

Claes Colmeus and Bertil Olsson



Equipment Review

The Very Variable Bow

The Variable riser was designed to be as variable and tunable as possible. Some of the basic design ideas are not new (OK Sportbogen 1980, Whitehart 1991), but they are more consistently implemented.

Its appearance leaves no one unmoved. Opinions vary from “beautiful” to “ugly as a sin.” The riser was designed in Autodesk Inventor and its shape is purely functional. The designer is Bertil Olsson, a true veteran archer. He shot his first arrows in 1950, and had three world records in 1955. After a long career as an electrician and teacher in electronics and computer technology he now has time enough to develop his many ideas, of which the Variable Bow is but one of many.

The riser is CNC milled from aluminium SS4212 (ENAW6082). The shape enables no less than 30 risers to be cut from one sheet of material 2000 x 600 x 50 mm with very little waste. The billets and the triangular holes are cut with a high pressure (3500 - 4000 kp/cm²) high speed water jet, mixed with sand. This method has very little negative influence on the material strength (no local heating, no surface cracks). The finish is a dull dark blue or red

anodizing to avoid annoying sun reflexions and increase the surface hardness.

The FITA Technical Committee considers the Variable Bow to be a bow, in the sense described in the FITA rule book, for the Recurve Division. The committee pointed out that it is possible to set the plunger bracket for more than the 40 mm overdraw allowed, and that it is the archer’s responsibility to pay attention to this. Furthermore, some safety matters were emphasized. The grip must be well fixed and have some means to prevent it from sliding into the riser, and the safety brackets to prevent the arrow from hitting either the riser or the archer’s hand must be attached if the arrow is short enough to be drawn past the riser’s edge.

The Variable is primarily intended for Olympic archery. It does not fulfill the requisites for the FITA barebow class, as the riser cannot pass the 122 mm ring test. It may be possible to shorten the grip mounting rod and the plunger bracket enough; however, their adjustment ranges will be severely restricted. The designer even tried to rig

the Variable as a compound with excellent results.

The riser can be turned over for left hand or right hand

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archery focus

shooting. Just move the sight and the plunger bracket to the other side, turn the grip half a turn and switch bow arms. Except for this, the designer has tried to obtain symmetry, and placed the V-bar and the longrod right in front of the pivot point to prevent any horizontal movements from causing vertical rotation. The long rod is a bit sideways displaced to somewhat compensate for the larger than usual asymmetric mass of the riser. However, this is not enough to get it completely out of the sight line for an archer with a weak bow. Either you must use a rather short long rod, or it can be mounted with an adapter pointing slightly down. The Variable, being rather heavy, is very stable even with a short stabilizer.

Brace height and draw length, using the standard terms, have no real significance when the grip can be moved at will. To get a reasonable starting point for the brace height, within the limb maker's recommendations, mount the grip with 40+5 mm sleeveings on the rod, bringing the pivot point to about 40 mm from the limb pockets, giving the bow a conventional geometry. After adjusting the string length to obtain the recommended brace height, you can move the grip and/or the plunger bracket positions to vary the draw length, the bow weight or the arrow length. The limbs will always work at their optimum setting, as long as the string length is unchanged.

The tuning parameters and ranges of the Variable Bow are extensive; therefore, it may be difficult to find a reasonable starting point. A conventional bow has a fixed plunger position, a fixed arrow rest position, and the draw length is given by the archer. The Variable has a plunger and rest bracket that is adjustable horizontally and vertically, and the grip position will decide the drawing length. Setting the bow for a conventional geometry will lead to a very reasonable final tuning, but the archer who isn't afraid of experimenting may reach much further. The adjustable draw length makes it possible to tune for very different



arrow spines and lengths in a completely new way. Paul Hawthorne from England is a good example. With his Variable, he qualified for the British team at the Paralympics and the disabled world championships. Missing most of his left arm, he shoots by holding the string with his teeth, drawing by pushing the bow towards the target. This limits his draw length; his arrows (before the Variable) were only 23" and the long range precision suffered. The Variable solved this problem. Another advantage of the adjustability is that the nocking position is easily changed: simply adjust the plunger bracket to obtain a new nocking position without affecting the tiller at all.

The Variable Bow weighs in at 1100 g (about 2.4 lb) before the grip, the limb bolts and the plunger bracket are mounted. A complete riser will weigh 1600 - 1700 g (about 3½-3¾ lb), making it about 100 g (about 3½ oz) heavier than a Hoyt Axis. For the archer who likes a heavy bow, this is only an advantage—there is no need to attach expensive extra weights. If you shoot 35 lb of draw or less, it will probably

feel very heavy, but for those who draw 40 lb or more, it may be just right.

Most normal accessories can be used with the Variable. However, the plunger and the arrow rest must cope with the longer than usual distance from the mounting bracket to the arrow path. This distance is no less than 22 mm from the inside of the bracket, and 28 mm from the outside. Most magnetic or conventional rests can be used, but some must be mounted on a small distance block. A stainless steel clicker plate is included, and is usually needed, unless the arrows are very long. For the archer who wants an alternative to the common stabilizer setups, the designer made a novel swingbar. It is mounted to the side of the riser, below the grip, and is vertically and horizontally adjustable. The friction adjustment is high precision and is very little affected by temperature and rain.

All necessary tools for
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"It's the only bow I can adjust to imitate almost any other."

Håkan Rönndahl



Here is the water jet making short work of blasting through the side of the riser.

mounting and adjusting the bow, mainly hex wrenches, are included. The limb mounts are of the “industry standard,” Hoyt type and are adjustable to set draw weight, tiller, and limb alignment. The alignment adjustment is novel and can easily be set, even with the bow braced. Using a flat table surface or a long ruler for reference, the adjustment can be made in a few minutes.

in a rather brutal contact with the protection bracket or the plunger bracket. A neutral balance will work very well, and the bow will simply continue to point in the target direction.

You can learn more about the variable bow at VariableBow.com.

Shooting the Variable is a little different from shooting a conventional bow. The grip mounting rod will almost inevitably be where one of your fingers wants to go. You must adapt your technique a bit, and using a high grip is an advantage. How you follow through is dependent on the bow's balance. If it is front heavy you simply can't just let it fall forward, hanging in the sling, as this will result



Bertil Olsson

To give you an idea of the adjustments possible with the variable riser—



The grip can be canted . . .



The rest can be slid in close to the riser or back as far as the slot allows . . .



The grip can be slid in close to the riser for less draw length . . .

The grip can be slid away from the riser for more draw length . . .



. . . or you can combine any of these settings to suit your particular style of shooting.



ARCHERS' COMMENTS ON THE VARIABLE BOW

IK *Ingrid Kihlander* (1st World Games 1997, 1st Field Nordic Championships 1997, and 10 times Swedish Champion—two times with the Variable Bow)

RL *Robert Lindgren* (1st Swedish Championships 1998, 3rd 1999, 3rd Nordic Championships Indoor 2000, 6th World Championships Indoor 2001)

HR *Håkan Rönndahl* (1st Nordic Championships 1991, 4 times Swedish Champion)

GB *Göran Bjerendahl* (1st World Championships 1986, 1st European Championships 1995, 2nd World Championships 2000 and 43 times Swedish Champion)

What was your first impression? The looks? The feel?

IK My first reaction was the appearance! Can a bow look like that? But the visual impression during the shot is not different from any other bow I have used, so I guess I got used to it.

RL Of course the first impression is in its looks or you must be blind! Then all its tuning possibilities took over the interest. Thanks to the massive weight and my tuning it feels very stable, an impression I really appreciate.

HR My first impression was too heavy, but when I got another one with the triangular holes in it, that feeling disappeared. It was exciting to try something new. I immediately felt that this one would be right for me.

GB Having been a bit involved in the development I can't have a first impression. The idea sounded brilliant, and the test shooting was definitely not disappointing. The looks is of course a matter of taste. I don't really find it beautiful, but rather cool. As an engineer, of course, I realize the logic of its design.

What about tuning? Any difficulties?

GB The designer's manual is very clear on this point and easy to follow. Or you can set it just like your old bow and start making small adjustments. Shoot arrows and check the groups. This is a lot of work, but will pay off, and there are many untreaded paths to follow. And if you go all wrong, just go back to zero and start all over again.

HR I had some clearance problems, easily overcome, and I could go on experimenting.

How is your shooting now?

IK The bow does its job very well. However, I don't practice enough; that's why my results haven't improved much lately.

RL I must say that the bow does exactly what I expect it to do, delivering stable shots with a very nice feeling.

HR Hitting gold is a piece of cake now.

Did the Variable improve your shooting?

RL It's a difficult question to answer, I used to practise a lot more. My results are about the same, but I only have time to shoot once or twice a week now, as opposed to at least five or six times a week before I got my Variable.

HR Hard to say, I'm not in my very best shape yet. I did shoot 118/120 indoor 18m/40cm and 283/300 25m (on a 40 cm target!), so it looks very promising.

GB No, but I haven't really had time and opportunity to give it a fair chance yet.

Anything you want to change?

IK It is a bit difficult to transport my bows to and from practice and competition. The riser is bulky and will not fit any "standard" case.

RL The riser is a bit on the heavy side if you don't practice regularly. Even if I always have shot heavy bows, I would like to shave some weight off it.

GB No, nothing I can think of!

What is the best feature of the Variable?

GB The possibility to move the grip back and forth. That gives me a unique possibility to test different pivot positions, something I never have been able to do before.

IK I have been able to try tuning way outside my earlier limitations.

RL The stability and the almost limitless tuning. If you can't get a good tuning with a Variable, you will probably not be able to tune any other bow. I have tried settings I only wish were possible in other bows.

HR It's the only bow I can adjust to imitate almost any other.