

HORIZONTAL IMPACT

John Dudley explains arrows for compounds, and his HIL tuning method

Several years ago, I wrote an article about properly tuning the Easton X10 and ProTour arrow shafts. At the time, I wrote it simply because of the amount of demanding emails I received from people asking questions on the subject. Still, to this day, the number one question I get asked is: "Which Easton X10 spine is best for me", or maybe it's: "How do I tune my bow for the X10 or Easton ProTour?"

I understand that quality arrows come with a high price and making the right choice can save you hundreds of pounds, so I've decided to revisit the subject – with some expanded discussion. And hopefully answer some of those queries for those of you lucky enough to pick up this magazine. Always remember: Proper arrow tune is easy if you follow the simple steps of selecting the appropriate spine and then making small tweaks so that spine matches your bow exactly.

The X10 series

Before I go further, I want to speak about the Easton X10 and X10 ProTour. I realise there are a number of outdoor arrows I could go into detail with but for this article – but I am going to focus on these two Easton arrows because they're the two I have most familiarity with, and are the most popular around.

In my professional opinion, the X10 series is the most impressive target arrow design to date. Their small diameter yet dense material make up – and heavy mass – makes them aerodynamic masterpieces. And that's especially true in windy conditions – as no other arrow has better ballistic capabilities when being bullied by a breeze. The bottom line is: The smaller

diameter has less drag and less surface area to be affected by the conditions, and the mass helps them retain speed at longer distances.

The original X10 is a barreled shaft, meaning the thickest part of the shaft is in the centre – and it tapers in each direction to smaller diameters at either end. The X10 was originally designed for recurve shooting,



using a finger release – and the paradox, or flex pattern, of the shaft when the arrow's released by a finger shooter.

In the 1996 Olympics, the superiority of the shaft was at its most evident – and this is when the X10 caught everyone's attention, including that of compound shooters. But although the tapered shaft has huge benefit for compounders, tuning an original X10 is a slightly more complicated process – as a release aid's effect on the arrow differs greatly to fingers (it's a different 'paradox', if you will), and the force a compound exerts on the arrow when released is much greater than with a recurve.

This means the back portion of the arrow shaft takes more force than with a recurve – and this is what makes the X10 slightly more difficult to tune perfectly, with a compound. There are times where it's not a problem, and you can tune easily – but there are also times where it's not. After a lot of experimentation, someone discovered that cutting the back end off the X10 will quickly stiffen the arrow up, and – in some cases – make it react better to a compound.

It's a fine line, though – as cutting off the back affects the spine of the arrow far more than cutting off the front. So putting saw to carbon at the back end is a scary prospect for many – as cutting too much off will over-stiffen the arrow, and you can't glue that bit back on!

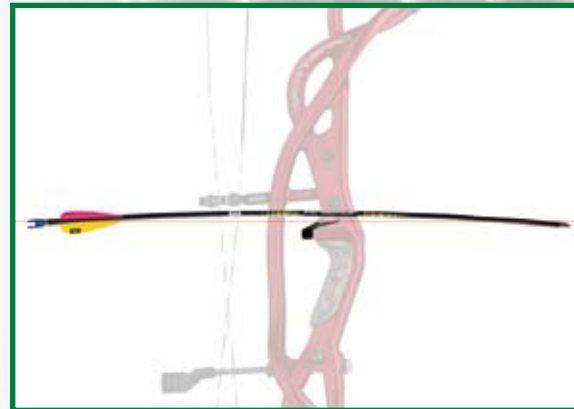
Having said all this, I need to make it clear that the X10 has been responsible for all my best scores – whether in target or field. So, although the tuning may sound difficult, it's really all about education – and seeing what cut configuration works best for your set-up. It is time consuming, but very rewarding. And in light of new technology there are now better options for compounds.

Because of the confusion in how to cut, or tune, the X10, Easton came up with a compound-specific version: The X10 ProTour.

The design brief was simple: Make an arrow that had the aerodynamic benefits of the original, but be easier for tuning with compounds. The concept is great, because the front of the arrow is still like the original X10 – tapered, with a smaller diameter – but the back is perfectly parallel.

The rear portion of the shaft is now custom engineered for the dynamic force a compound exerts on an arrow – as the back has much more torsional strength, and doesn't bend as much (because it doesn't need to account for a recurve's paradox). This means there's no need to trim from the back – **in fact, the ProTour arrow is designed NOT to be cut from the rear at all** – and this saves a lot of time and money, as it's easier to find the arrow spine that suits your bow.

Back to the bold letters above, though: Cutting a ProTour from the back will weaken the arrow – as it's the stiffest part of the shaft you'd be cutting off. So don't do it! Remember, the design behind the ProTour is to make things simple – and if you're going to mess around with the arrow at the rear, you're completely negating its qualities.



The recurver's paradox (top left) forces the arrow to bend out from the bow, whereas a compound release aid eliminates this – and the arrow bends mostly up and down (left)

Dudley worked with Patrizio Hofer on HIL tuning methods at the famous Werner Beiter facility to perfect his 70-metre shooting



Spine selection

The Easton spine selection chart – which covers compound (in three different categories: Hard, medium and soft cams) and recurve bows, and aluminium and carbon arrows – is available for download from the downloads section of the Easton website.

If you follow the homepage link, though – it'll take you through the process without you having to decipher the chart... Easy!

W: www.eastonarchery.com

Archer's advantage is an independantly-produced program for Palm OS and Windows that covers sightmarks, angle cuts and tuning – with a heavily-detailed spine selection matrix. It's a must have for any field archer, and is a worthwhile purchase for anyone looking to get the most from their equipment and archery – especially since you can download a copy for less than \$40.

W: www.archersadvantage.com

By plotting the results of your experiments on the face, you get a quick, visual results sheet



Which spine?

The first step in selection should always be checking the Easton spine chart – or free shaft selector program (which you can get from the Easton website). Nine times out of ten it'll be spot on. I use the Archer's Advantage program, too – and the shaft selector program on that is extremely detailed; it lets you input point weights, and trimmings – and determines how this will effect the arrow's tune.

It's the trimming's effects that many archers overlook. Vinyl arrow wraps add support to the back end of the shaft, and will stiffen it slightly. Heavier vanes add back-end weight, and will weaken the tune. A long point (inside the shaft, not outside) – no matter its weight, though this affects things, too – will reduce the amount the front end flexes – and stiffen the arrow.

Putting all these factors into one program allows you to make a more informed decision – and the cost of Archer's Advantage is offset when you consider how much one bad arrow shaft decision can set you back!

To use any standard shaft selection chart you've got to know your drawlength, cam type, arrow length, preferable point weight and the peak pull weight of your bow. It's the best place to start – but by no means the end, as you've got to tweak after initial selection.

Fine-tuning

When it comes to tuning, you've probably read my favourite saying: "I don't tune my bow to my arrows, instead I tune my arrows to my bow". My bows shoot how I want to shoot them – I set up my bows to tune my arrows.

Fine tuning involves shooting groups with a specific bow, then just trying something different – each time noting the results. With the original X10 the process was way more complex due to the unlimited number of rear-cut variations – but, thankfully, with the ProTour that variable's not something to worry about.

I'm going to focus on tuning the X10 ProTour – as that's the arrow that's intended for compounds. It's actually a fairly simple process to tune – using a combination of various point weights, or adjusting the peak draw weight of your bow. Ultimately, it's a trial and error method of working – but the ProTour was designed as an arrow a compounder can take out of the packet and easily tune.

I use a method I describe as HIL – or Horizontal Impact Line – which is the left to right variation in groupings. In other words,

the margin of error from the arrows in your group furthest to the left when compared to those at the right. Check the image to the left, where I have three groups plotted. You'll see each has a slightly different HIL measurement – but the one at the top clearly has the smallest variance, telling me they tune the best to my bow. Bear in mind, bow and archer were the same for each of those groups – it was only arrow spine that changed. One set would shoot me 60 points at 70 metres – as long as I shot well, of course – whereas the other two are 57 or 58s at best. Imagine that over the course of six ends at 70 metres – and that's a huge margin.

Start out by setting up the best arrows how you would prefer to shoot them – with your desired point weight and length. Then shoot a group at your competition distance, or the furthest distance you feel comfortable shooting. If it's a windy day, wait! There's no use trying to fine-tune when the weather's going to skew any results. If you make a lousy shot, walk down to the target straight away, pull the arrow out and shoot it again. Marginal shots are acceptable – as you will have those in tournament situations – but bad shots should never be considered when tuning.

Mark the arrow holes on the paper – with a certain colour, or line – then shoot another couple of ends, again marking them. This should give you a clear, on paper, HIL view. Then decrease your bow's peak weight by a few pounds – making sure you keep your tiller as you change the weight – and repeat the process, marking the new holes differently. After those three groups, shoot another three – marking the holes with another different colour – but increase your peak weight over the original shooting weight.

It's paramount that you don't adjust your sight left or right during the test, as you'll want to see your true HIL and not compensate for anything while plotting. And, of the three groups, you should see a clear difference in HIL variation – so set your bow weight to the figure that corresponds to the best group on paper. And leave it there for as long as you shoot the arrows!

From there, the final step in fine-tuning is done with differing point weights. For my Alpha Elite and ProTour 420, I installed 100-, 110- and 120-grain tungstens each in a dozen shafts – then labeled each set of arrows with a different nock colour. (In this case, that was red, white and orange respectively.) But this test works just as well if you mark the arrow holes as you did for the previous stage.

Right: Use point weight to fine-tune your arrows



Again, shooting at the longest distance you're comfortable – put down a good end, and make sure not to worry about impact points as the lighter points will hit higher. The focus isn't on being in the middle – but about your HIL spread, and which point weight shoots the tightest group. It might not be the most obvious variation, but there will be some – and I'd recommend shooting several ends with each of the configurations, just to make sure. Starting with a fresh target is always helpful, too.

Remember that a group's high and low margins can be corrected by moving the arrow rest or nocking point, and this is rarely difficult to correct – and it's not nearly as important as the horizontal spread, which is a direct reflection of an arrow's compatibility with your bow set-up.

Last year, I was training with Patrizio Hofer at the Beiter facility, in Germany. Patrizio was struggling with his 70-metre scores – even though he was shooting great. I walked him through the process I've described and within an hour his scores shot up over five points on a 70-metre round.

This process works, and I have no doubt that if you walk it through you'll benefit greatly. Shoot well! ☺

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