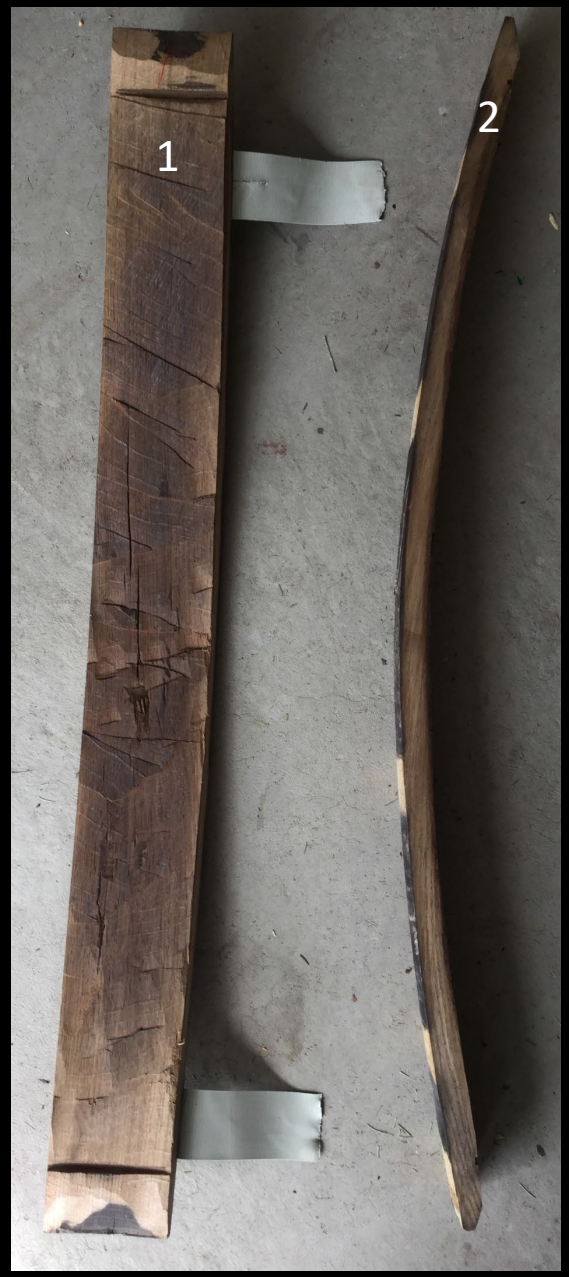
When all the staves are planed, it’s time to reassemble the barrel.

The challenge is to get all of the staves glued side-to-side, in order, back into the barrel shape. One good solution, which several drum-making guides suggest, is to gather your taiko group members, glue all the stave sides at once, and work as a team to fit them together into the proper shape. Once you’ve done that, you can replace the metal rings to hold the shape until the glue dries. This is a good and fun way to do it. But sometimes scheduling makes it difficult.

Below is another option that one person can do alone, or several people can work on independently. It does take more time.

Arrange staves 1 and 2 as shown. Place them so the correct sides will be glued together. In this case, the right side of stave 1 will glue to the left side of stave 2 (which is positioned up so glue can be applied)

Place two strips of duct tape on the outside of stave 1 as shown



Barrel rebuild

Add a line of wood glue (Titebond or Gorilla work well—make sure it’s wood glue) down the length of the stave sides that you’ll connect. Smooth the line to cover the surface, then do the same for the other stave.

Barrel rebuild

Carefully join the glued ends of the two staves as precisely as possible.

“Clamp” the staves using the duct tape: Be sure one end of the tape is attached solidly to one stave, then pull the other end until it stretches slightly. Then attach it. Duct tape has some elasticity, so stretching it slightly before attaching will create some tension that will pull the staves together as the glue sets, forming a tighter bond.

Use the same procedure to apply more strips of tape to the top, middle, and bottoms of both the outside and inside of the joined staves. The goal is to have the glued sides have as much contact as possible. You can also tape over the joint at the ends to make sure ends line up.

Barrel rebuild

Check your glue's instructions, but the "clamp" time is probably around 30 minutes, so freshly glued staves should be left alone for at least that long. After an hour or so, you can *carefully* start adding more boards using the same method. If you want to speed things up, you can join the staves in pairs, then join the pairs into fours, then eights, etc. Be sure to follow the stave numbering in order. However you do it, wait enough time for glue to set and be careful not to break the glue bond. There is no rush to remove the tape—wait a day or so before doing so to be sure the glue has totally dried.

Barrel rebuild

Keep going

After the combined staves get heavy that they might fall over, but before the barrel is complete enough to stand on its own, you'll need a creative solution to stabilize them while the glue dries.

Barrel rebuild

Keep going. Before long, the barrel will be complete enough to stand on its own. At that point, you can start adding staves to both ends—but be sure to keep the numbers in order. The highest number will be next to stave 1 and will decrease from there.

Barrel rebuild

Keep going.

Barrel rebuild

In the photo below, notice that the staves on the left and right of the gap are different than the others. This is because although all of the barrel staves were joined, but there was a six-inch gap! This is common when staves are glued back together after being held by rings. I'm not sure why either (possibly the rings were compressing the wood, which then relaxed to a slightly different shape when the rings were removed? Let me know if you have a better answer.)

The good news is it's not hard to fix—you just need extra staves which you can get online or from another barrel. The extras that I added matched those of the barrel, in size and shape, very closely (luck). Often they won't. But you can hack them to make them fit.

Barrel rebuild

The height of this extra stave is fine, but the curve is way off, so the stave must be gently coaxed into the proper shape.

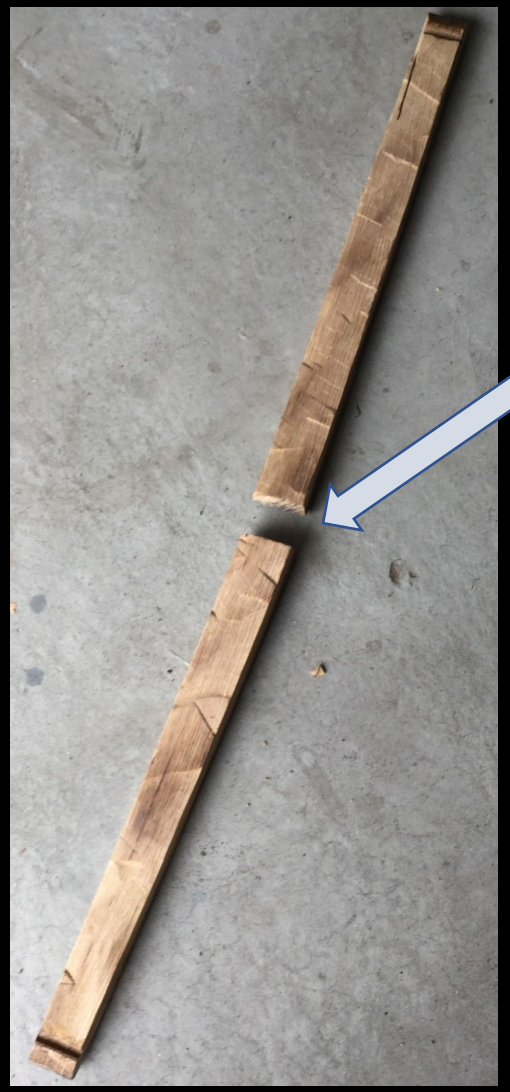
Barrel rebuild

Start by cutting it in half.

Then glue and tape the bottom half into position—the curve won't line up perfectly, but it should be close, and we'll plane and sand the body later so it will smooth out.

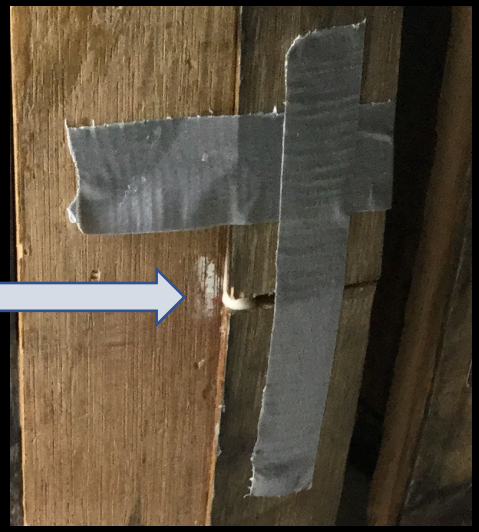
Note: if the extra stave's curve is very different from that of the barrel, you could cut it into thirds.

Barrel rebuild



Slightly angle the cut of the top half so it will contact the cut of the bottom half when glued into place (you can just grind it on some concrete to adjust the angle)

Glue the top half into place—glue the cut joints too.



One more stave to go!

Barrel rebuild

If the last stave is the wrong width, choose one that's as close as possible, erring on the side of too wide. Then you can plane it to be more narrow (lowest setting, even strokes so it's smooth.

It's impossible to make it perfect so don't worry—the important thing is that the stave has enough contact with its neighbor staves to **glue solidly into place**. Remaining gaps can be filled later with wood chips or putty.

Barrel rebuild

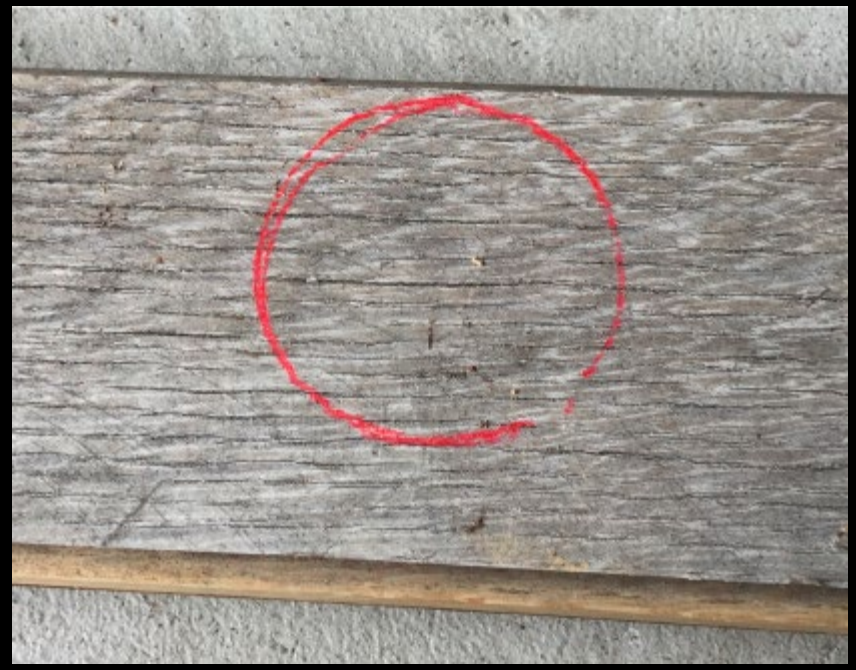
Fix the last curve using the gentle cutting-in-half procedure explained before.

Barrel rebuild

And I’m done! A nice, solid, franken-barrel with no major gaps or holes or . . . oh yeah, holes . . .

Barrel rebuild

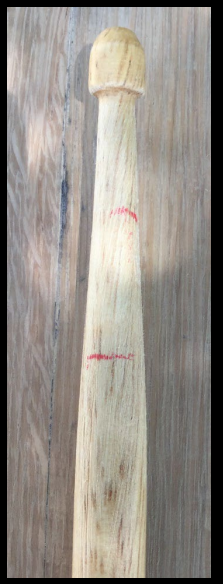
For the big hole, just make a plug from one of the top boards. Press the top board against the hole and draw a circle from the inside.



Barrel rebuild

Use the hand saw to cut the plug—wear your gloves and don't try to cut while holding the wood! Use a clamp. Sand or plane, or drag the plug on concrete to fine-tune the shape.

For the smaller holes, you can shape any narrow dowel … but you're a drummer … be creative.



Body prep

Now we're done with the barrel rebuild.
On to the body prep.

Place the finished barrel on a stable support. I'm using a plastic sawhorse with a carpet tile over it, but there are lots of options . . . you just need to keep the barrel stable and unscratched because we'll smooth it next.

Body prep

The next steps can be customized depending on how you want your finished drum to look. If you want it very smooth and shiny, you can use a hand sander and go over (and over) it with sandpaper—starting with coarser paper and moving to very fine paper. I will look great, but it will take a long time and a lot of sandpaper.

I personally decided to compromise a smoother finish for lower expense and time—I plane once, then sand with coarse paper once, then finish with fine paper. Much faster, and the finish looks good. Just a bit rustic.

Finish before sealing with tung oil.

After sealing

Taiko photo from Wikipedia

Body prep

Use the hand planar set at is lowest (most shallow) setting so you don’t strip off too much at one time (which might leave a deep gouge.) You can make as many passes as you want. Use slow, even strokes to keep the surface as smooth as possible.

Plane very lightly at the ends—the planar will drop when it goes over the end of the barrel and can make a divot in the wood. Be sure not to plane the rims—they’ll be the rims for the hiradaiko.

Body prep

Keep going.

Body prep

When the barrel is complete, check for gaps and holes that you may want to fill. You can just use wood putty for small gaps and nail holes—wood putty provides no strength so use it only for aesthetic reasons. Avoid getting too much on the wood around the gap you're filling—wood putty affects how stain is absorbed, so using too much will affect the finish. Larger gaps can be filled with wood chips and wood glue, or epoxy.

Clean off the excess putty after the gap is filled.

Body prep

As you probably know, most barrels are not of ideal size ratios for a drum. The bodies are too long, and diameter of the ends are too short—the sound from a drum of these dimensions would be muffled because the already light sound from the small heads would further diminish while traveling through the long body. So the ends of the barrels are cut off. The good news is that we can use those ends to make another drum.

Body prep: Hiradaiko

The typical ratio of a drum made from a barrel is 4:5 (end diameter/height). The diameter of the opening gets bigger the lower down the barrel you cut (since the barrel is wider in the center), so shorter body = wider heads. Use painter's tape to map out potential cut points and find the optimal amount to cut from each end of the barrel (the cut ends must be equal in height.)

Instead of worrying about the 4:5 ratio, my logic was: the barrel is 35" high. I want to use the ends to make a hiradaiko and I don't want that to be too short (for aesthetics, sound, and because since the ends are glued they need to be long enough to hold together). I decided a 10" height for the hiradaiko was good, which means 5" cut off each end. So the chudaiko ended up 25" high with a 25" head diameter. Slightly off the usual ratio, but close enough for my non-precise needs.

As a quick, but highly informative, side note Japanese taiko usually have a ratio of 1:1—the difference is that they're shape is usually a bit rounder.

Body prep: Hiradaiko

What’s an easy but accurate way to mark the barrel for 5” cuts? There are lots of options, but here’s the one I slapped together:

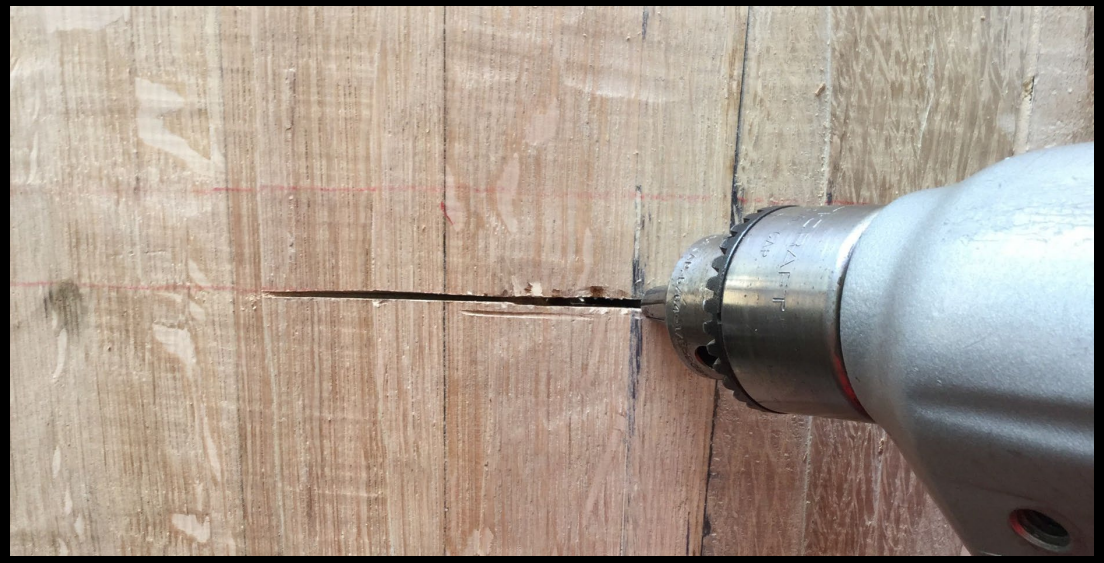
Make sure the barrel is on a even, flat surface and drag the high-precision flowerpot compass around the barrel.

Body prep: Hiradaiko

Start the cut with a hacksaw. Once you've cut deep enough, the cut will open on the inside so you can fit a jigsaw blade through.

Body prep: Hiradaiko

If you need to, you can widen the cut using a drill with a very narrow bit—you only need it wide and long enough to get the blade through.



Body prep: Hiradaiko

Cut along your line as straightly and evenly as possible. When you get about half way, duct tape the end to the center so the weight of the end doesn't cause it to crack or distort as you continue to cut. You can also wrap tape all the way around if the end staves start to feel loose or unstable.

Body prep: Hiradaiko

When you've cut all the way around, carefully stand the body up, release the tape from the center, and tuck it around the bottom of the end. Leave it taped like this until you're ready to use it—the ends are delicate at this point.




Body prep: Hiradaiko

Follow the same procedures to cut off the other end.

Body prep: Hiradaiko

The ends are delicate because the staves probably didn’t fit together perfectly and because there is less contact area (and therefore less glue) between them. We need to stabilize each half before joining them.

Body prep: Hiradaiko

I use a carbon fiber/epoxy approach. Fiberglass also works. You could buy metal plates from a hardware store, bend them into shape, and attach them to the inside with screws—if you use this approach, I recommend using some kind of thread-lock glue on the screws to make sure they don't loosen over time and fall out inside the drum.

Carbon fiber can be a bit expensive, but it's easy to use, holds well, stays stiff, and has been shown to have good acoustic properties. An overview of applying carbon fiber follows:

I use one ring on each hiradaiko side, and patches to reinforce the hiradaiko body at the center once the halves are glued.

There are several carbon fiber sources online (including Amazon). I use Soller Composites—they sell bulk carbon fiber and epoxy kits. I get 3K twill weave—it's a loose weave which is Ok for this application. It is also cheaper than finer weaves.

Body prep: Hiradaiko

Each carbon fiber ring is 2-3” wide, and its length should be the circumference of the inside of the half. Calculate the circumference by multiplying the diameter by 3.14 (pi). In my case that was 25” x 3 (close enough—just cut a little extra) = 78”. So I cut two 3” x 78” strips.

You may need more than one strip depending on the length you need.

If you pull out one carbon fiber thread, it will give you a visible straight line to cut. Cut with sharp scissors.

Lay your strips out carefully—don’t put out fraying threads for now, it will just make it fray more.

Body prep: Hiradaiko

Refer to the instructions for your epoxy, but the basic procedure is:

Mix the epoxy and hardener in the recommended ratios. Mix slowly for about two minutes (avoid air bubbles).

"Paint" a layer of mixed epoxy slightly bigger than the width of the carbon fiber strips around the half.

Wait until the epoxy gets tacky (your finger will stick slightly if you touch it). It depends on your hardener, but it could take two hours.

When the epoxy is tacky, gently press your strip(s) of carbon fiber against it. Be careful, the carbon fiber is difficult to move after it's stuck to the epoxy. You can either stick loose threads to the epoxy or leave them to cut off later.

Mix another batch of epoxy (about the same amount as the first) and carefully paint that over the carbon fiber. Try to press the epoxy into the carbon fiber.

Do the same to the other half, and take a break—it can take several days for your carbon fiber rings to fully cure.

Body prep: Hiradaiko

The next step is to join the two ends into one hiradaiko body. The first challenge is that, no matter how careful you were cutting the ends, they probably don't fit together perfectly.

This is one of the rare parts of this process that we really do need some precision. We want the ends that will join to each be as flat as possible you don't have gaps in the middle of your hiradaiko.

So how do we make them flat?

Imagine you had a moving walkway with a sandpaper surface. You could press each half of the hiradaiko body on it for a few minutes and it would do what we want—even, flat ends that have full contact when joined.

Body prep: Hiradaiko

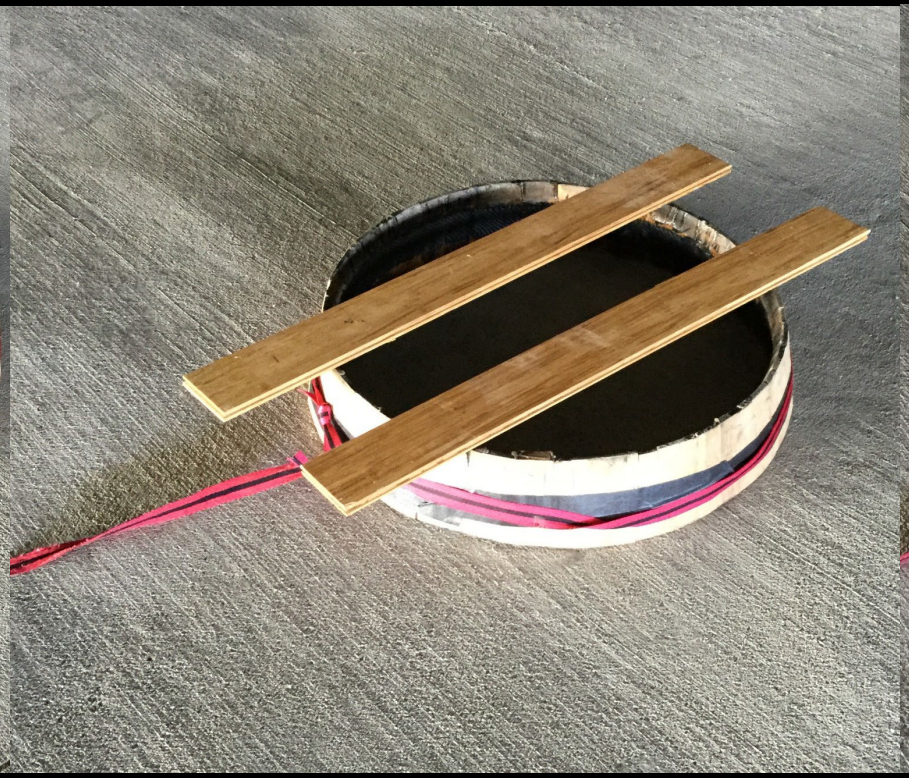
You could pencil in hashmarks on the end, and when all the hashmarks had been sanded off, you'd know that the joining-end surface was totally flat.

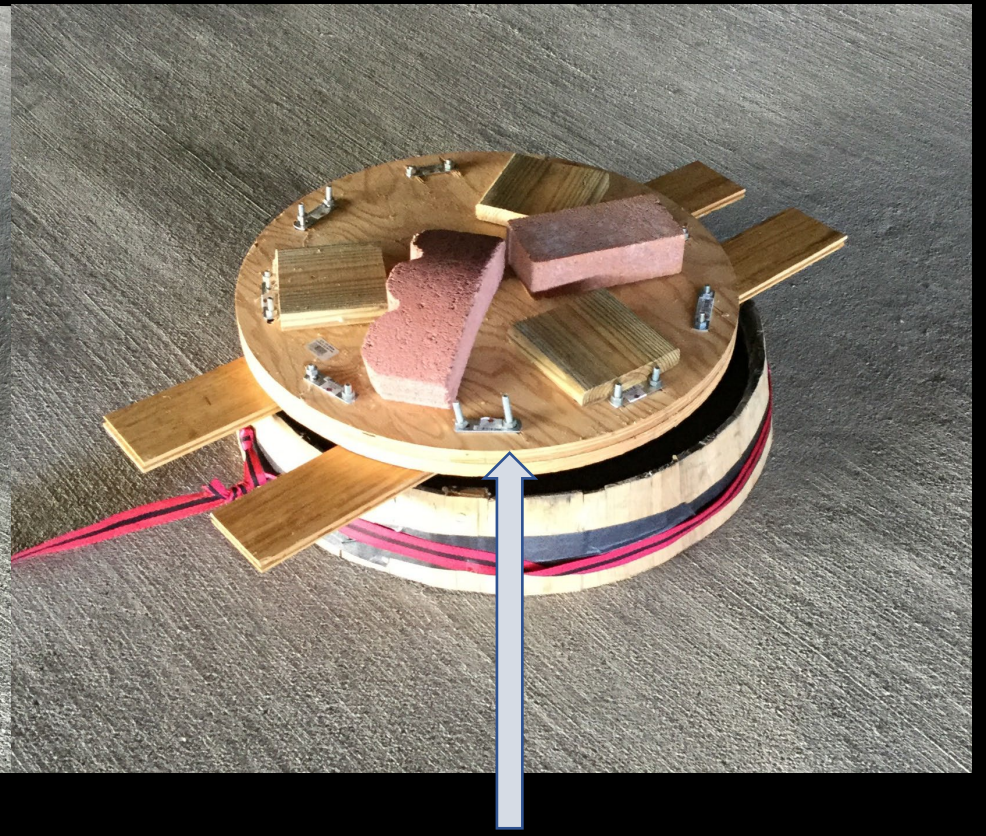
Perfect!

Unfortunately, sandpaper walkways are quite expensive and illegal in most states.

Body prep: Hiradaiko

So . . .





(Random, heavy crap to add weight—your random heavy crap may vary. Just try to weight it evenly and securely.

Body prep: Hiradaiko

- Empty parking garage (Sunday am)
- Heavy-crap-loaded hiradaiko body half
- Long strap so you can drag without lifting the hlaf up off the ~~sandpaper~~ concrete
- Drag slowly—the rough concrete will cause the body to vibrate—too much of that will compromise the glued joints of the staves
- Rotate the strap around the body occasionally so different sides lead (helps keep it even)
- It took about 20 minutes per half for this one. Stop every five minutes or so to check that the staves aren't loosening (if they are, secure with duct tape, or abort for now and re-glue), and that the weights are situated properly. Check the hashmarks to see your progress.
- Don't drag longer than you have to—when the hashmarks are gone, you're done.

Body prep: Hiradaiko

This is close—just a few hashmarks left

This is done

If there is a section of the end that's very recessed—for example it's a half-inch up from the rest of the edge so you'd have to grind another half inch off to make all the hashmarks disappear—don't worry about it, you can stop dragging. If you can get 90% or more of the ends of the two halves connected and glued, you'll be fine—you can fill the gap with a custom plug later.

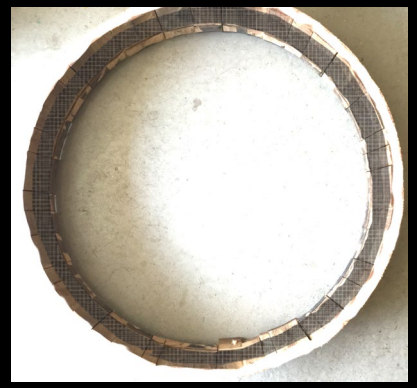
Switch out the halves and repeat.

Body prep: Hiradaiko

The final test is putting the halves together—they should line up and have good contact all the way around the circumference. If there are still gaps, you can either grind more, or connect the halves and use something to fill the gaps.

Body prep: Hiradaiko

Apply wood glue around each end and bond together. Be sure to pair the staves correctly (you can tell by the width and color of the staves—each stave should be paired with its partner from the other end). Apply evenly distributed random heavy crap for a better bond.



Body prep: Hiradaiko

After the glue has set, apply carbon fiber patches that overlap the center of the body for further stability. Wait for the epoxy to fully cure.

Body prep: Hiradaiko

Finish the hiradaiko body by planing and sanding so the exterior is even and smooth. You can choose how much time you want to spend on this. I just planed the center rim and gave one pass with rough sandpaper, one pass with fine sandpaper.

Sand the top and bottom edges now—the heads will stretch over them so we want them curved and smooth.

Body prep: Hiradaiko

The last step is staining (optional, but helps seal the wood and brings out the wood grain):

- If you're using a dark stain, tape the body at the ends—the cowhide for the heads is slightly translucent, so the dark stain will be noticeable through it.
- Stain according to the stain's instructions (typically you paint the stain with the grain, then rub off excess with a soft cloth).
- Remove the tape after the stain is dry, and your hiradaiko body is done.

Body prep: Chudaiko

Finish the chudaiko using some of the same procedures as you used for the hiradaiko:

- Carbon fiber near the ends (nothing needed in the middle). This is optional since the staves are more solidly glued than the hiradaiko ends, but it will add stability.
- Sand the body and smooth the edges at each end.
- Tape the ends and stain.
- If desired, you can add a high gloss finish on top of the stain to further seal the wood and make the bodies shinier.

Bodies are complete, ready for heads!

Head prep: Cutting the rounds

It is possible to buy cowhide “rounds” that are precut and of even thickness—they can be very good quality and convenient, but they can also be expensive. Following are procedures you can use to cut your on rounds from a full cowhide.

Head prep: Cutting the rounds

You can purchase a whole cowhide (or bull hide) online. Try to get as thick as possible, with no brands (it can be difficult to avoid brands, but try).

The hide will arrive rolled up into a tight cylinder. The first step is to unroll that so you can cut it. Secure one end (in the photo below, the end is nailed to the outside of the fence with three nails). Cowhide becomes more pliable when it's wet, so spray the roll (or use a sponge to swab on water from a pail) so it's damp (it doesn't have to be soaked). Unroll, add water, unroll, add water, etc. until you get the hide flattened out as shown below:

Head prep: Cutting the rounds

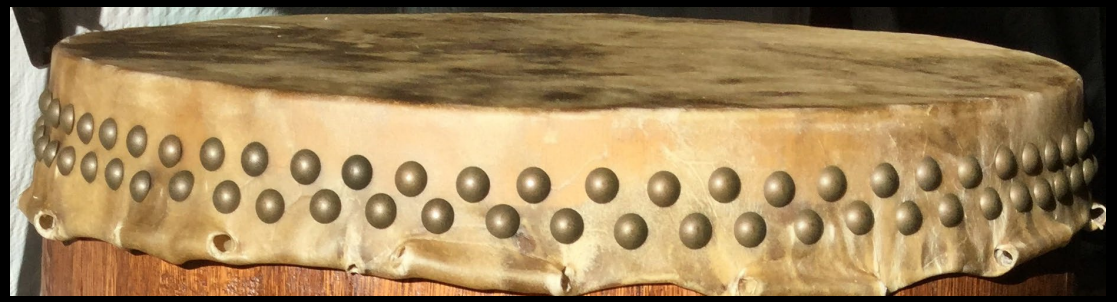
Lay the hide on a flat surface, add more water, and add some heavy crap at the parts that want to curve up. Let it dry that way for about 15 minutes. It will dry fast since it’s not soaked.

Head prep: Cutting the rounds

‘While it’s drying, make a high-precision string/pencil compass like the one below. You’ll use this to draw the rounds that you’ll cut from the hide.

Head prep: Cutting the rounds

The diameter of the rounds should be about 6” to 10” wider than the diameter of the opening of the drum body, depending on the style of mimi that you want. The extra length on each side are for the side panels, mimi, and extra that can be cut off, kept on, or tucked up under the panels.

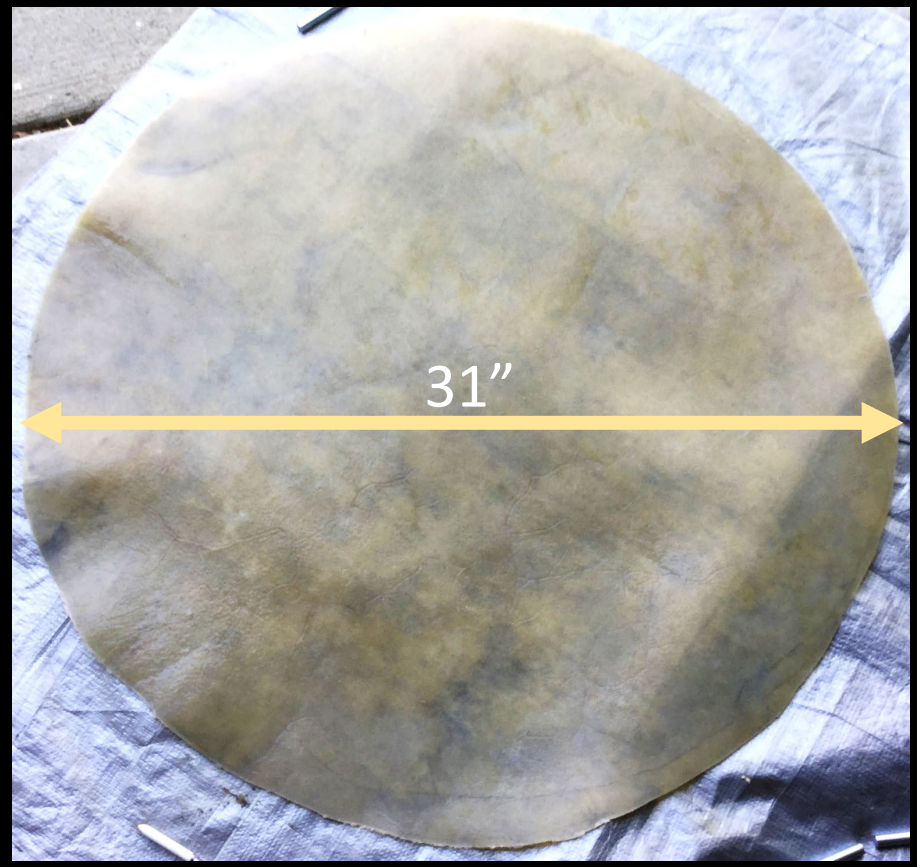


Taller drums usually have longer side panels for extra tacks, and “tucked” mimi. The diameter of the round for this head was cut 10” longer than the diameter of the body opening.

Shorter drums usually have shorter side panels because you don’t want the side panels to take up too much space on the body. The diameter of the round for this head was cut 6” longer than the diameter of the body opening. If desired, you can cut the mimi holes below the tacks for a straight line after the heads are finished.

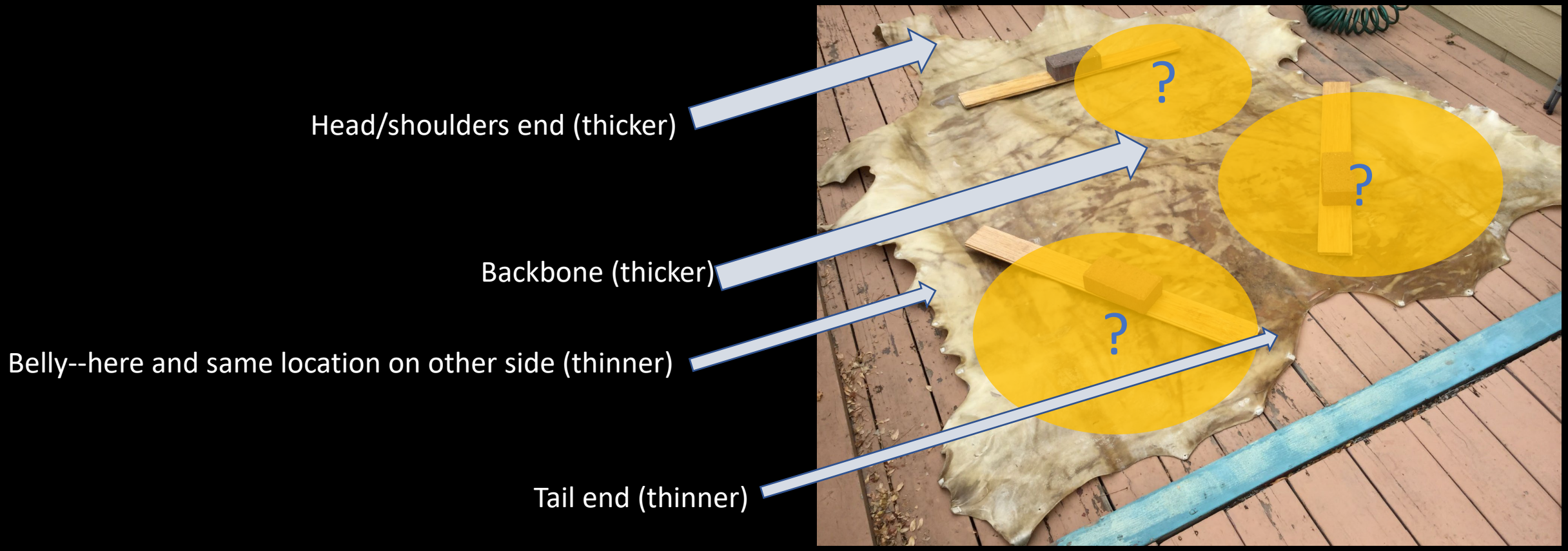
Body prep: Chudaiko

For this demo, we'll do the hiradaiko first, with 3" side panels on each side.



Head prep: Cutting the rounds

Deciding where to cut the rounds depends on which locations will leave the maximum usable hide for other drums (which will depend on what size those drums will be), and what thickness is desired for the heads (for big drums, thicker is usually better). If possible, it's best to cut the rounds for each drum from symmetrical locations on the same hide. The exception is if you want each head to have a different sound, in which case you might want one thick head and one thin head.



Head prep: Cutting the rounds

When you decide the diameter for the rounds and the locations to cut, tie a knot in the string of the compass at half the length of the diameter—in this case, 15.5” (half of 31”).

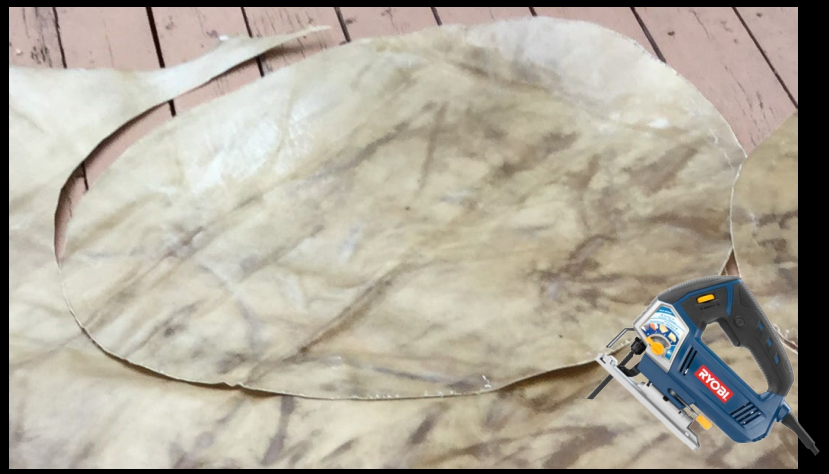
Experiment a bit to find the best location for the round. Then hold the knot firmly in the center of what will be the round and draw a full circle. The end of your drawn circle should meet the beginning of it. Redraw if necessary. Do the same thing for the other round.

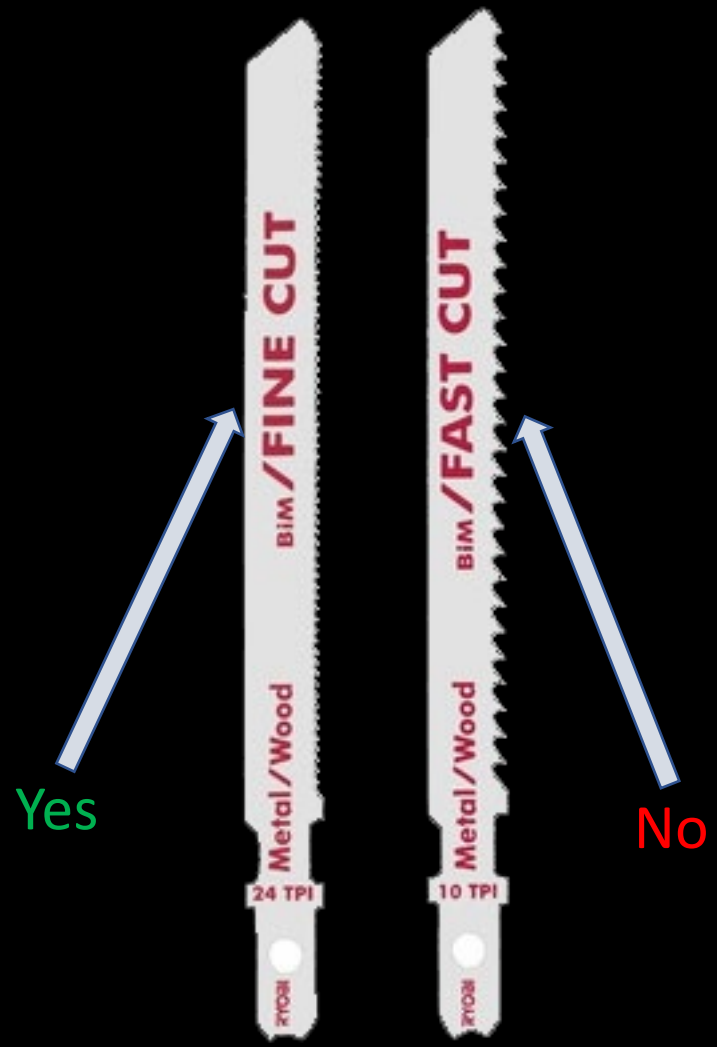
knot

Pencil circle

Head prep: Cutting the rounds

Use your jigsaw (or a hacksaw) with a non-aggressive blade to cut the circles. Wear gloves and go slow—even a non-aggressive blade will cut the hide quickly. The hide will probably vibrate up and down as you cut so stabilize it well and be careful.





Head prep: Cutting the rounds

To stretch the heads, you need twelve 6” long, 3/8” diameter (or thicker) steel dowels. If there isn’t a Dowel Depot in your neighborhood, you can buy two 36” dowels (Home Depot and Lowes usually have them in-store) and cut them into six pieces using the same non-aggressive blade you used for the hide. After you’ve cut them, lightly file the ends to remove any sharp jags that may remain.

Head prep: Hiradaiko

Heading the drum has three major steps: Shaping the hide into heads (first stretch), stretching the formed heads onto the body (final stretch), and tacking.

To prepare for the first stretch, soak one of the rounds overnight in a little doggie pool with a bone shape on the bottom (or whatever—wide and shallow is best to avoid needing too much water):

Make sure the hide is completely submerged for its overnight soak. After the hide soaks for about 30 minutes it will be more pliable and will sink more easily—add rocks at the edges to hold it down if necessary. If its necessary to folder the hide to make it fit, make the water level deeper so the folds can be loose and don't end up as creases.

Head prep: Hiradaiko

The next morning, we make this:

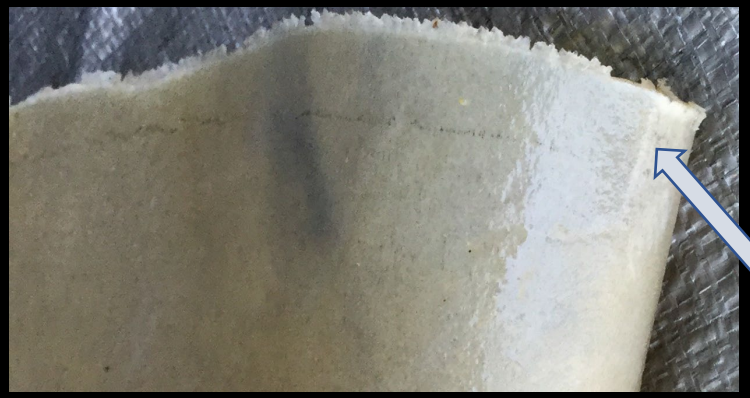
The smooth side of the hide is the outside of the cow and will be the outside of the head. The inside (“meat” side if you want to be gross about it) is rougher, grainier, and fiberier* That side will be on the inside of the drum.

The process explained here results in 12 “mimi” (ears) and they’re positioned like the hours on a clock. Twelve mimi works very well, but you can adjust if you want, but you will have to change some of the equipment and do a few steps differently so I recommend 12 for now.

**Fiberier* means “with more fiber” and is not actually a word.

Head prep: Hiradaiko

Start by folding the now-pliable hide in half so you can mark the top and bottom



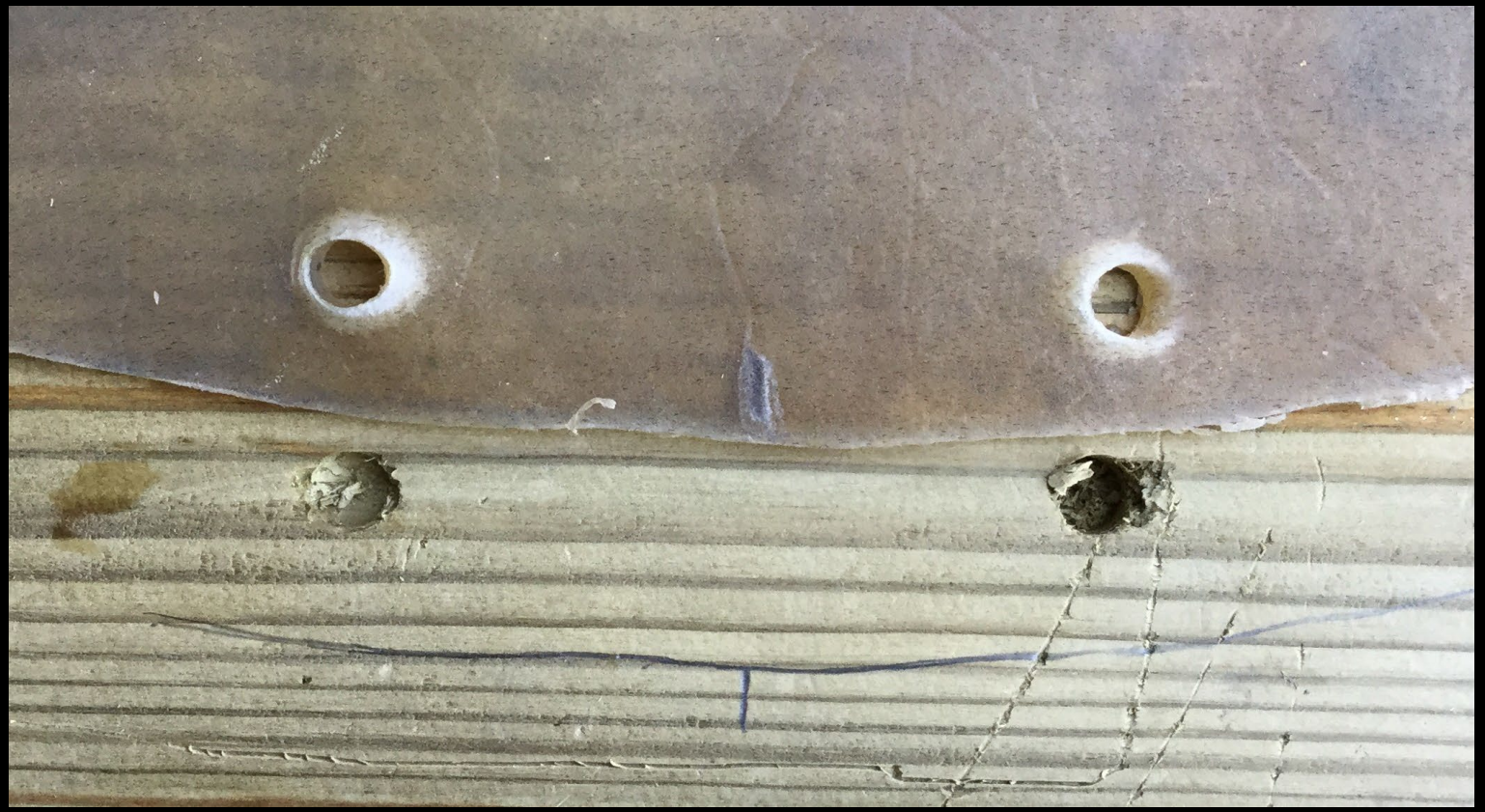
It’s difficult to draw on wet hide, so etch it in with the pencil tip if necessary.

Head prep: Hiradaiko

Put marks about one inch in from each end of a dowel. Position the dowel about a half inch from the edge of the round, making sure it's lined up. Put marks on the round next to the marks on the dowel. Use those marks as the locations for drilling the mimi holes. Drill into a piece of scrap wood—the wood will protect the drill and serve as a template for the rest of the holes.

Head prep: Hiradaiko

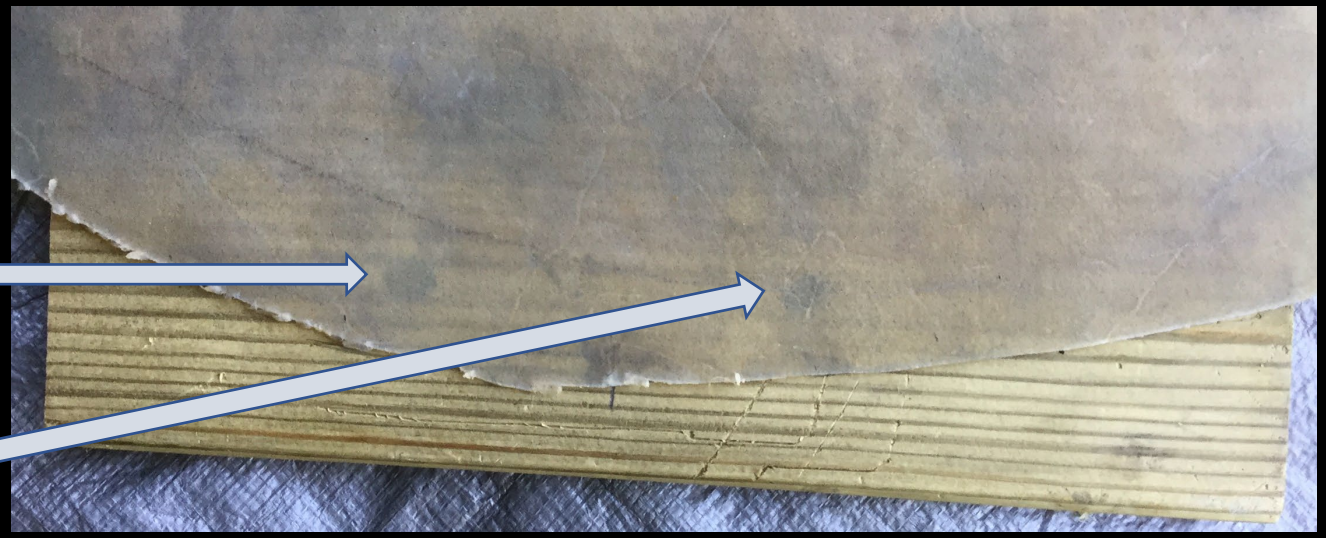
Before moving the round, draw an outline of it with a mark that lines up with the mark on the round.



Head prep: Hiradaiko

Thread a dowel through the mimi holes.

Rotate the round 180 degrees and use the wood template (lining up the edge and the center mark) to drill two more mimi holes (you can see the holes through the translucent hide).



Head prep: Hiradaiko

Thread a dowel through the new mimi holes. Fold the round in half again, this time lining up the mimi holes and dowels—this will give you the halfway points for two more dowels.

There is probably a clever mathematical way to find the exact locations for the marks to use for the in-between dowels, but in this case, eyeballs work fine. Just try to place two dowels so the distance between all four is about the same. Then roll the dowels to the edge and mark their halfway points on the round. Use those marks with the template to drill the mimi holes.

Head prep: Hiradaiko

Keep going and you'll end up with something like this:

Head prep: Hiradaiko, first stretch

Center the body on the drum lift and the doweled round on the body. There is information on how to build a drum lift at the end of this presentation—for now, just try to get a sense of the process and how it works.

Head prep: Hiradaiko, first stretch

Use one nylon strap (or two tied together) to create a “belt” loop that will go around the drum head, dipping between the mimi dowels.

“Belt”

Hook the ratchet straps through the Belt dips and thread the other end through the ratchets.

Ratchets

Note that you’ve got 12 mimi, 12 straps, 12 ratchets, all lined up like the hours on a clock.

Head prep: Hiradaiko, first stretch

Start cranking the ratchets. Alternate sides—for example, crank 12 o’clock a couple of times, 6 o’clock a couple, 3 o’clock/9 o’clock, etc. Make sure the head stays centered on the drum. Don’t use the jacks at all for the first stretch.

Head prep: Hiradaiko, first stretch

When the hide is pulled evenly and firmly, you can stop. It's tempting to over-crank the ratchets, but for this step we just want to establish the shape of the head so let it dry in this position for a few days. For traditional mimi, tuck the hide that sticks out at the bottom up under the dowels. For this drum, I'll cut the mimi off later so I left it as is.

If we tried to stretch it very tight in this step, the side panels would deform because they're wet. So we let it dry this way first. For the final stretch, we wet only the center (not the side panels), and repeat this process. The side won't deform because they'll be hard and dry. Then we tack the head through the side panels and let the center dry—the result is a tight, well-shaped drum head.

Head prep: Hiradaiko, first stretch

Because the shape of body, and therefore the head, isn't symmetrical, we want to be sure to place the heads on the correct side of the body, in the correct position for the final stretch. Add a short length of painter's tape over the head and body and write the number of the head on it. This is head 1, so I wrote "1" on the head side and on the body side. This will help you put the head back on in the correct orientation.

Head prep: Hiradaiko, first stretch

When the first head has dried, release the ratchet tension, flip the body, center it on the drum lift, and follow the same procedures you used for the first head to do the first stretch for the second head.

The second head will need to dry for a few days too, then we'll be ready to do the final stretches for both heads and finish this drum.

Hiradaiko, last steps

This last series of steps usually takes place on the same day over the course of a few hours. When you're done, you'll just let the drum dry for several days and then you can play it.

First, release the straps and reset the drum lift to get ready for the final stretches.

Hiradaiko, last steps

Remove head 1 (make sure the location tape you added stays in place). The head might be on tight, so you can use a hammer on the dowels to gently knock them loose. Thoroughly wet some old towels and arrange them on a tarp as shown below.

Hiradaiko, last steps

Place head 1 upside down on the bottom wet towel, and arrange the other wet towels to fully cover the head center—avoiding the side panels which need to stay dry. Pour in a little extra water and work it into the center towels. Leave this arrangement alone for about 90 minutes.

Hiradaiko, last steps

Things to do while you're waiting:

- Write something meaningful inside the drum.
- Goop up the rims with water-based lube
- Prepare your drill and drill bits
- Take off head 2 (don't wet it yet)

Hiradaiko, last steps

When the 90 minutes is up, head 1's center will be wet, but the side panels will be dry. Put head 1 back on the drum on the correct side in the correct position by lining up the tape. Start soaking head 2 the same way you did for head 1.

Manually push the head on as far as possible—it will be tight, so re-rig the straps and ratchets and use them to pull the head down firmly onto the body. Use the jack instructions prep the jacks.

Use the ratchets to pull the head back down onto the body

Hiradaiko, last steps

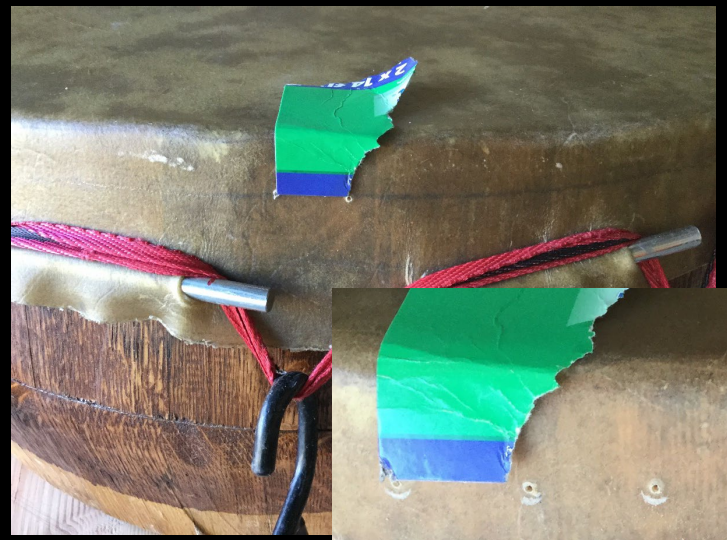
Start lifting with the jacks. Remember that these are very powerful (one can lift a car—you're using four). You'll be adding a lot of tension to the drum head and body quickly. Be methodical—jack twice, go to the other side and jack twice there, then do the other two the same way. Keep jacking and keep them equal at first. After you've jacked several times, tap around the head and compare the tones—add an extra jack or two if one side of the head has a lower pitch than the others (the lower tone is probably a result of the section being looser or thicker than the others so adding an extra jack will even it out).

When the head is pretty tight, climb on and either walk or crawl your way around, concentrating on the thicker areas. This will help break down some of the hide fiber and let you stretch a little tighter.

Mark Miyoshi's great tip (that I learned from Stanford Taiko's great web tutorial) on knowing when you're done stretching is hitting the center of the drum and listening to the sound—if the pitch goes down after the hit, stretch more. If it goes up, it's tight enough, so go tighter only if you want a higher pitch. With the procedures in this presentation, it's impossible to get a specific pitch, so just go for a good-sounding drum,

Hiradaiko, last steps

Next we'll tack the head into place. For this drum, I decided to do one row of tacks, about one inch apart, placed about midway between the rim and the bottom cut line (just above the mimi) of the side panels. Be sure you have enough tacks for the pattern you want. Since we'll use upholstery tacks, which are cost-effective but have a tendency to bend, we need to drill guide holes first. My procedure is to take piece of thin cardboard, torn so the bottom edge is one inch (or your preferred distance), and bend it over the rim so the corners are where you'd like the first two tacks to be. Drill those holes, then slide the left corner to where the right hole is and drill another hole at the right corner (or, use a pencil and mark all the way around first). Your drill bit should be more narrow that the tack point (otherwise the tack will fall out). A 1/16" bit usually works best—be sure to have plenty. The drill bit will get hot, which makes it easy to break. A good process is drill five holes, then hammer in five tacks—this will give the bit a chance to cool down. Hammer the tacks slowly and evenly to avoid bending the point (replace the tack if it bends). Keep going all the way round the drum.



Hiradaiko, last steps

Do the same thing for head 2. Release and reset the jacks and the ratchets, sweep off the drum lift platform, flip the drum over, align head 2, and go for it. If head 2 hasn't soaked for 90 minutes, take a break until it has. Don't let the head soak too long—if you go much past head 2's 90 minute soak time while working on head 1, you can remove the towels for a while.

Hiradaiko, last steps

Head 2—lightening round:

Hiradaiko, last steps

When you've tacked head 2, knock out the mimi dowels with a hammer. You may need to move them around to loosen, and you may need to pull them out with pliers—if so, use a cloth on the metal dowels so you don't scratch them.

Hiradaiko, last steps

You’re work on the hiradaiko is done! Wait several days for the heads to dry completely, then go ahead and DORO tsuku your brains out. Give your drum a name! This one is called *Chibi* after a character in the anime *Totoro* (spoiler alert—the chudaiko’s name starts with a “T”).

Head prep: Chudaiko

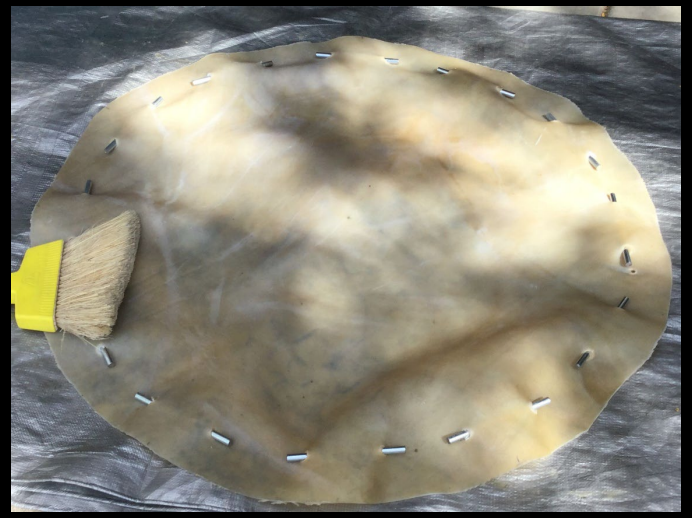
Heading the chudaiko is almost exactly the same as heading the hiradaiko. The main difference is in preparing the side panels and mimi. Usually with a longer body, you can use longer side panels, traditional mimi, and two rows of tacks.

This side panel is about 4 inches—the hiradaiko panel was about three inches (they'll be about 2 inches after being cut).

The dowels are placed higher so the extra hide below can be tucked up under the side panels

Head prep: Chudaiko

Because the process is the same, a photo overview follows:



Head prep: Chudaiko

Chudaiko, last steps

After both heads have dried, the final stretches.

Chudaiko, last steps

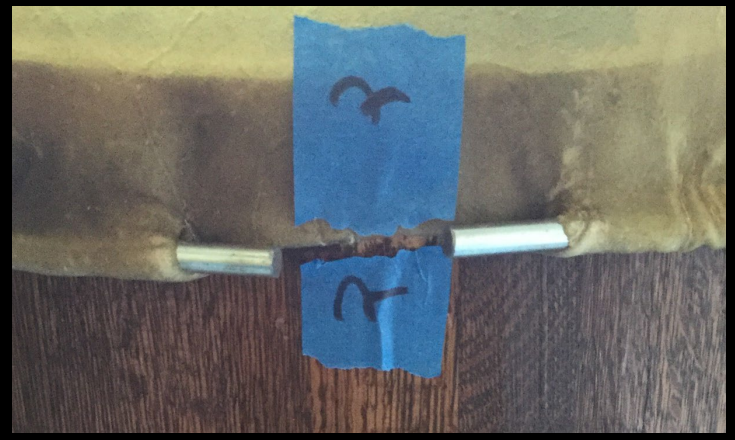
Chudaiko, last steps

Chudaiko, last steps

Chudaiko, last steps

Because the first row of tacks will hold the head you can start on the second head. After you tack that with one row, you can go back and do a second row for each if you want.

Chudaiko, last steps



Chudaiko, last steps

Chudaiko, last steps

There are different methods for lining up the second row of tacks. Being relatively lazy and interested in finishing up, I eyeballed it. I clipped the pointy end off one of the tacks and used the head to judge where the tack would look best, then I pressed it in hard so the clipped point indented the hide. I marked all the way around, then drilled five holes, tacked five times (to let the drill bit cool off), and repeat.

Then flip the drum and do the other side . . .

Chudaiko, last steps

Done!

Let your new chudaiko dry inside for several days, and give it a name.
The one we just made is Totoro.

Have a huge party

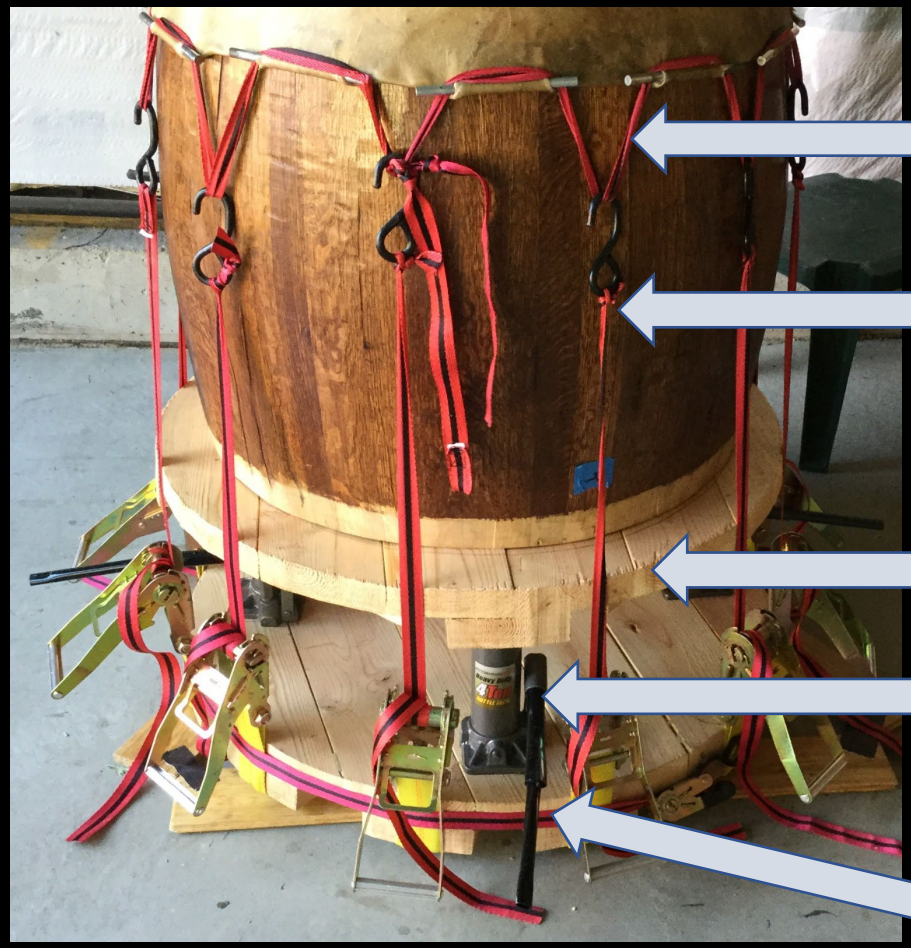
The End

Questions?
marc@marcsteuben.com

But wait, there’s more!
As a special bonus, some photos and a few comments on the building of the drum lift follow.

Building the drum lift

Like all of the processes in this video, there are a few ways to head the bodies but the goals are the same, either: 1) ***pull*** the drum head down onto the body with enough force that the wet hide will stretch, or 2) ***push*** the body up into the drum head with that same level of force, or 3) do both. This drum lift does both.



The Belt: a single hoop of strap or rope the circles the drum head and dips down below each mimi dowel. This is what holds the head in place during the pushing up and pulling down.

Straps with hooks: these are attached to the Belt at the top and the ratchets at the bottom. As you work the ratchets, the straps shorten and pull the belt which pulls the mimis.

Lift table: Supports the drum body and is pushed up by the jacks.

Jacks with handles: cranking the handle raises the jack which lifts the lift table.

Base: The ratchets are secured to the bottom of the base by bolts underneath and a tightened ratchet strap that circles the base.

Building the drum lift

Make the base and the drum lift big enough to support the biggest drum you want to make. Totoro is the biggest for me, so I used its body as a template.

Outline the opening and make a circle a few extra inches in diameter. Cut the boards individually following the outline—these cuts don’t have to be perfect.

Line the boards up into a rough circle and glue between the boards—put them under compression to dry.

Building the drum lift

Reinforce the base. There are 12 supports, one for each ratchet, and they are both glued and screwed to the base.

Reinforce the lift table. It doesn't need as much support as the base—just enough to hold it firmly together and provide support for the jacks to push against.

The nails are the guides for placing the jacks. You can tell by the indentation how much for the ratchet/jack combo supplies.

Building the drum lift

When the rough cuts are ready, draw a cutting guide with a string compass (the length of the string should be the radius of the size you want—half the diameter). Cut along the cut guide to get the correct shape for the drum lift and then do it again for the base.

Secure the ratchets to the bottom of the base. I used two lag nuts with large washers for each strap and did some creative tying. The ratchets must be extremely secure because they will be under intense pressure when you start jacking—you don't want them to pull loose.

I also added wheels to hold the base off the floor and make it easy to move around. I used small wheels because I don't have to move it very far, but you can use bigger ones if necessary.

Building the drum lift

The End

(for real this time)

Sincere thanks from Simpson Taiko
to the Taiko Community Alliance and
Simpson United Methodist Church