

Target Recurve Equipment Overview

In the time leading up to the official opening of the range, I'll be posting a series of posts which gives a rough overview of the competition target recurve equipment. This is also what you'll most likely be shooting with by the end of this school year if you attend the club on a regular basis.

Do keep this in mind: In archery, like any other sports, the equipment is only as good as the archer using it.

Part I, Basic components,

A basic take-down (can be taken apart into 3 pieces for easy carrying) recurve bow will have the following parts:

- Riser, The part with the handle and sight window. Also house mountings for the arrow rest, plunger, sight, and stabilizers.
- Limbs, The parts that actually does the shooting, they come in all kind of size and makes, all of which will be covered in detail later.
- String, they come in many types, and there's some major difference between them which will be explained in later sections.
- Arrow rest, goes on the riser, where the arrow sits on.
- Plunger, this is a little piston thing that sits against the arrow on more advanced bows.
- Sight, simply put, it's the thing you use to aim with.
- Stabilizers, These are the long and short rods that stick out of the bow, and sometimes in all directions. It is not a required part for your bow, but you should have at least one.
- Arrows, it's not part of the bow but you should know what this is.

Part II, Risers,

This part often get overlooked by beginning archers, as it does no apparent work in the shooting process, but rest assured that the right riser will make all the difference. Some riser comes with a unique fitting, as in they can only accept very specific limbs. Others are made with ILF (International Limb Fitting) where they can accept a wide range of limbs from most of the manufactures out there which gives a lot of room for upgrades later in your archery career. There is currently a running debate as to which system is superior, but no solid evidence have been found to support either side of the argument. The choice of fitting system on a riser is purely up to the manufacture.

The first thing about the risers is that they come in different sizes. Most of the major manufactures make them in either 23 inch or 25 inch. A 23 inch riser will provide better stabilization during draw phase, whereas a 25 inch riser will propel an arrow faster.

Risers also come in different materials and are made with different techniques.

Wood/Plastic risers, these risers tends to be big, which can be difficult for people with small hands. The material used cannot handle the stress of ultra modern limbs, so they generally come with a unique limb fitting and limit the choice of limbs to a very specific set. This type of risers will eventually fail when modern string material such as FastFlight is used, some have been known to crack or break mid-shooting when the wrong string material was used. It is however, extremely cheap, and some of them will take a stabilizer, they'll do the job.

Die-casted risers, most of them are made of aluminum alloys. The technique used in making the riser cannot guarantee there won't be faults such as small bubbles in the riser, which could cause it to crack if Dry Fired a few times too many. Because of this, the risers are generally designed with a lot of redundancies, and could take thousands of Dry Firing before breaking. The downside of this design however, is that these risers tend to be on the heavy side, but the making process does ensure a dependable, straight riser capable of meeting the demands of modern string and limbs. No one will laugh at you if you walk into a national championship with this type of riser, it is proven technology, and will still be around 25 years from today.

Forged & Machined risers, Forged risers are simply a chunk of aircraft grade aluminum hammered into the desired shape and machined to the desired specifications. There are stronger than die-casted risers, which allows more freedom in riser design and cutout holes in weight saving. They're lighter and better looking than the die-casted risers in general.

CNC Machined/Single Forged risers, Simply take a large chunk of high grade aircraft aluminum, a high pressure cutter and a computer, and this is what you get afterwards. Because it's cut from a whole piece of aluminum, it has very little internal stress which makes it extremely strong and gives the designers a lot of possibilities to play with, such as adding advanced composite material into the riser. Due to the same manufacturing process however, a lot of materials are wasted during fabrication, you could easily start with a 8 or 9lb block of metal and end up with a 2lb riser. The costs are sky high, but the quality speaks for itself.

Part III, Limbs

Like the riser, they also comes in all shapes and sizes, most limbs today are still using a wood core but are laminated or made from several layers of materials.

The length of limbs are quite important, if you draw a bow too far for that particular pair of limbs to handle, it will stack, where the force required to draw the limb for a given distance increase significantly than before the stacking starts (effect is opposite to stretching a spring past its elastic limit), which makes reaching full draw extremely difficult. It will take a longer distance for the long limbs to stack than for the short ones. Most major manufactures make their limbs in 3 sizes, short, medium, and long to accommodate the height and arm length difference of archers. Better quality limbs will also stack at longer distance than crappy ones.

Wood core limbs, Most commonly just one piece or several layers of treated wood laminated together, some are further laminated with fiberglass for better

performance and water protection. This kind of limbs is the one that's been in use for the longest time, however, one major drawback is that non-laminated limbs will become warped if there are subjected to repeated rapid changes in temperature and/or humidity.

(fiber)glass limbs, This type of limbs are slowly taking over wood limbs it seems. If done right, glass limbs can have equal or better performance than the wood limbs, and they don't bend out of shape so easily.

Foam core limbs, This material gets it's own category, because it's extremely efficient. However, make sure you get a decent quality one and try not to go beyond the recommend draw length (will be covered later) as some damaged low quality ones from some nameless manufacture have been know to snap without warning.

Composite/Advanced materials limb, everything from titanium to honey-combed-carbon-foam-block have been used in limbs, and they're fast, smooth and just overall darn good. But unless you're planning to go to a major competition every other weekend, you don't really need to think about this one. There are a few that are in the mid-level price range, but most of them are quite costly.

Part IV, String,

There are a few types of strings out there, and there's some fairly major difference between them.

Dacron, a bit old fashioned but reliable, will not travel fast enough to put excessive amount of stress on the riser, just about the only string safe to use with a wood or plastic riser. One downside is that individual strands of this type of string doesn't like rubbing against each other, so avoid having over 40 twists in your setup.

Kevlar, bullet proof vests can stop a bullet but a sharp knife could easily slash through it. Kevlar isn't exactly strong when there's a lateral force, and they also degrade in the sun. Kevlar string generally breaks in under 500 shots, cover your ears and run like hell if and when you see one of these.

Fast flight/Angel DSB/Spectra, all three are essentially the same thing, very tough, very light, will break wood and plastic risers. One of these will last you a lifetime, and they're not very expensive either. You can twist it however many times you like as long as it doesn't start knotting up. Some of the string comes with excessive wax, so you might want to remove them before shooting or just leave it there and you won't have to wax ever again. Fast flight will stretch, but should settle down after the first 500 shots, at which time you'll need to change the brace height slightly, but it shouldn't take more than 2 minutes.

Part V, Arrow Rest,

The main job of the arrow rest is to hold the arrow in position for the duration of the shot, the most basic versions are simply injection molded plastic pieces.

More fancy version includes spring loaded rests and magnetic rests, they flip away

when the arrow is going past, and thus giving better clearance, but honestly the improvement is very slight at best.

Part VI, Sight,

You aim using this, along with a good string alignment. Target sights all look quite similar. Metal ones are generally preferred because they respond to post-shot vibrations better.

Get your hand on a Cartel/Doosong Championship sight for around \$60~70 and you're good until you go to Olympics.

Sight ring are preferred over a pin by some archers, again, archery is a very personal sport. A pin encourages conscious aiming and causes the archer to hesitate when releasing the arrow, which can easily cause fatigue and have disastrous result in a full tournament.

Part IIX, Stabilizer,

There are a lot of them out there from just plain old metal tube to multi-rod-carbon-aluminum-dampening system and everything in between, even ones filled with powder or mini hydraulic systems.

What do they do? They add moment of inertia to your bow and dampen the vibration of your bow in both pre-shot and post-shot. For example with a stabilizer a small twitch in your fingers won't set the bow oscillating, and the bow won't vibrate so much after shooting.

The center long rod produce the most noticeable stabilization effect on your bow, as it increases the stability around the Z-axis (up) by more than 900%.

Personally, I prefer a long-long-rod with a small weight at the end, since a quarter of the mass at twice the distance do the same thing as 1 mass at 1 distance. But again, it's a very personal thing.

While a stabilizer(s) is not required for your bow to function properly like all the previous parts, having one will greatly improve the feel of the shot, a few of the better risers are designed with a stabilizer in mind and failure to use one might result in string hitting the arm (but nothing else bad will happen). If you haven't got a proper release/follow-through worked out already, getting a stabilizer maybe more trouble than it's worth.

Part IX, Arrows,

There are five basic types of arrows out there, wood, fiber glass, aluminum, carbon, and carbon/aluminum.

Wood arrows are your very basic arrows, I'd say not use them whenever possible. They break easily, shatters sometimes, and they warp.

Fiber glass ones are slightly better, but they're heavy, soft, and also break quite easily. Splinters of fiberglass can get under your skin and it would take days to get them out. These type of arrows are used for training mostly. At least it's cheap.

Aluminum arrows are your typical beginner arrows, they are light and durable. They can take quite a bit more punishment than wood or fiber glass, but still be very careful with them. They bend but do not break, and most of the time can be fixed. This type of arrow is best suited for indoor shooting. Most popular type include Easton's Jazz/XX75 they cost around \$3-6 each, so you could afford to break a few. The spine (stiffness) for these arrows are in 4 digit numbers, the first 2 numbers are the diameter of the arrow, the second 2 numbers are the thickness of the wall. E.g. 1916 is stiffer than 1816 as it has a larger diameter. 1914 and 1916 are the same size, but 1916 is stiffer because its wall is thicker.

Carbon arrows are just that, tiny carbon fiber cross-weaved or glued (sometimes both) into a cylinder. Most of them are designed for hunters, and are too light for its size for long range target shooting. They're very tough, almost impossible to break unless you were really trying. They have only two states, good, or broken. If it's not lying there in pieces, it is straight and in good shooting condition. The spine of this type of shaft is usually indicated by 3 numbers, measuring the amount of deflection when a 2lb weight is hanging from the middle of a 29 inch arrow supported at the tips. Smaller the number means stiffer the arrow.

Carbon/Aluminum composite arrows are what the big boys use. Unidirectional carbon fibers are bond to a very small aluminum inner tube using epoxy. Special "barreling" technique is used to make the middle of the arrow slightly larger than the tips. The end result is an arrow that's less than half in diameter compared to other arrows but just as strong. They perform exceptionally well in windy conditions at long distances compared to other types of arrow. The best ones on the market today are Easton's X10/ACE/AC Navigator and Cartel's Triple. Do not be surprised that the arrows cost \$30 each.