SBAC September Newsletter

Please contact villyangelico@yahoo.com to make archery related announcements (e.g. other club shoots), to provide archery related articles, to submit any archery related photos or to sell archery items in this newsletter.

SOUTH BAY ARCHERY CLUB, INC.

Motto: To foster, expand, and perpetuate the practice of field archery and the spirit of fellowship among archers

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General Information

SBAC meetings are held on the **second** Wednesday of each month from 7:30 to 8:30 p.m., at **the Ladera Linda Community Center,** located on Forrestal Drive, off of Palos Verdes Drive South, across the street from Trump's Golf Course, up the hill almost the end. We meet in one of the classrooms to the right of the parking area.

SBAC monthly shoots are held on the **fourth** Sunday of each month, except in December, when it is held on the *third* Sunday. All shoots start at 9:00 a.m. **Registration closes at 9:15.**

Monthly Shoot Fees are as follows:

Single	$5.00
Family	$10.00
Juniors (Young Adult, Youth, and Cub)	$1.00
Guests (first time with a member is free)	$10.00

Club patches are $5.00 Club T-shirts are $15.00 (regardless of size)

Items (articles, want ads, etc…) should be submitted to the Newsletter Editor via e-mail no later than the Saturday following the club meeting.

September President's Report

President's Report:

The benefit of going to every single tournament is that you get to compare them, to some extent. Well, the August shoot was a hot one! After a scant turnout the month before, I expected the waning days of summer to draw most shooters away. Instead, we had 19 brave souls endure the heat, made even less comfortable by the fact that no water had been put out to stave off heat strokes. But we all managed, buoyed in part by gorgeous weather, great camaraderie, the sound of Irene-driven surf echoing nearby, and a local pod of dolphins putting on a show to compete with flocks of pelicans.

Please remember that if you arrive at a shoot close to its start at 9:00, be sure to crank up and lock the gate as the grace period for newcomers and guests is over, and leaving the gate down invites the curious to venture down our road. Also, it was decided by the membership that we will resume free water at Sunday tournaments.

Because we can afford it, and because we need it, the road will likely get some major grading done in the near future. As evidenced by the large number of repaired spots on nearby Palos Verdes Drive, Mother Nature has been hyperactive of late, and it's time to flatten things out before a tow truck becomes a Club necessity.

I neglected to mention my first Robin Hood a couple of months back. It feels kind of cool until you remember what arrows cost these days, after which I felt slightly guilty that mine was actually usable after extracting it from my fellow archer Tom Cahill's shattered nock…

For those of you concerned about next February's raise in rates from $72 per year to $120, as soon as there's a plan for a work party (three hours will keep your dues at this year's lower rate,) you'll probably receive an email from Fred Minton to alert you to its impending date. It may also appear on the website.

Recently, someone--and we definitely believe it was NOT a Club member--had a major party on the site. If you witness something like this, please call the Sheriff's Department. The partiers were trespassing. The litter left and damage to the road only hurts us, and it's in violation of our agreement with the Land Conservancy.

And on a final, concerned note, our dear friend and often SBAC President John Burns could probably use your prayers and best wishes. This consummate archer has not been feeling well of late, but we hope to hear and see him again soon.

Keep shootin' sp⊙ts!

- Paul Farbman

South Bay Archery Club, Inc. - Meeting Minutes
September 14, 2011

1. Treasurer's Report – club in good standing
2. The meeting place will be relocated to a facility near the Torrance Airport in the very near future. It is approximated that the relocation will occur in 2 months.
3. There was a discussion on heavy road work being required. No decisions have been made.
4. There has been a discussion to provide water at the monthly shoots. There was an agreement in the meeting to re-implement the provision of bottled water at the shoots.
5. There is now a total of 182 current members. 8 new members joined plus 1 renewal.
6. 3 more animal 3-D targets will be purchased.

Respectfully submitted by Keith Yang.

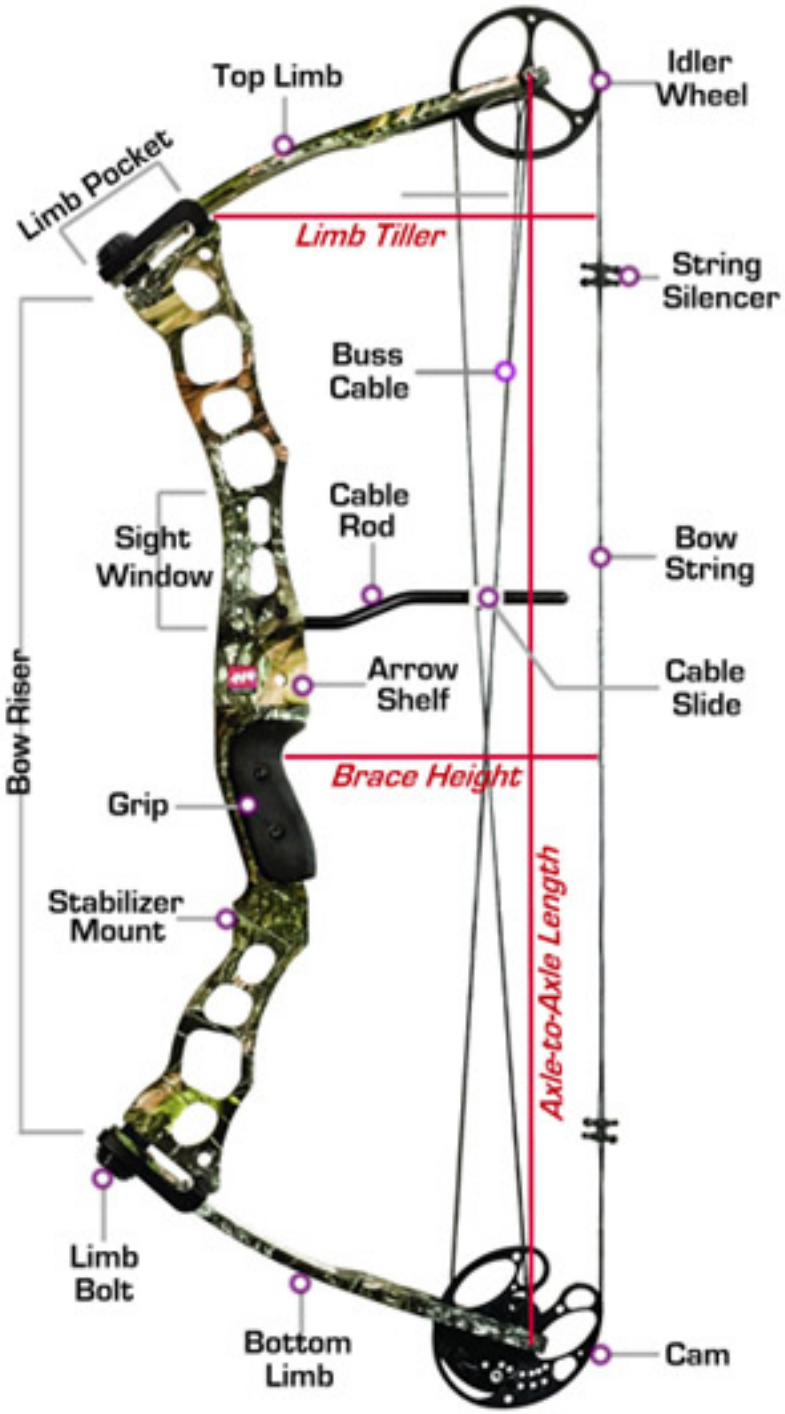
Tournament Scores

SOUTH BAY ARCHERY CLUB

FIELD ROUND AUGUST 28, 2011

NAME	STYLE	SPOT	SCRATCH SCORE	HDCP	HDCP SCORE	NEW HDCP	PLACE
LEO FURLONG	**N/A**	**22**	**432**				
TOM MAGILL	**N/A**	**39**	**477**				
DAN MARTIN	**N/A**	**36**	**489**				
KEN MEYER	**N/A**	**10**	**337**				
ROY BROKAW	TRAD-LB	15	344	154	498	154	
MIKE SMITH	TRAD-LB	8	305	204	509	204	
BOB DUPUY	TRAD-RC	6	204	283	487	283	
THOMAS SMITH	TRAD-RC	6	250	200	450	200	
DALE WARREN	BH	17	392	126	518	126	
BRIAN MARGESON	BHFS	49	472	78	550	68	2ND
FRED MINTUN	BHFS	39	459	98	557	98	1ST
DEITER VEES JR	BHFS	43	463	68	531	68	
DIETER VEES SR	BHFS	20	418	102	520	102	
GLEN DEOBER	FS	40	478	61	539	61	3RD
PAUL FARBMAN	FS	41	455	62	517	62	
ARNIE VILLACORTA	FS	58	485	35	520	35	
KEITH YANG	FS	36	452	52	504	52	
FIELD 20 PIN AWARDS							
GLEN DEOBER	15						
BRIAN MARGESON	20, 35F						
FRED MINTUN	BUNNY, 20, 25						
DIETER VEES SR	15-14						
ARNIE VILLACORTA	BUNNY, 15, 20, 25						
KEITH YANG	55						

Compound Bow Selection Guide



Introduction

Like many products, compound bows come in a variety of shapes, sizes, colors, and levels of sophistication. If you're new to the sport of archery, we'll guide you through all the jargon and technical hoopla and help you to make a better-informed choice on your new bow.

If you're not already familiar with the components of the compound bows, please take a moment to examine the illustration at right. Note the red lines denoting brace height and axle to axle length, as these attributes are mentioned frequently in this guide.

There are many pages of information here, you may wish to print this section for your reference (16-20 pages).

Keeping Things in Perspective

Undoubtedly, the modern compound bow is a fantastic hunting weapon. But let's try to keep things in some reasonable perspective. Before you're swayed by an advertising campaign promising exclusive-technology and predatory bliss, try to keep in mind that the compound bow is still a relatively simple device. The compound bow is constructed from readily available materials, it has only a handful of moving parts, and it isn't yet micro-processor controlled. So there's only so much technology which can realistically be applicable to the design and production of a compound bow. However, most bows are specifically marketed as a "high-technology" product. Why? Because bow companies know what modern bowhunters want the most - an edge - particularly a "technological edge". Bowhunting has a historically low success rate, so it is no surprise that compound bow advertising campaigns focus on offering bowhunters a "technological" advantage - even if it's a little stretch of the truth. They also know that outdoor product consumers love big scientific words and impressive acronyms. So beware. Your new compound bow could be packaged with a few Ultra-Lite Hyperpolyresin fibers of CBT (cock-n-bull technology).

Statistical Deception in Advertising

If the Nike shoe company paid the world's 50 fastest sprinters to wear only Nike brand shoes during competitions, it would be no surprise that most of the big races would be won by athletes in Nike shoes. Would it be fair then to conclude that Nike shoes make runners go faster? Of course not! But the company could make it seem that way if they advertised the race statistics without mentioning the paid endorsements. Sadly, some archery manufacturers use this same little trick to entice buyers, and it usually works. Beware of advertising campaigns that lead you to believe their brand of bows are more accurate, and tempt you with "stacked" statistics on how many tournaments their bows win. The Point: Bows don't win tournaments any more than shoes win races. The most talented runners win races and the most talented shooters win archery tournaments. Many factors are involved in accurate shooting (proper fit, careful tuning, good technique, etc.). A good high-quality bow is just one part of the equation.

Understanding Trade Offs

There are many characteristics that archers look for in a new bow. Most archers want a bow that has blazing fast performance, a silky smooth draw stroke, very low hand-shock, a generous valley, and high let-off. Most archers also want their bows to be very lightweight, compact, quiet, forgiving to any flaws in technique, easy to tune, easy to adjust, and affordable for any budget. Unfortunately, this perfect bow doesn't exist. To get a bow with a certain set of characteristics, you'll likely have to sacrifice some others. For example, very fast bows are generally less forgiving, low recoil parallel-limb bows are generally heavy, and so on. Ultimately you'll have to decide which characteristics are most important to you and choose the bow that best fits your personal criteria.

Limiting Factors of Compound Bow Performance

Since speed is often the #1 consideration for new bow buyers, let's begin with the issue power. First, we need to understand that bows don't make energy. They just convert energy from one form to another, so the chief performance-limiting factor is human power. So what makes a bow more "powerful" is quite unlike what makes a rifle more powerful. For a firearm, the "power" comes from the cartridge, not from the shooter. So providing you can withstand the recoil, you could shoot a gun for hours without ever breaking a sweat.

With a compound bow it is just the opposite. Don't be fooled into thinking that a bow capable of shooting 340 fps is somehow "more powerful" than one that shoots 300 fps, and that the effort required to draw and shoot each bow will be the same. In general, if a bow shoots faster it is because it requires more total effort to draw the bow back. A compound bow is simply a machine that stores energy, supplied by the shooter, then releases that energy into an arrow. And sadly, you can't get more energy out of the bow than you put in. No amount of high-tech engineering can change that. The Point: The compound bow gets

its energy from YOU. So if you choose a bow that takes an eye-bulging amount of effort to draw back, you may find that the bow isn't very enjoyable to shoot in spite of the gains in arrow velocity. Learn more about theoretical limits of compound bow performance.

Energy Storage and Release

When you pull the string of a compound bow, the limbs of the bow are squeezed inward. The energy you supplied to draw the bow is stored in the limbs, as potential energy, until you release the string. Upon release, the potential energy is transferred into the arrow as kinetic energy, as the limbs "spring" back into place returning the string to it's original position. Seems simple enough! But careful examination of this process of storing and releasing energy is what gives a compound bow its performance characteristics, and it is something you should consider when selecting your new bow. The Point: In essence, there are only two factors that determine how much "power" your bow will have: 1) The amount of energy that can be stored in the limbs during the drawstroke. 2) The amount of that potential energy that can be successfully transferred into the arrow upon release (efficiency).

Understanding the IBO Speed Phenomenon

Before we break down the issue of energy storage, we should be clear on why it matters so much. Ultimately, manipulating and optimizing energy storage is about generating faster arrow speeds. And believe it or not, most archery enthusiasts are "speed junkies" to some extent. When most shooters evaluate a new bow, one of their first questions is likely to be "How fast does it shoot?". In the archery industry - speed sells. And like the coveted 300 yard drive in golf, and the 300 mph funny-car pass, the 300 fps mark seems to be the benchmark for high performance in the archery market. As a matter of consumer perception, a bow that shoots under 300 fps is generally considered slow, while a bow that shoots over 300 fps considered fast - in spite of the fact that there's no practical difference in a 298 fps bow and a 302 fps bow. Nonetheless, manufacturers are under tremendous pressure to produce bows that pump out big 300+ fps IBO speeds.

So what is an IBO Speed? Let's start at the top. On the most basic level, there are three main components of actual arrow speed: draw weight, draw length, and arrow mass. The higher the draw weight - the faster the arrow will shoot. The longer the draw length - the faster the arrow will shoot. And the lighter the arrow - the faster it will go. So for the purposes of testing, a slick manufacturer could setup a particular model bow and establish their bow's advertised speed using an unrealistic 100# draw weight, 32" draw length, and shoot an anorexic 250 grain arrow. Surely that combination would yield a blazing fast test speed and would help to sell more bows, right? Well, not so fast.

To really compare two bows, the industry uses an "Apples-to-Apples" method of comparison. Manufacturers generally rate their bows using the same IBO (International Bowhunting Organization) Standard. To get an accurate IBO Speed rating, manufacturers must test their bows under the same preset conditions: setting the bow for exactly 70# Peak Draw Weight, exactly 30" Draw Length, and they must shoot a test arrow that weighs precisely 350 grains. This levels the playing field on basic settings, so the differences in IBO scores reflect other design attributes (brace height, cam aggressive, bow efficiency, etc.). OK, fair enough!

However, since most manufacturers rate their own bows - they'll usually give themselves a few added advantages by testing the bows with a bare arrow shaft (no fletchings), a naked string (no nocking point, peep sight, or silencers), the lowest possible let-off setting, and with a drop-away style rest. This helps to maximize storage and eliminate friction so it's possible to squeeze out a few extra fps, but it doesn't necessarily reflect realistic shooting conditions. Manufacturers can also squeeze a few more fps by shooting the bows from the hard-wall (forcibly drawing the bow back a little too far) rather than from the soft valley (more on wall and valley concepts later). And finally, the manufacturer's IBO speed is likely to reflect their "best" test, rather than their average test.

Since the industry has no independent testing authority to actually scientifically verify each of the manufacturers' claims, most bows end up with advertised IBO speeds that are optimistically high, and nearly impossible to duplicate. After all, most consumers don't have the benefit of a chronograph, and few people actually shoot 70# DW, 30" DL, and exactly a 350 gr arrow. And even if they did, there will always be some percentage of variance among scales and chronographs to help dismiss any claims of

discrepancies. So there's really no way to hold manufacturers accountable for their exact IBO speed numbers. From our experience, they're all guilty of a little IBO speed padding. But in all fairness, most are careful not to get too carried away. A little padding and outright fabricating are different things.

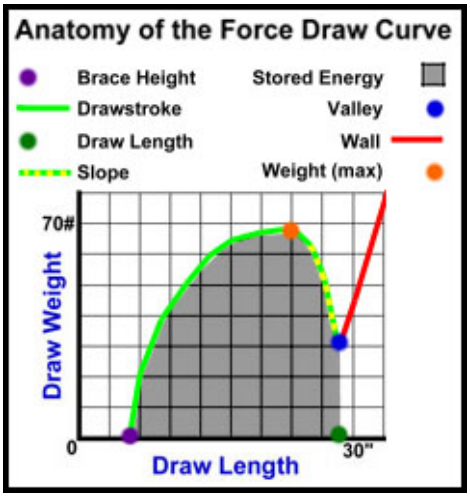
As such, we recommend you consider the manufacturers' ratings as a **high-estimate**. In most cases, the IBO speed is still a reliable method of "Apples-to-Apples" comparison among different bow models. We just have to accept that manufacturers invariably doctor-up their apples to be a little sweeter than they actually are. It's just part of the game. So don't assume something is "wrong" with your new bow just because it doesn't shoot as fast as it's posted IBO Speed. Very few, if any at all, bows do.

In fact, we periodically IBO test new bows here at our facility. Over the course of several years and countless dozens of tests, we have NEVER found a single bow which will actually shoot at or above it's advertised IBO speed - from any manufacturer. Admittedly, some manufacturers come closer than others, but in the real world, most compound bows will actually shoot 10-20 fps less than their advertised IBO speeds. And once setup in a typical hunting rig with a loaded-string, most will shoot a measurable 30-50 fps less than the advertised IBO speed.

So while we understand that speed is a big selling point for compound bows and a major performance characteristic that merits concern, we strongly suggest you not get too caught-up in splitting hairs over IBO speed. Compared to the wheel bows we grew-up on, any modern compound bow is blazing fast. In the field, the 298 fps "Slow-Bow" will probably perform just as well as the 302 fps "Fast-Bow". Neither you or the deer will likely ever know the difference.

Force-Draw Curve

So how is one bow capable of a 330 fps IBO Speed, while another only shoots 290 or 300 fps? Again, it's all about energy storage. As noted above, the key ingredients to arrow speed are draw weight, draw length, and arrow mass. But there's more. The amount of energy a bow stores also depends upon the aggression (geometry) of the cam or wheel design, the bow's let-off percentage, and the bow's brace height. To better understand how each plays its role, you should familiarize yourself with the Force-Draw Curve. The Force-Draw Curve is simply a graph that shows how much energy is being stored in the limbs, inch-by-inch, until the bow reaches full draw. Draw weight (in pounds) is plotted against draw length (in inches). The green line represents the amount of pressure the shooter must supply as the bow is drawn back. Notice that draw weight varies throughout the drawstroke (an important point for later in our discussion). When finished, the graph shows the amount of energy stored during the drawstroke, and the shape of the graph also gives us a good preview of the bow's performance characteristics and how smooth or radical the bow will feel to shoot. Take a look at the following example graph and familiarize yourself with it.



Area Under the Curve (no calculus required)

The Force Draw Curve (above) represents an average modern single-cam compound bow. The amount of energy the bow stores is represented by the darkened gray area under the curve. The more gray area you have, the faster the bow will shoot. So how do we get more gray area? Just change the shape of the

curve. Of course, changing the shape of the curve requires changing the bow's major characteristics. This is where draw length, draw weight, cam design, let-off, brace height, and other attributes come into play.

The Bow's Drawstroke

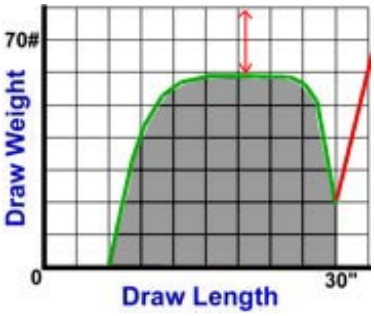
The curved line on the force draw curve represents the bow's drawstroke, commonly known as the powerstroke. The powerstroke represents your effort. The powerstroke begins as you pull the string back from the resting position and is completed when the bow reaches full draw. Each bow will have a different powerstroke depending upon its settings and cam characteristics. Powerstrokes which are longer, higher, or wider will result in increased energy storage and arrow velocity.

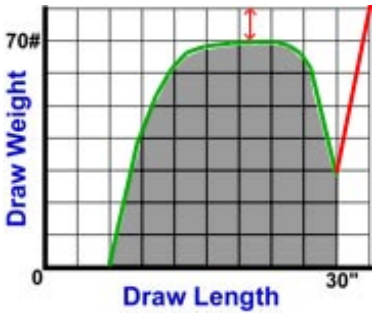
Theoretical Limits

If speed were the only goal, a Force Draw Curve shaped like this one would yield the greatest possible amount of stored energy for any bow at 70# max draw weight and 30" draw length. Of course, a bow like this would be nearly impossible to aim and shoot. With a 0" brace height, the string would rest on the bow's handle, and would nearly chop off your hand with every shot. And the bow would have no let-off, leaving you to hold back the entire 70# until release. A bow like this would be far more dangerous to the archer than it would be to the game animals. And although this graph is only a theoretical example, it can help us to understand how today's super-cam bows are yielding faster arrow speeds than ever before. But beware! The closer a bow's Force Draw Curve comes to the theoretical limit graph, the more difficult it is to draw, shoot, and control.

Draw Weight - Height of the Powerstroke

The primary method for increasing the amount of stored energy during the powerstroke is to shoot a bow with a higher maximum draw weight. All other things being equal, a 70# bow will store more energy and shoot faster than a 60# bow. However, this is a complicated issue you should consider carefully when selecting your new compound bow. The maximum draw weight of the bow is typically determined by the stiffness of the bow's limbs. Compound bows come in a variety of maximum draw weights, but the most common are the 50-60# and 60-70# versions. Although you may purchase a bow with 70# limbs, you can generally adjust the draw weight 1-10# down from the maximum weight. So a 70# bow could actually be adjusted for 61#, 64#, 67#, or any draw weight within the allowable range. However, it should be noted that a 70# bow, turned down to 60#, will not perform as well as the same bow in a 60# version operating at it's maximum draw weight. Bows are generally more efficient at or near their maximum draw weight.





Recommended Draw Weight Ranges (Modern Compound Bows)

Here are some general guidelines for choosing an appropriate draw weight. Of course, each individual is different. You should apply your common sense here and interpret this chart with due respect to your own age, general physical condition, and Body Mass Index (BMI). If you are new to the sport, please read additional discussion article on choosing an appropriate draw length and weight.

Very Small Child (55-70 lbs.)	10-15 lbs.
Small Child (70-100 lbs.)	15-25 lbs.
Larger Child (100-130 lbs.)	25-35 lbs.

Small Frame Women (100-130 lbs.)	25-35 lbs.
Medium Frame Women (130-160 lbs)	30-40 lbs.
Athletic Older Child (Boys 130-150 lbs.)	40-50 lbs.
Small Frame Men (120-150 lbs.)	45-55 lbs.
Large Frame Women (160+ lbs.)	45-55 lbs.
Medium Frame Men (150-180 lbs.)	55-65 lbs.
Large Frame Men (180+ lbs.)	65-75 lbs.

Draw Weight - Effect on Arrow Velocity

High poundage bows require heavier, stiffer arrow shafts. So while they will certainly generate more energy at the target, they may not necessarily generate much faster arrow speeds at IBO standards. Lower poundage bows can use lighter, more limber arrow shafts. IBO standards allow 5 grains of arrow weight per pound of draw weight. So a 70# bow can shoot an arrow (safely) as light as 350 grains. A bow set for 60#, no less than 300 grains and so on. So surprisingly, when set for IBO minimum standards, many bows are only fractionally faster in the 70# version vs. the 60# version. Since a 70# bow must shoot the heavier arrow, the savings in arrow weight offsets the loss of energy storage during the powerstroke. So properly set-up for best speed, a 60# version of most bows will perform within 10 fps of the heavier 70# version.

Draw Weight - How Much is Necessary

Some states require a compound bow to meet certain draw weight minimums in order to hunt large game like Whitetail Deer. Always observe the rules and regulations for legally harvesting game in your state. However, it should be noted that some of these rules have been in effect for many years, and do not necessarily consider the recent technological advances in archery manufacturing. The average bow of 15 years ago was struggling to shoot 230 fps, and even at those speeds many bowhunters got clean pass-thru's on large game like Whitetail Deer. Today the average bow is shooting over 300 fps at 70# draw weight and 30" draw length. This means that even bows in shorter draw lengths and lower draw weights will still provide plenty of velocity to penetrate the ribcage of a Whitetail Deer and other large game. A modern single cam bow with a 50# peak draw weight and just a 26" draw length will still zip arrows well over 220 fps. Of course, if you plan to hunt larger game like Elk or Moose, or if you plan to take shots from longer distances, you will need additional kinetic energy for complete penetration and best chance of a humane harvest. As a general rule, a 40-50# draw weight will provide sufficient energy to harvest deer and a 50-60# bow will provide sufficient energy to harvest larger elk-size species. Unless you're planning to hunt huge animals like Cape Buffalo or Musk Ox, a 70+ pound bow really isn't necessary. You can often be just as effective with a more moderate draw weight.

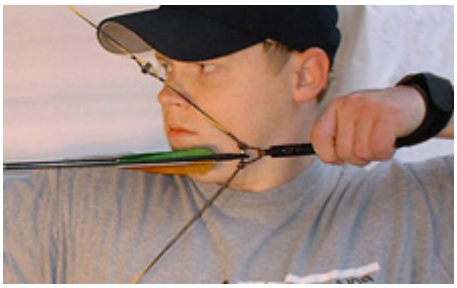
Draw Length Basics

Unlike a traditional recurve bow that can be drawn back to virtually any length, a compound bow will draw back only a specific distance before it stops (the wall). Compound bows are designed to be shot from the full-draw position. If a compound bow is set for a 29" draw length, it should always be shot from the full 29" draw position. But the bow cannot be over-drawn, say to 30" or 31", without modifying the setup on the bow. So the draw length on your compound bow must be set to match your particular size.

Fortunately, most compound bows use a series of interchangeable or "sliding" cam modules, which allows the bow to be adjusted to fit a given range of draw lengths. If you don't know your draw length, you should determine that before shopping for a new bow. Most men's bows adjust within a typical 26-30" draw length range, which fits shooters from roughly 5'5" to 6'3". But that's not true for every bow. Some bows have a narrow range of adjustment, or in some cases, no adjustment at all. So step #1 in selecting your new bow is finding a model will adjust to suit your particular draw length. Of course, if you have an unusually short or long draw length, your choices may be limited. So you'll need to take particular notice of the bow's advertised draw length range.

Draw Length Affects Power

The longer your draw length, the longer your bow's powerstroke will be - and the faster your bow will shoot. As a general rule, 1" of draw length is worth about 10 fps of arrow velocity. So if your particular bow has an IBO speed of 300 fps, and you intend to shoot the bow at 27" draw length - you should expect an approximate 30 fps loss in speed right off the top. But this is one area where speed should be a secondary concern.

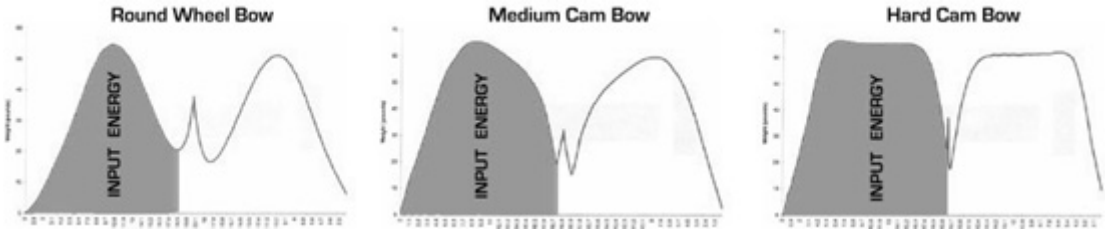


If you're 5'9", it would seem ridiculous to buy a #13 shoe for your #10 foot. Similarly, it's not such a good idea to buy a 30" draw length bow, when a 27" or 28" draw length would fit you much better. Shooting a excessively long draw length will indeed earn you more speed, but to get the extra speed you're likely to give-up a considerable amount of control and comfort. It's a bad trade-off. As such, we strongly recommend you NOT shoot a draw length that's too long for your particular body size. Accuracy should never be sacrificed for a little more speed. After all, a fast miss is no more impressive than a slow miss.

Nonetheless, the majority of compound bow owners set their bows for too much draw length, which results in poor shooting form - inaccuracy - and painful string slap on the forearm. You will better enjoy and be more successful with your new bow when it is fitted properly to your body. And REMEMBER! If in doubt, choose a little LESS draw length rather than a little more. If you are still unsure, or plan to shoot with a string loop, you may benefit from reading our Additional Discussion on Draw Length.

Cam Aggression

Of course, choosing a good bow isn't just about finding one that fits. You'll also want to choose a bow that offers the right blend of performance and shootability. This is where cam design comes into play. Modern cams come in a variety of feels and levels of aggression. Some cams are specifically engineered to produce a smooth feel. Others are made for best possible performance. The actual geometry of the cam system determines how soft or aggressive the powerstroke will be. Take a look at the additional sample graphs below, taken from bows with different types of popular cam systems.

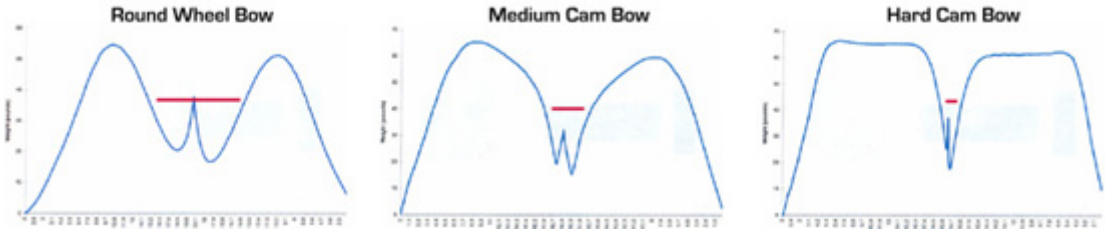


- **ROUND WHEEL / LESS AGGRESSIVE:** As you can see, a Round Wheel style bow has a very smooth bell-shaped curve which rises to peak weight for only a moment then gradually descends to full let-off. This cam style will feel very smooth and easy to draw, but will store the least amount of energy and shoot the slowest. Although this type of cam has been around for decades, some shooters still prefer the soft feel of this style cam - particularly instinctive-shooters and finger-shooters. So a number of manufacturers still offer bows with traditional round wheels or cam geometry ground to replicate the round wheel powercurve.

- **MEDIUM CAM / MODERATELY AGGRESSIVE:** The Medium Cam graph is typical of today's basic single and hybrid cams. These cams are more aggressive, ramping to peak weight more quickly and then coming to full let-off more abruptly. So they tend to store up more energy than a Round Wheel bow, and shoot notably faster. However, a Medium Cam is sure to "feel" a little heavier than a Round Wheel bow of equal peak weight. This type of cam geometry suits most shooters well, offering a reasonable blend of feel and performance. Medium cam bows will usually have moderate IBO speeds in the 295-310 range.

- **HARD CAM / VERY AGGRESSIVE:** The last example is a Hard Cam system, optimized for

maximum energy storage and speed. Notice how quickly the bow ramps up to peak weight and how quickly it transitions to let-off. Also notice the distinct high-plateau on the graph where the shooter must draw the bow over several inches at peak weight. This type of cam geometry will store dramatically more energy, and will usually have an IBO Speed of 320 fps or more. The downside is that Hard Cams feel harsh and heavy compared to other bows of equal peak weight. So they certainly aren't for everyone. But for shooters who want the hottest possible arrow speeds, the Hard Cam is the way to go.



The Valley

The "V" shape formed between the two halves of the graph is commonly referred to as the "valley", which represents how quickly the bow transitions to and from full let-off. A bow with a narrow valley is quick to "jerk forward" if you relax too much at full draw. On the other hand, a wide valley bow allows a little more leeway for shooters who tend to creep (a common shooting-form flaw). Aggressive hard-cams tend to have the most narrow valleys since delaying the let-off allows additional energy can be stored during the powerstroke. But be advised, managing a narrow valley bow takes a little getting use to.

If you're accustom to an older soft cycle bow, an aggressive narrow valley cycle may be a little nerve-racking at first. Very aggressive cams can have valleys that are effectively less than 1/2" wide at full draw. This can cause creepers to jerk and flail awkwardly at full draw, since the holding weight abruptly changes if the bow isn't held firmly against the stops. So to avoid being sucked thru your Whisker Biscuit, be prepared to make some moderate changes in your shooting form if you elect to go with an aggressive cam bow.

CAUTION: If you draw a high let-off bow without an arrow on the string, make sure you have a firm grip. High let-off bows are easily dry-fired. Once you draw the bow back and begin to relax, you're likely to forget that the full 70 lbs is waiting for you, just an inch or two away. When you begin to let the bow down, your grip is too relaxed, and WHACK! DRY-FIRE! Dry firing a bow is not only dangerous to the shooter, but it is an ideal way to seriously damage your expensive compound bow and generally voids most manufacturer warranties.

Brace Height

Brace height is yet another important factor in the energy storage equation. A bow's brace height is simply the distance from the string to the pivot point of the bow's grip. You can kind-of think of brace height as how close the string will be to your wrist when the bow is at rest. The closer the string is to your wrist, the more work you have to do to get the bow drawn back. If you're drawing a 6" brace height bow back to a 30" AMO draw length, you'll have to pull the string back a total distance of 22.25" before you reach full draw*. But if the string rests farther back from your wrist to start, say the bow's brace height is 8", then you'll only have to pull the string back for 20.25". So the bow's brace height also figures into how LONG the bow's powerstroke will be. And as you know, a longer powerstroke generates more energy.

As a matter of energy storage, brace heights are analogous to the length of the rubber-band on a slingshot. If you hold a slingshot at arms-length and pull it back to your cheek, a shorter rubber-band would be stretched for a longer distance (and shoot faster) than the same slingshot with a longer rubber-band. In much the same way, a short brace height bow stores more energy and shoots faster than a tall brace height bow (all other things being equal). So brace height has the same affect on total powerstroke

length as does the bow's draw length setting. The only difference is that the brace height determines where you start and the draw length determines where you stop. But unlike draw lengths, brace heights aren't adjustable. So you have to get this one right the first time. You can't change your bow's brace height later, should you change your mind.

If you compare brace heights and IBO speeds, you'll find an obvious correlation. Shorter brace heights tend to make for faster bows. Easy enough. Then it would seem that in order to get better performance from a compound bow, all you have to do is look for a model with a short brace height, right? Well, not so fast! Short brace height bows may be hot-performers, but they will come with a few drawbacks you should think about

*A bow's AMO draw length is measured 1.75" beyond the grip pivot point. So a bow's powerstroke distance is found by subtracting the brace height and 1.75" from the AMO draw length.

Brace Height - Speed vs. Forgiveness

If you've been shopping for a new compound bow, you've certainly noticed a variety of advertised brace heights, generally ranging from 5-9". But if shorter brace heights result in faster bows, then why aren't all bows designed with short brace heights? Trade-offs! That's why. Short brace heights aren't automatically favored because a bow's brace height has a profound effect on the bow's forgiveness and shootability. Short brace height bows are generally less forgiving and require more skill to shoot accurately. Since the arrow is in contact with the string for a longer distance and period, there is more opportunity for any glitches in your shooting form (hand-torque, trigger punching, etc.) to have a detrimental effect on the arrow's flight. Longer brace heights have the opposite effect, limiting the effects of form glitches. In addition, very short (sub-6") brace height bows tend to yield more string-slap on the shooter's forearm (ouch!). So there are some trade-offs to consider here.

If you shoot with absolutely perfect form and technique, a short brace height bow will be just as accurate as it's longer brace height cousins. But if you have average skills and are prone to occasional goof-ups, a bow with a little longer brace height will yield better accuracy in most shooting situations. The average new compound bow has a brace height of approximately 7". Bows with shorter brace heights (5-6.5") will be faster but less forgiving to shoot. Bows with longer brace heights (7.5-9") will generally shoot slower but will be more forgiving to your errors. Consider this carefully when choosing your new hunting or 3D bow. Unless you have a specific need for a blazing fast bow, you may find that a more moderate brace height will increase your enjoyment of archery and your success in the field. SPECIAL NOTE: Tall guys with draw lengths 30" and above should be especially conscious of brace height - as a long draw length and a short brace height are a particularly bad combination, especially for new shooters.

Brace Height Market Trends

Just as 300 fps seems to be the accepted IBO speed-minimum, 7 inches is the generally accepted brace

height minimum in today's compound bow market. If you visit our compound bow specification charts, you'll surely notice that a disproportionate number of bows are advertised with exactly a 7" brace height. This isn't by accident. Experienced shooters - particularly bowhunters - tend to avoid short brace height bows, regarding any brace height under 7 inches as "radical" or "unforgiving". So a bow with a 6 7/8" brace height is often a lame duck - at least regarding bow sales. As such, most manufacturers try to aim to hit the market-pleasing 7+ inch brace heights on most of their new bow designs. As a matter of selecting a new bow, we submit there's probably no justification for such an exacting prejudice, as there's nothing particularly lucky about a 7" brace height. But that does seem to be the commonly accepted line-in-the-sand between performance and shootability.

Short-Draw Archers - Built in Forgiveness

If you are a short-draw archer (27" draw length or less), you'll be pleased to know you have a nice advantage regarding forgiveness and shootability on your compound bow. As we noted earlier, a bow which has a 6" brace height and is set for long 30" draw length will have 22.25" powerstroke. This means the during the shot, the arrow will remain in-contact with the string for approximately 23-24" (including string follow-thru) until the arrow finally releases. This would generally make for a rather unforgiving setup. But that same bow in the hands of the short-draw archer will be considerably MORE forgiving to shoot. If a short-draw archer shoots the same bow at - say - 26" draw length, his/her powerstroke will only be 18.25" long. So the short-draw archer's arrow gets off the string in a shorter distance - thus the short-draw archer has some "built-in" benefits of forgiveness. If you are a short-draw archer, don't spend too much time fretting over brace height. Instead, consider shooting a bow that's a little more aggressive. The same bow that might give your 6'4" hunting buddy fits, will be quite manageable when set for your short draw length. And choosing a more aggressive bow will help you to recover some of the speed and power lost in a short-draw setup.

Kinetic Energy: Arrow Mass & Arrow Velocity

So how does energy storage and arrow speed translate into actual hunting penetration? In the shooting sports, penetration is most often expressed as a function of kinetic energy (KE). This topic is covered in great detail in our Arrow Selection Guide, but we'll mention the highlights here in the bow guide as our final thought on bow "power".

In the end, the measurable "power" of your new bow - it's total kinetic energy output - ultimately depends upon just two variables: the mass of the arrow and the speed of the arrow. Kinetic energy of an arrow can be found by using the formula $KE=(mv^2)/450,240$ where m is the mass of the arrow in grains and v is the velocity of the arrow in fps. So if your new bow setup ultimately shoots a 400 grain arrow at a respectable 250 fps (a typical field-output for a modern rig), your actual kinetic energy or "power" will be:

$$KE=(mv^2)/450240$$
$$KE=[(400)(250^2)]/450240$$
$$KE=25000000/450240$$
$$KE=55.53 \text{ ft-lbs}$$

So, will that be enough? Take a look at Easton's Kinetic Energy Recommendation Chart.

Kinetic Energy	Hunting Usage
< 25 ft. lbs.	Small Game (rabbit, groundhog, etc.)
25-41 ft. lbs.	Medium Game (deer, antelope, etc.)

> 65 ft. lbs.	Toughest Game (cape buffalo, grizzly, musk

According to Easton's recommendations, 55 ft-lbs of KE would be plenty for most popular North American game species. But is that a guarantee of success? Absolutely not!

Remember, bowhunting is a traditional and difficult sport. And regardless of how you crunch your numbers during pre-season, you can't avoid the elements of chance during the actual hunt. Shooting a live animal in the woods is quite different than shooting a block of ballistics gel in a laboratory. In the field you'll encounter unpredictable and complex variables that limit any mathematical model to just a "best guess". If you consider that your arrow must arrive on target then pass through layers of hair, hide, muscles, bones (perhaps), and a host of other tissues.....AND that all of this is happening in an uncontrolled outdoor environment, it's pretty clear that the issue of hunting penetration cannot truly be distilled into a mathematical puzzle.

As many experienced bowhunters can attest, just as it's possible to make mistakes and get lucky, it's also possible to do everything right and come-up empty handed. That's just part of the sport. However, with good equipment, good technique, smart planning, and some common sense, you can surely tip the scales in your favor and maximize your chances of success in the field.

To be continued in next newsletter.