

Van Webster

Hot-Rodding a Mathews Genesis Bow

A bow arm shoulder injury had sidelined me from shooting for more than two years. As the shoulder healed I wanted to get back to the sport while protecting my still fragile joint. I needed a low mass bow with about 40 pounds of draw weight. The Mathews Genesis bow is a light weight arrow flinger with a unique single cam that allows a wide range of draw lengths without the typical let-off found on more traditional compound bow designs. As a compound finger shooter, I am more comfortable with true let off. So the challenge was to create a bow with low mass

weight, adjustable draw length, and reasonable performance.

Warning The information contained in this article is for recreational reading only. Compound bows store tremendous forces that can seriously injure and possibly kill the unwary. Any modification of a compound bow should be undertaken by a competent bow mechanic with the proper tools. This is not a task for amateurs. Also remember that any unauthorized modification of a bow will void all manufacturer's warranties. Archers attempting this modification do so at their own risk.

Tools and Materials

This modification will require some basic tools and archery specialty items. The following tools will be needed:

- Bow Press
- String Jig
- Drill motor or preferably a drill press
- $\frac{3}{8}$ " Drill bit
- #29 Drill bit
- 8-32 tap
- Propane torch
- Large pipe wrench
- General hand tools

The materials list is:

- Mathews Genesis Pro Bow
- Hoyt Accuwheels #3 size
- Saunders Z-Rod
- 1 extra Mathews Genesis long axle shaft with cable retainer clips
- 1 8-32x $\frac{5}{8}$ " machine screw
- Golfsmith golf shaft epoxy
- Acetone
- Paper Towels
- String making materials and serving thread



Special Feature

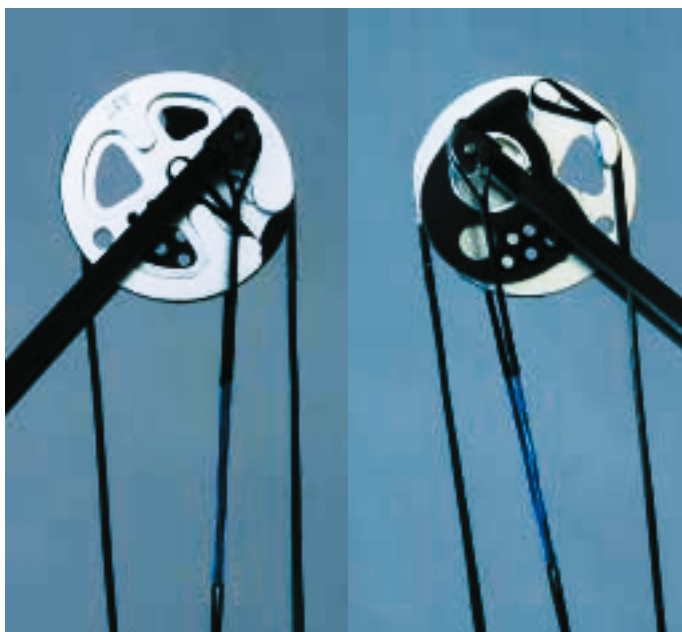
Preparing the Riser

The first step is to remove the bow string, cables, cam and idler wheel from the bow. Use the bow press to lower the tension in the strings for removal. After the string have been removed, *slowly* release the pressure on the bow press to release the riser. Keep all the parts in a Ziploc bag as you may want to restore the bow to its original form later.

This modification will cause the cable to move farther rearward as the bow is drawn than the original single cam setup. It will be necessary to remove the stock cable guard rod and install a longer one. The stock rod is epoxied in place. Use a propane torch to heat only the rod to soften the glue. Do not heat the riser. Then use a pipe wrench on the rod to break the glue bond and free the rod. The old rod can be thrown away.

The cable guard mounting hole in the riser will need to be cleaned out using a $\frac{1}{8}$ " drill. This task is best accomplished on a drill press but a hand drill can be used. The objective is to remove all of the old epoxy and provide a clean, bare metal surface for the new glue.

Cut off the threaded portion of the Saunders Z-Rod and then sand the remaining short portion of the rod to remove the paint and provide a more solid foundation for the glue. Mix up a batch of golf shaft epoxy, coat both the hole and the Z-Rod and put the rod in place, rotating it to provide adequate cable clearance. Excess epoxy can be removed with a paper towel light-



Left Top Wheel Left Side. The wheels are marked for for size and placement. A3T=Accuwheel, #3 Size, Top.

Right Top Wheel, Right Side. The Accuwheel can be adjusted for draw length by moving the plastic cable cam element.

ly moistened with acetone. Let the bow set for 24 hours before moving on to the next step.

The forces acting on the cable guard rod will eventually cause the rod to rotate in its mounting, reducing the sting clearance. To prevent this rotation, cross drill through the mounting boss and the rod using a #29 drill bit. Thread the resulting hole with an 8-32 tap. Inserting an 8-32 X $\frac{5}{8}$ " machine screw will secure the rod and prevent any future rotation.

Should you desire to restore the bow to its stock configuration, the longer cable guard rod will work just fine.

Installing the Wheels

The single cam design of the Genesis Pro bow means that the top axle shaft will be long with cable retainer clips and the lower axle will be short with e-clip retainers. Set aside the short axle and its e-clips in the Ziploc bag for future restoration.

The Hoyt Accuwheels are made in three sizes and two styles. Because of the short axle-to-axle length of the Genesis Pro, the largest (#3 size) wheel will probably be the most useful as it permits a wide range of draw lengths. The early wheels had a simple brass bushing fitted into the aluminum wheel to act as a bearing. Use this style wheel if you can find a set. Later versions of the wheel added a shoulder to the bushing that widens the space needed to fit the wheel between the limbs. Either one will work fine.

Mount the wheels in the bow, noting that the wheels are marked "top" and "bottom" for right hand-

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Figure 3. Cable Guard Mounting. Once the cable guard epoxy glue has cured, cross drill and insert an 8-32 machine screw to prevent future rotation of the rod.

ed archers. Use the long axles and secure them in place with the plastic cable retainer clips. It's a good idea to place a drop of lightweight machine oil on the shafts before assembly to insure smooth operation. Test the wheels by spinning them after the clips are installed. The wheels should turn freely with no binding or rough spots.

String and Cables

This conversion will require one bowstring and two cables. The goal of the string-cable dimensions is to produce a net axle-to-axle-length of 35 $\frac{5}{8}$ ". The bowstring length is 54 $\frac{1}{4}$ " with end servings of 13" top and bottom. The center serving can be to taste.

Hoyt style cables are made in two parts. The yoke is made from a 12" long string served into a loop at both ends. When folded over itself it adds 6" to the overall working length of the cable. The cable is looped over the yoke to form the typical cable configuration of a loop at one end and two loops at the other. The cable length without the yoke is 31 $\frac{3}{4}$ " long with the loop end served 8 $\frac{1}{2}$ ". I used 14 strands of B-500 material for both the string and the cables.



Left Genesis Bow, Left Side. This is the Genesis Pro bow fitted with #3 Hoyt Accuwheels. **Right** Genesis Bow, Right Side. Note the use of a longer cable guard rod.

Put the riser back in the bow press and thread up the string and cables. Take your time and be sure that the loops are seated solidly. Check to see that the cables are not crossed and that they align easily with the grooves in the wheels.

Slowly release the pressure in the bow press and bring the bow up to tension. Always stand to the side when tensioning a bow so that any mishaps happen away from you.

Once the bow is up to tension, you can test it for smooth action by drawing and letting down the bow. Be sure everything is stable before trying an arrow.

The bow setup is the same as with any bow. Set the arrow rest and nocking points. Adjust the cams for the draw length that fits you. Set in the peep sight if you are using one. The bow is now ready for tuning.

Performance

So, what does this effort get you? The resulting bow has a very low weight of 3 pounds 8 ounces (1.6 kg) without accessories. Add the usual arrow rest, sight and stabilizer and the bow will still come in under 5 pounds (2.3 kg) ready to shoot.

The draw weight is 42 pounds with about $\frac{3}{16}$ inch of additional limb screw adjustment available. The let-off is about 50% which is good for a finger bow. Using a 305 grain arrow, I found the calculated arrow speed to be just over 200 feet per second, enough to shoot 80 yards.

On the down side, the short axle-to-axle length means that the string makes a sharp angle at full draw which can pinch the fingers and increase the holding weight. Release shooters should find this small angle less of a problem. The very light weight of the bow means that it is highly sensitive to any hand movement by the archer. This bow will sharpen your form. Finally the bow riser is top heavy by design and is therefore less stable than a balanced or bottom heavy bow riser.

Costs

This modification is a relatively low cost way to get a lightweight compound bow with good target performance. Genesis Pro bows retail for about US\$170, the Hoyt wheels for about US\$100 and the rest of the parts for

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under US\$50. So for about US\$300 you end up with a fun bow that's easy to shoot. It worked well enough for me to win my class at the local Senior Games this year.



Van Webster is a NAA Level 3 coach and is Vice President of Pasadena Roving Archers. He is the co-author of the Basic Archery Instruction Program (BAIP), a 6 week course in archery shooting form, taught as part of the PRA Saturday morning archery classes. PRA serves up to 90 community members a week with free and low cost archery instruction. Van is also coordinator for the Woodley Park Archers grant-funded archery outreach program.

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