

Bow Press - Homemade

By Midlife Crisis

These plans were largely (almost all) based on plans from Devin Smith posted at:
<http://www.bowzone.ca/modules.php?op=modload&name=News&file=article&sid=122>

I modified them to fit my needs: (1) fit for a Switchback; (2) no welds [for improved portability and perhaps some cost savings]. The blueprint drawings were Mr. Smith's, with a few modifications to fit the design of a bolted press presented here. The photographs are of my press (built with modifications to Mr. Smith's plans), with the exception of those labeled as Mr. Smith's press. Mr. Smith really deserves all the credit for this project.

If you have suggestions for improving the clarity of these instructions, please send me a pm on www.archerytalk.com.

I urge you to contact your bow manufacturer by telephone before cutting the main steel square tube (a long 1.5" square piece). Devin Smith's plans called for the piece to be 22" long end to end. However, my conversation with Greg at Mathews Inc. technical support led me to make a longer piece. If you are putting the inner rollers on the riser of a Mathews Switchback, for instance, it is best to have the rollers spaced 24" apart – and wider than that if you are trying to get a Sure-Loc X-Press type of fit against the limbs. Either would be impossible to do if you had cut the main square steel tube to Mr. Smith's specifications.

If you work with more than one bow, it may end up that you want to fabricate a couple different main beams to support different bow styles (parallel limb and non-parallel limb) while keeping the other components the same (legs, feet, arms, rollers, cable and jack).

Notes from my conversation with Greg at Mathews technical support:

For bow presses, a wider roller is better. Use ones at least ¾" or more in diameter. The more surface area, the more spread out the force against the limb and the better it will be for the limb. **If you use a press that presses against the Switchback riser (and other Mathews bows – maybe other brands, too?), be sure to loosen the limb bolts 7 full (360 degree) turns before pressing.** You might want to (but it is not necessary) to loosen the brass cup screws for Switchback V locks.

If you are trying to replicate the action of the Sure-Loc X-Press, you will need to measure and drill very precisely. I thought about it and decided not to try. The benefit of the Sure-Loc X-Press action is that you do not need to loosen the Mathews limb bolts before pressing. The Sure-Loc X-Press inner rollers press against limbs right at the end of the riser. The outer roller should press against the limbs just before the beginning of the "V" cut in the limb. Greg's guess was that the Sure-Loc rollers are about 1" in diameter, but he had not measured them.

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TOOLS: Radial arm saw (or equivalent), two 7" metal cutoff wheels (I had one completely consumed by cutting steel and needed a second one to finish the cutting), bench grinder, drill press, 1/2" drill bit, 3/8" drill bit, 3/16" drill bit, oil for drilling lubricant, hammer, anvil, wrench, electrical cable stripper, C-clamps, ribbon clamp, metal square.

Material List

- 60" of 1-1/2" Square Tubing (11 gauge). [Cut two one-foot lengths for the feet (on a bolted-together press) and use the remainder for the main steel tube of the press.] Be careful when you cut the main steel beam – I needed 24" between the inner rollers [center to center] for a press that could handle a Switchback (this is what was recommended by Mathews tech support to me over the phone) – and more room on the ends to accommodate the arms that hold the outer rollers. My main beam tube ended up being 30" long end to end [Mr. Smith's plans call for the main beam to be 22" long end to end.].

[If you are going to weld the feet to the legs instead of bolting them together, only buy 36" of this material.]

- 48" of 1-1/4" Sq. Tubing (11 gauge). Cut into four 12' lengths for legs and arms.

[Note: if you are going to weld (instead of bolt) the feet to the legs then you should only buy 36" of 1-1/2" tube and get an additional 16" (for a total of 64" of 1-1/4" square tube – if welding cut four pieces 12" long for feet and arms, and two pieces 8" long for legs).]

- 32" 1/2" Cold Drawn Round Stock. Cut to four pieces of about 8" each.
- 5" 1-1/4" 0.125" hot rolled steel A36 carbon angle iron
- 3' 1/8" wire rope (cable), coated
- 2 1/8" cable clamps
- 2 3/8" eyebolts with nuts
- 4 3/8" washers [for eye bolts, probably not necessary, but inexpensive]

- 2 1/4" x 2" grade 2 bolts [for fastening angle iron jack support to main tube]
- 2 1/4" grade 2 nuts [for fastening angle iron jack support to main tube]
- 2 1/4" washers [for fastening angle iron jack support to main tube]
- 6 3/8" x 2" grade 5 bolts [for fastening legs to main beam, feet to legs, and press arms to main beam]
- 6 nuts for 3/8" bolts [for fastening legs to main beam, feet to legs, and press arms to main beam]

- 1 3/4" black pipe end cap [to cradle the cable when press is used]
- 1 3/16" x 1" threaded bolt and nut [used to hold bottle jack to angle iron]
- 1 3/16" x 2-1/2" threaded bolt and nut [used to hold bottle jack to main beam]
- 1 2 1/2 ton hydraulic jack [I bought a 2-ton bottle jack at Napa Auto Parts]

- 1 12" length of 1/2" ID heater hose
- 1 12" length of 3/4" ID heater hose
- 2 5" boat spool rollers, black rubber, 1/2" tube
- 2 1/2" Roller Shaft Pal nuts

- 1 can Rustoleum can spray paint – primer coat
- 1 can Rustoleum can spray paint – final coat in desired color
(or use acrylic urathane paint over epoxy primer for a hard automotive finish)
- 2 athletic wrist bands (not necessary, but nice to have to protect the bow's finish)

If you do not use the boat rollers, you will need to double the lengths of the heater hose listed above in order to create cushions for the outer rollers. Pal nuts are not necessary, but nice to have for the boat rollers. You do not need them for the heater-hose rollers.

I did not have a local steel distribution center (and Home Depot's stock was not sufficient), so I ordered my steel online from www.onlinemetals.com. The steel and shipping were \$57.10 (I had two pieces of 1-1/2" square cut to 1-foot lengths to use as feet – which added just a little to the cost – and also ordered a 36" piece of 1-1/2" square for the main beam).

I ordered two 5" boat rollers and two roller shaft pals from <http://shop.easternmarine.com>. The rollers were \$3.75 each and the pals were \$0.55 each. Shipping was \$7.84. I used 5" boat rollers instead of 4" (which come on some Apple presses) as my buddy down the street has a split-limb bow and the 4" rollers would not fit his limbs. They were a little too snug on my old PSE bow as well. The 5" should be able to accommodate all bows.

All the hardware (nuts, bolts, washers, screw eyes, cable, cable clamps, and paint) were \$14.79 at Home Depot. The 7" metal cutoff wheels were \$2.88 each at Home Depot.

The bottle jack was \$14.99 from a local NAPA (Auto Parts) store. I assume most of the 2-ton bottle jacks on the market are pretty standard. On mine the plunger jacks up 4-3/4" and I can increase the height by another 1-7/8" by twisting the extension screw in the end of the plunger.

The heater hose was \$3.20 for one foot of each 1/2" and 3/4" hose – also from Napa Auto Parts.

I used old athletic wrist sweat bands, but a new pair can be bought for less than \$1 at Wal-Mart.

I already had the drill bits, oil (used while drilling metal), and tools. All in, including taxes and shipping, my costs were about \$115.

Directions and Tips

1. Wear goggles or a face shield (better) to protect your eyes, a long sleeve shirt, and work gloves to prevent skin burns (from hot steel fragments) on your arms when cutting and grinding the steel.
2. Cut the square tubing and round stock to the dimensions listed above in the **Materials List**. Take care to cut the main beam square tube at least as long as the length required for your bow. [I used a metal cutoff wheel on my radial arm saw for cutting steel pieces to specified lengths.]
3. Use the metal cutoff wheel to cut openings in the 1-1/2" square tubes (bottom of main beam and top of the feet) to allow the 1-1/4" tubes to fit inside. Be careful with the orientation of the weld joint in the 1-1/2" tube. It is best to have the weld on the top side of the main beam and on the top sides of the tubes used for the feet. Do not have it on either side of the main beam or feet because the weld will interfere with your ability to fit the 1-1/4" tube completely inside the 1-1/2" tube, which is necessary for bolting all the pieces together (instead of welding).

Take care with the distance between the legs on the main beam. You will not want the legs to be so close that the bolts would interfere with the attachment of the angle iron that will be used to support the bottle jack. I kept the legs on my press 8" apart and centered on the main beam.

Be careful when cutting the openings in the bottom of the main beam and the tops of the feet – use multiple passes with the cutoff wheel to create the openings. When you come close to creating an opening big enough to fit the 1-1/4" tubes, pause and check repeatedly – you want to keep the fit snug.

[If you are welding and not using bolts to connect, consider cutting the 12" legs down to 8". Weld the legs to the center points of the 12" long base feet. If you made the adjustments noted above in the bill of materials then both your legs and feet will be 1-1/4" tube.]

4. Carefully mark the holes to be drilled in each arm and the main frame. I recommend using a drill press and clamping the square tubes in place while drilling. If you have to use a hand drill, center punch the drill holes and make sure your drill is perpendicular to the steel. I also recommend using a band clamp to hold the legs inside the feet and the legs inside the main beam while drilling the holes that will be used in bolting these pieces together. Use a metal square to be sure they are set up at right angles. By drilling them while they are in "assembled" position, you can be assured that your bolt will go through (if you try to drill them separately you may be misaligned and it might not be possible to fit the pieces together and bolt them in place – this is why I really recommend using a drill press on assembled joints).

Important!: Label the holes (on the inside of each tube) on each piece so you will know which end goes where immediately after you unclamp them from the drill press. Holes in the various pieces will be close to each other, but not exact. An exact line-up is necessary to bolt the pieces together. Knowing which holes were

drilled together as a pair will enable you to assemble the press quickly instead of through trial and error. You can later write a label on the painted surfaces. I suggest using a Sharpie for labeling purposes.

Drill all of the holes as called for on the plans below including the pivot holes, eyebolt holes, and one hole in a foot (or each foot if you like) should you wish to bolt the press to a workbench.

5. Grind the ends of each arm according to the plans & pictures below so they can rotate freely upward when bolted in place to the main beam (Figure 5).
6. After all the roller holes are drilled, notch out the ends of the main beam. I used both my grinder and the metal cutoff wheel for this task (Figure 6).
7. Drill or cut channels (using the metal cutoff wheel) in the hydraulic jack base to allow the jack to be attached to the main beam and angle iron support (Figure 9). I started out with drilled holes, but because I could not get the hole perfectly perpendicular to the base (using a hand drill) I cut channels, which makes bolting it to the press frame easier anyways.
8. Position the angle iron on the main beam. Mark and drill 1/4" holes to bolt them together. Be careful that the positions of your 1/4" bolts will not interfere with the holes and 3/16" bolts that will attach the bottle jack from above (Figure 10).
[Alternatively weld the angle iron to the main beam.]
9. Bolt [or weld] the legs to the main beam (Figure 8).
10. Grind a groove into the top of the black pipe cap (or directly into the jack) using the bench grinder (Figure 9). You may need to grind down the sides of the bottle jack top a little bit so that it will fit inside the end of the pipe cap (as I did).
11. Install the cable through one (just one at this point) of the eyebolts. Use a cable clamp, hammer, and anvil to secure it to one end (wait until you check the press and cable fit to your bow before securing the other end – steps 16 and 17).
12. Install the eyebolts in the arms (Figure 7).
13. Attach the arms to the main frame.
14. Install the 1/2" heater hose over the 1/2" round stock. Install the 3/4" heater hose over the 1/2" heater hose and round stock to add a second layer of cushion (Figure 4). Place the boat rollers over the 1/2" round stock pieces. Use a hammer and anvil to install one pal nut over one end of the round stock pieces holding each boat roller. Insert the rollers into the roller holes in the press main beam and arms
15. Get your bow and use rubber bands to hold the bow in place against the lower rollers (Figure 2). While the bow is in place estimate the amount of cable you will need to press the bow and to allow the press to relax and release the bow. Remember, the bottle jack riser can screw up and down about 2" to reduce or

- increase slack in the cable when the jack is at rest. The arms should be above horizontal when the jack is depressed.
16. Cut the cable and secure the remaining end through the eyebolt with the remaining cable clamp. You may want to remove the eyebolts from the press arms to facilitate this task.
 17. Secure the eyebolts in the arms with the nuts and washers.
 18. Disassemble and paint. Once paint is dry, reassemble and label joints.

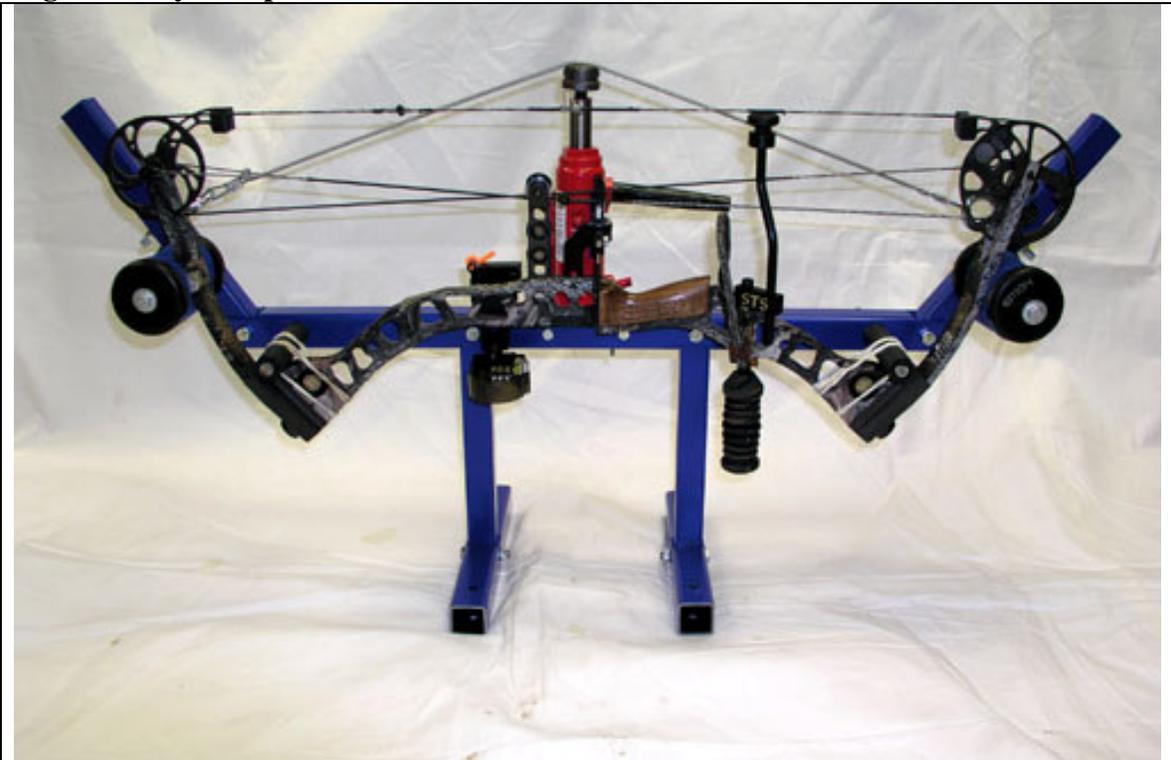
Note: I only finger tighten the bolts on my press. This thing is sturdy. I use one bolt or “C” clamp to hold it to my workbench just to be sure I don’t knock it over in a mishap of some sort. Disassembly is quick and easy – I only need a small hammer to pop some of the bolts out.

Figure 1. My Completed Bow Press



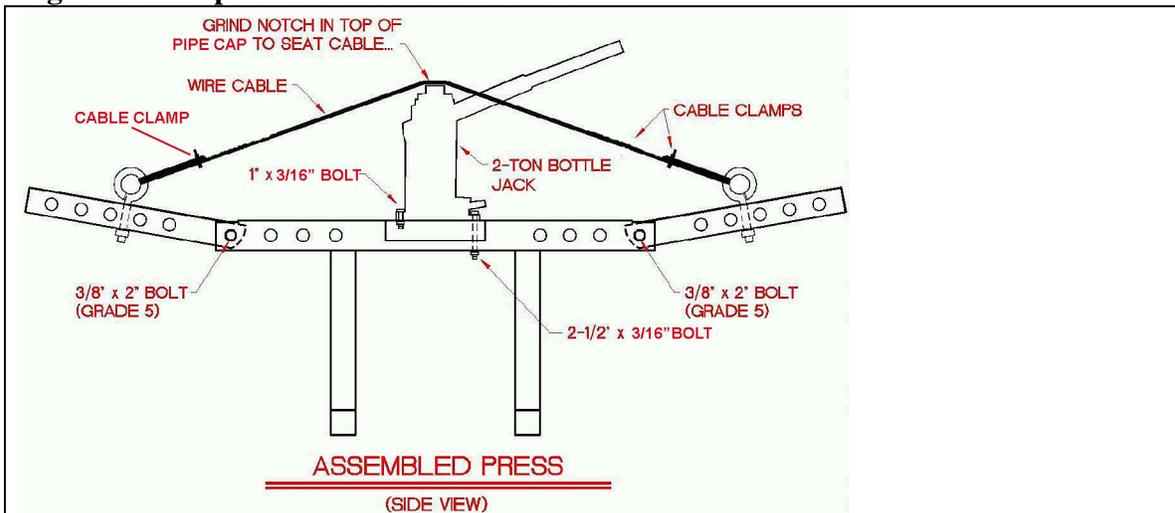
I use several rubber bands to hold the bow against the lower rollers. I drilled holes in the 2 feet to bolt the press to my workbench to prevent an accidental knocking over while my bow is in the press – I have used a large C clamp on one leg instead. I only finger tighten the bolts on the entire press – it is heavy and very stable.

Figure 2. My Completed Bow Press & Switchback



Note the wide positioning of the inner rollers, which meet the riser right above the two round holes at each end of the riser. This is what was recommended to me by Mathews. It would be worth a phone call to your bow manufacturer to see what the optimum placement would be for your bow (and do this before cutting and drilling!).

Figure 3. Completed Bow Press Schematic



The lengths of the bolts (1" and 2-1/2" shown here) that are used to attach the bottle jack to the main beam and angle iron support may be different for your bottle jack.

Figure 4. Roller Arm Detail Schematic & Photos

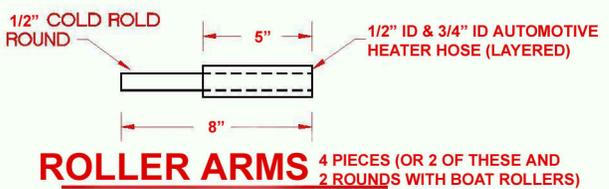
 <p>ROLLER ARMS 4 PIECES (OR 2 OF THESE AND 2 ROUNDS WITH BOAT ROLLERS)</p>	
	<p>Note that I cover the boat rollers with old sweatbands to help protect the finish on my bow. This is probably not necessary, but I saw it used in a pro shop and thought 'why not.'</p> <p>Above, I use 2 layers of heater hose on a 1/2" steel round for the inner rollers. I use 5" boat rollers for the outer rollers (4" rollers were not wide enough for a friend's split limb bow or my old PSE bow).</p>

Figure 5. Press Arm End Cut Detailed Schematic

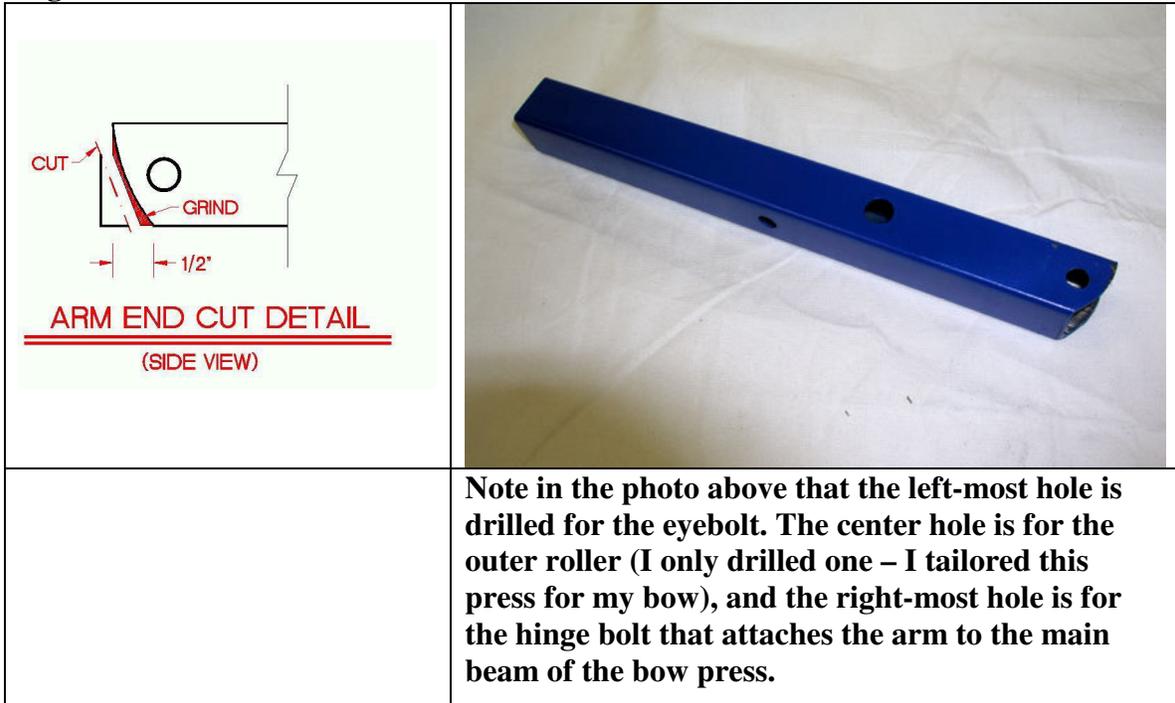


Figure 6. Main Press Beam End Cut Schematic

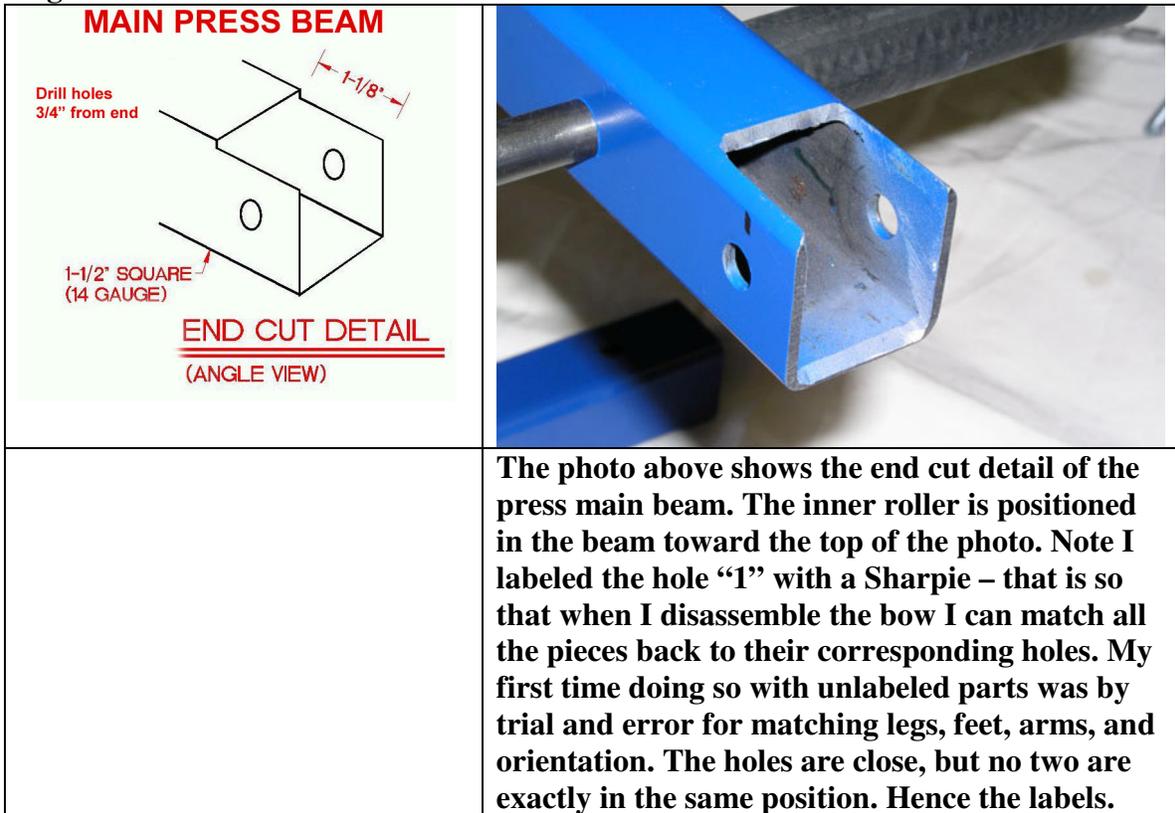
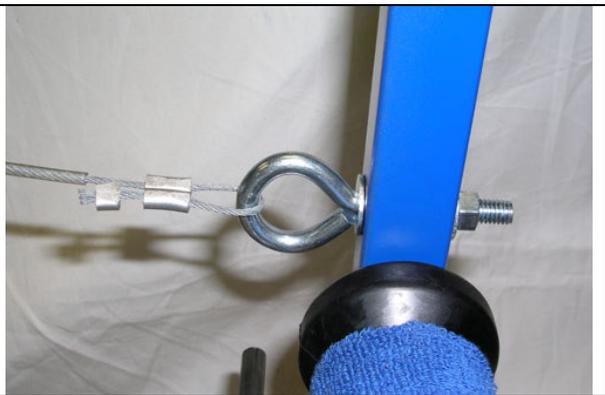
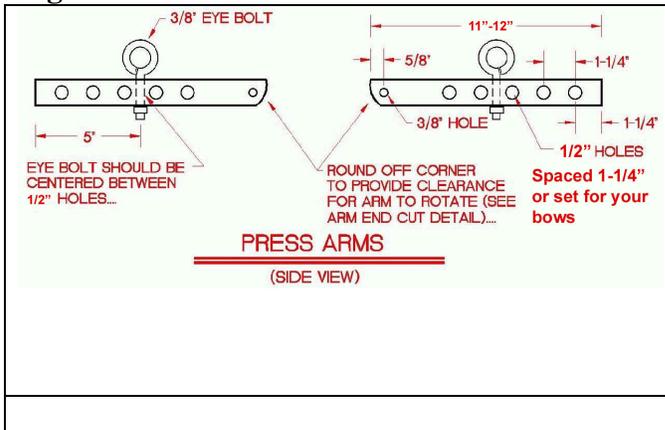
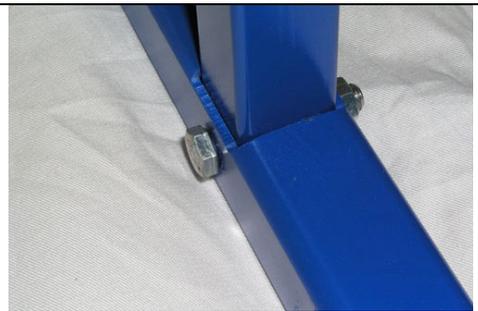
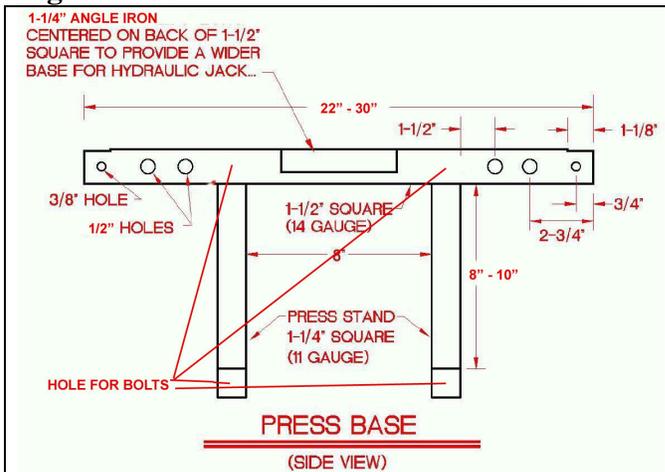


Figure 7. Press Arm Detailed Schematic



Eyebolt attached to arm with cable

Figure 8. Press Base Side View Schematic



Drill the 1/2" holes for rollers in the main beam in positions that will work for your bow. The positions depicted above may or may not be optimal for your bow. Call your manufacturer and ask where to best position the inner rollers on the riser for your bow.

Picture of leg meeting foot and bolt used to attach the two. The joint at the top of the leg attaching it to the main beam is similar – the leg fits inside the main beam and the two are bolted together.

Figure 9. Bottle Jack Holes/Channels and Pipe End Cap



Left: black pipe end cap with groove ground in to serve as a channel for the cable.

Figure 10. Press Base Top View Schematic

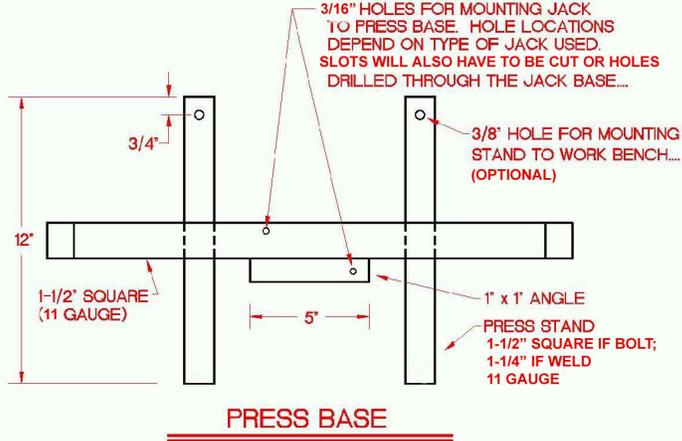
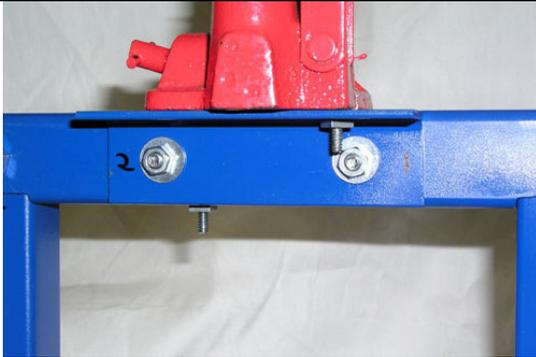
 <p>3/16" HOLES FOR MOUNTING JACK TO PRESS BASE. HOLE LOCATIONS DEPEND ON TYPE OF JACK USED. SLOTS WILL ALSO HAVE TO BE CUT OR HOLES DRILLED THROUGH THE JACK BASE...</p> <p>3/4"</p> <p>12"</p> <p>1-1/2" SQUARE (11 GAUGE)</p> <p>5"</p> <p>3/8" HOLE FOR MOUNTING STAND TO WORK BENCH... (OPTIONAL)</p> <p>1" x 1" ANGLE</p> <p>PRESS STAND 1-1/2" SQUARE IF BOLT; 1-1/4" IF WELD 11 GAUGE</p> <p>PRESS BASE</p> <p>(TOP VIEW)</p>	
	<p>Jack support above. The left-most and center bolts shown attach the angle iron to the main beam. Note the hole drilled in the top of the angle iron and in the top of the main beam are used to attach the bottle jack (shown left and below). Picture to left shows bottle jack bolt does not interfere with angle iron bolt on right – measure both for hole position before drilling and after bottle jack notches are cut.</p>
	<p>Left picture shows press and jack from the front.</p>

Figure 11. Devin Smith's Completed Press (Welded)



Figure 12. Devin Smith's Completed Press (Welded) and Bow

