

CONQUERING THE HIL

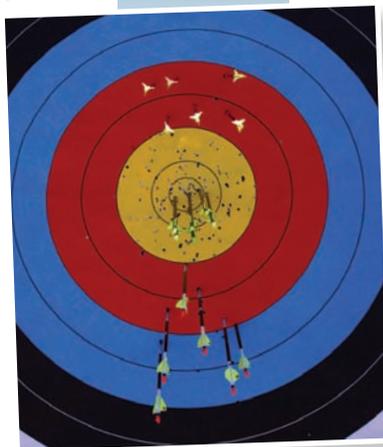
John Dudley reveals an arrow-tuning method that he's never discussed in print before. It's simple, and your scores should soar

In recent years I have stopped telling people to tune their bow. I believe you set up the bow, and you tune your arrows. Photo one is an example of what I mean. It shows groupings shot out of one of my bow set-ups. The grouping in the middle shows the perfectly tuned arrows for the bow set-up. The groupings that are high and low represent the same kind of arrow but in a different spine. This shows that even if the bow is set up correctly, it doesn't mean that everything is 'tuned'. Your bow and your shooting can be perfectly tailored to shoot good groups, but if you don't pay attention to detail on your shaft selection then you won't get your best results. All three groups were shot with the same bow, just with differently configured arrows.

A couple of years ago I wrote an article for *Bow International* called 'Get the Point'. It discussed the importance of using a wide range of point (pile) weights

to fine-tune your indoor arrows to absolute perfection. I receive a lot of feedback from readers about that article. People were amazed that trying different point weights tightened their groups. It works because most indoor arrow shafts that we select to shoot are far too stiff for our indoor set-ups. For example the 2315, which is most common among indoor shooters, is rated for 70lb+ of pulling weight if you factor in all the variables. Since we are shooting less than 60lb for our FITA set-ups we are obviously shooting an over-spined arrow. So to weaken that shaft we have to increase the point weight enough to lower the spine of the shaft so it matches the bow. Once this is achieved, the groupings have the potential to be at their best. For these indoor arrows you have the option of

Photo one: All three groups were shot with the same bow, by the same archer. The difference is in the arrow tuning



a huge point weight selection. However, for outdoor arrows there is something a little different to look for to get maximum results.

Shaft selection

From what I've seen, UK shooters tend not to be picky about arrow shaft selection. I understand that archery equipment is very expensive in England. This normally causes people to buy odd arrow types and sizes from club members, or off eBay. I think that as people try to upgrade the level of their equipment, they go for a name rather than a perfect selection. If you put some Easton X10s on eBay they will get viewers within seconds. Everyone wants the name. The Easton X10 has built a reputation for being the best arrow in the world. However, if you aren't buying the right size



The Easton X10's reputation goes before it, but John thinks not all archers know how to get the best out of it

then are you really getting the most out of that arrow? I believe a high majority of archers have not been educated enough on this to know how well their X10s can shoot. I commonly witness changes in one or two points per end.

It's a good idea to take advantage of the shaft selector programmes that are available online from the manufacturer. These are designed to get you as close to having the correct arrow as possible. If you enter information including your cam type, arrow length, shooting poundage on your bow and point weight, you will get a much closer selection for the right shaft. Programmes like Archer's Advantage (<http://archersadvantage.com>) are a good investment for any archer. They are even more precise and very good to use as a starting point. Also, I would encourage you to talk to other people, preferably top shooters who are posting good scores. They will probably have done their homework and have a set-up that has perfectly tuned arrows. Some archery forums have reputable archers on there who can tell you what is working for them.

However, some pros won't reveal this information, so you may just need to look for yourself when you see them at a tournament. If you want to know mine, here it is. If you shoot a 31" draw at 59lb out of a Hoyt Vantage X8 then either an Easton Pro Tour 420 or a 410 X10 with 2" cut off the back, both with a 120gn tungsten point, will work perfectly. People often ask me what arrow size they need to get the best results. But unless they have the same configuration as me

He was frustrated with his shooting, but I knew it wasn't his shooting at all. I showed him the importance of recognising your horizontal impact line

then I can't answer. Again, the best starting point is to refer to the section charts from the manufacturers or a programme like Archer's Advantage.

Once you have a shaft selected that is correct for your bow set-up, then you need to do a simple check to see how your arrows are matching up to your bow. This is a super tuning method I use that I have never written about. I call this method 'conquering the HIL.'

What the HIL?

I'm sure you are asking 'what the heck is the HIL?' The HIL is the Horizontal Impact Line or the left-to-right variance of your arrows in your groupings. It is the margin of error from the furthest arrow on the right of your group to the furthest arrow on the left. Look back to the photo of the FITA face where I have three sets of groupings. You will see that all three groupings have a slightly different HIL. The ones in the middle have by far the smallest variance, telling me that those arrows are perfectly tuned for that bow. One set of arrows would cause me to shoot ends of 60 points if I made good shots; the other sets would give me results of 57-58s at best. Imagine that over

the course of six ends at 70m. That is a minimum of a 12-point margin from the same shooter with the same bow.

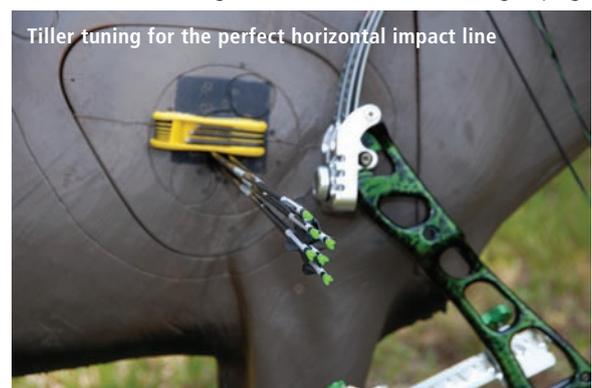
Many national-level teams and professionals have access to a lot more shaft selections than the average shooter. They are fortunate enough to have multiple shaft sizes and sometimes multiple rear-cut configurations on barrelled shafts like X10s and A/C/Es. But that doesn't mean that you can't get your set-up to deliver the same results, and here is why. What I have found is that if any shooter uses a manufacturer's selection chart as a starting point they are 80% on their way. But then you can take it a step further and check your HIL by doing a simple test using your bow poundage. This is a new take on 'Tiller Tuning'. It is what I do with all my bows. Tiller tuning in the past was a way to balance the bow limbs back when limbs were inconsistent and made of laminated wood. In today's world, no human is going to be able to balance a bow limb better with an Allen key than the computers do at the bow factories. Besides, balancing is not what conquering the HIL is about. It is about adjusting the spine of the arrow by using peak weight and noting the results.

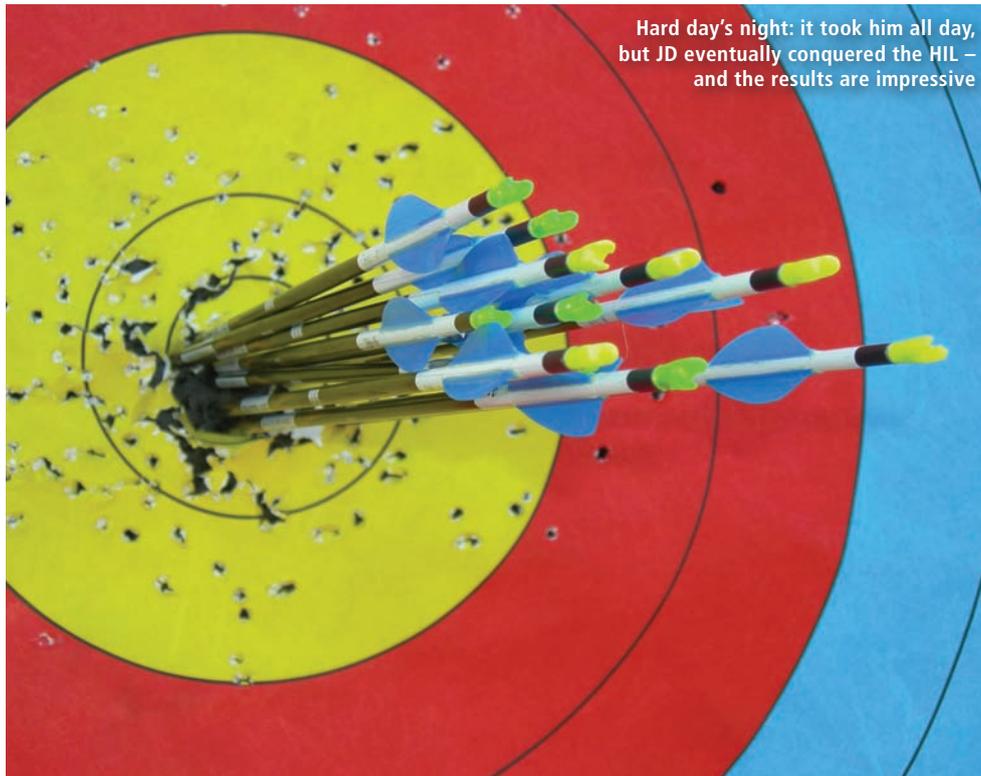
Note: When documenting your HIL, it is easier to use a fresh target so that you can easily see the arrow holes. I also use a digital camera so I can see the differences in the test results better.

How to do it

Start out by shooting a group at the furthest distance you feel comfortable at, or at the distance you plan to compete at. If it is windy wait for another day, and if you make a bad shot don't take that arrow into consideration. Marginal shots are acceptable because you will have those in tournament situations. But if I make a lousy shot I walk down, pull it out right away and shoot it again.

Shoot a grouping with at least six arrows. Mark the holes in the paper then go back and shoot two more groupings





Hard day's night: it took him all day, but JD eventually conquered the HIL – and the results are impressive

As people try to move up in the level of equipment, they go for a name rather than a perfect selection

as before. This will give you a clear picture of the HIL. After shooting the first setting, decrease your peak weight on your bow by at least 3lb. (Make sure you keep your tiller even as you change your weight.) After decreasing the weight, repeat your shooting process and again mark the holes. I recommend using different-coloured pens to mark the holes each time you change the peak bow weight. After shooting three groups again you then need to increase your bow weight to 3lb over the original weight. Shoot three more groupings and note the holes. For a shooter wanting to shoot around 55lb the model would look like this: the first group 55lb, the second 52lb and the third 58lb. Bear in mind that speed will increase and decrease as you change these settings, so make sure to adjust your sight a few metres higher or lower as you change the peak weight.

I have found that 3lb is enough to start showing a change in the spine of the arrow and how it tunes to your bow's

set-up. After you have shot this 6lb variance (-3 to +3), you will have a clear picture of your horizontal impact line. One of these three groupings will have an advantage over the others. Whatever that setting is will be the best option for you with the arrows you have chosen. Take a look at photos two and three. You will see the difference in the HIL. I would have preferred to shoot my 3D bow at 62lb as opposed to what the testing method showed to be the most accurate setting. This proved that with the bow configuration I had (Hoyt Vantage X7), I needed a slightly stiffer spine than I had when I shot 62lb. I was setting up this bow for a 3D tournament and had some 410 spine X10s already built. The arrows had been working great out of my Vantage X8 but I wanted to try the X7 to get a little more speed. The arrow showed signs of being weaker with the Vantage X7 because it has a slightly shorter brace height than my X8 and a little more peak weight. That means there is more power on the stroke and more force to the arrow. This gave me the direction I needed to go. From there I know I can reduce the point weight in the arrow (which will stiffen the arrow) and then move my poundage back

up towards my desired weight and get the same result. Otherwise I could shoot more peak weight if I choose to move up to the 380 spine arrow.

When I first started working with GB international Liam Grimwood he was in the same position as most archers. He had ordered some Easton X10s in a size that was shooting well for another archer. As we trained together I started to realise from his groupings that his arrows were not tuned to his bow. I had set up his bow and I knew that the centre-shot, rest position and loop configuration were all set properly. But his HIL was poor. He was frustrated with his shooting, but I knew it wasn't his shooting at all. I showed him the importance of recognising your horizontal impact line. Liam was not worried about speed. He was only worried about his groups. We found that backing his bow down to nearly 56lb shot his arrows in groups about half the size of what he had been shooting at 60lb. It made a difference of one or two points per end at 70m. Obviously Liam still applies my basic rules into his set-ups and tuning and he now holds the 90m world record.

Endless possibilities

I want to go on record and say that there are a lot of variables in shooting. Proper form and string clearance are especially important when conducting a test like this. When I am shooting in top form I have no problem running through my methods and getting bows capable of shooting world-class scores. When I have time to devote to training and shooting I feel like I am a machine. However, I still do extensive arrow tuning and bow adjusting using a shooting machine. I have a Hooter Shooter and a few other devices that I super-tune my gear with. The Hooter Shooter proves that my Hoyt is capable of shooting arrows in to the same hole. This helps me identify mistakes I have in my own form that prevent me from doing the same. Shooting machines are expensive, but I think that clubs and large groups of close shooting companions can benefit from investing collectively in a unit like this. Experimentation is unlimited. But make



Photo two: a poor group



Photo three: a tighter group following a decrease of 3.5lb

Machine-accurate: the Hooter Shooter proves that it is possible for John's bow to shoot arrows into the same hole



sure you don't spend more time shooting your bow with a machine than shooting the bow yourself. Tournaments don't let you bring the Hooter Shooter, so practise first, play second.

I am very fortunate to have accumulated a lot of different shaft sizes and configurations over the years. Whenever I get a new bow and set it up, the first thing I do is take a fistful of all the arrows that I believe to have the best chances of shooting well and launch them all down to the target. Every combination that shoots too wide a HIL immediately gets eliminated. Usually there are one or two spine options that stand out as having potential. I then super-tune my top contenders using peak weight, just as I explained earlier. The reason I have a lot of spine options is because at the end of the year, when I have only a few shafts left, I don't eBay them – I keep them. Some years I shot 380 X10s and others I shot 450s. I have shot anything from a 470 A/C/E to a 400 A/C/E. The same goes for A/C/Cs and Navigators. I never know what is going to work on next year's bow until I try them. I have heard people say many times, "my new bow doesn't shoot as well as my old one." My question would be, "did you try

The Hooter Shooter proves that my Hoyt is capable of shooting arrows into the same hole. This helps me identify mistakes I have in my own form that prevent me from doing the same

new arrows with your new bow?" In the majority of cases, the answer is no. Easton makes countless numbers of spine sizes for an important reason. Every person and every bow may require something different. There's a lot to take into account if you want to get a bow that's shooting in the gold to shoot in the X. The photo that I took of my full day's results gives ample evidence of that. This tuning system doesn't replace the normal set-up and adjustments that have to be made to the bow. It is still very important to have a good centre-shot, loop/nick settings and launcher tension etc. This system only identifies what arrow is matched to your bow configuration or how to match your bow to your arrow. Once you know you have the best possible horizontal impact line, you can be assured that your final score is in your hands only.

