

CONCEPT X

HOYT®

WHITEPAPER

CONCEPT X™ IN-DEPTH



TECHNICAL COLLABORATIVE

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Speed

The Concept X brings real speeds to the game. Concept X delivers the fastest speeds that Hoyt has ever produced in a target bow, by model. Performance was one of the key requirements of the SCTR cam, and combined with the TXL limbs, gives fantastic speeds of **330 fps in the Concept X 37 and 327 fps in the Concept X 40**. Optimized for performance at short draw lengths, **Concept FX produces 332 fps** at its maximum 29.5" draw length.

Unlike other companies, Hoyt tests to ATA speed guidelines. These include parameters of:

- 350 grain arrow weight
- 70lb draw weight
- Draw length of 30", +/- 1/4"

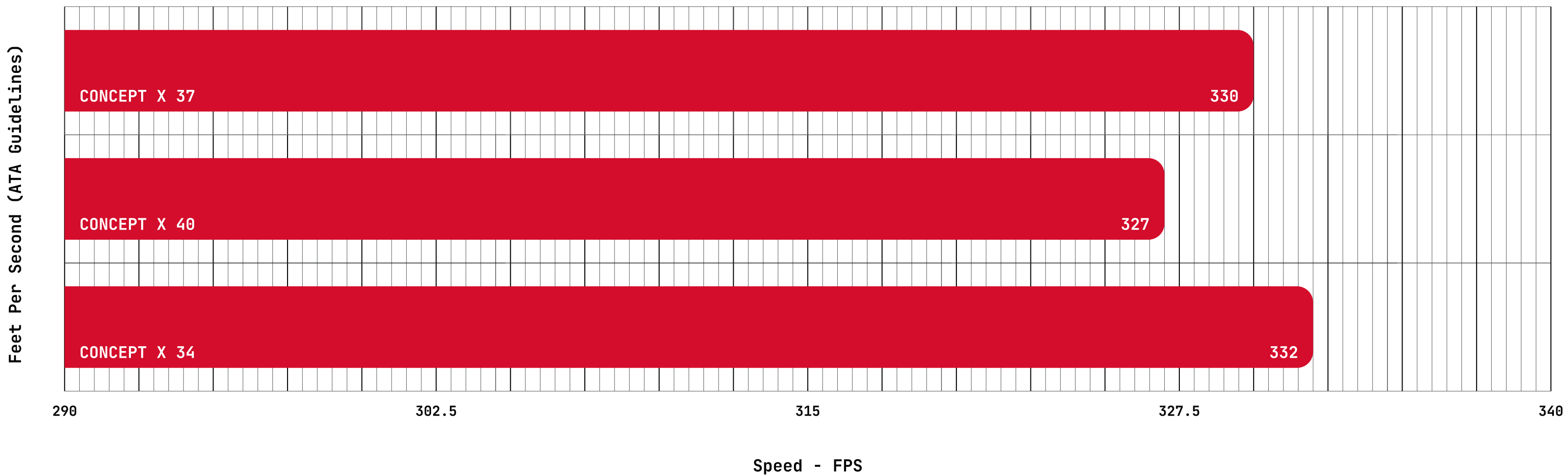
The ATA speed test gives speed numbers that are far more realistic once an archer gets the bow fully built and ready for competition.

Note: The Concept FX doesn't reach 30" draw lengths and is not offered in a 70 pound configuration. It is tested at 29.5" draw length at 60 pounds with a 300 grain arrow.

Other companies utilize an "IBO" speed measurement system, which has much looser testing parameters that include:

- Draw weight up to 80lbs with 2 lb tolerance
- Arrow weight must be 5 grains per pound of draw weight
- No specified draw length standard

These testing parameters, combined with verbiage that vaguely rate speeds such as "up to X fps" allow companies to publish speed numbers that are inflated. By testing up to 82lbs, efficiencies can be found that garner a few extra feet per second that real world archers won't see. The lack of a draw length standard can artificially boost the rating significantly. It becomes quite easy to show an IBO speed rating that won't hold up when compared to ATA guidelines. At Hoyt, we perform comprehensive tests on competitor products, giving us an accurate gauge of true specifications within the archery market.



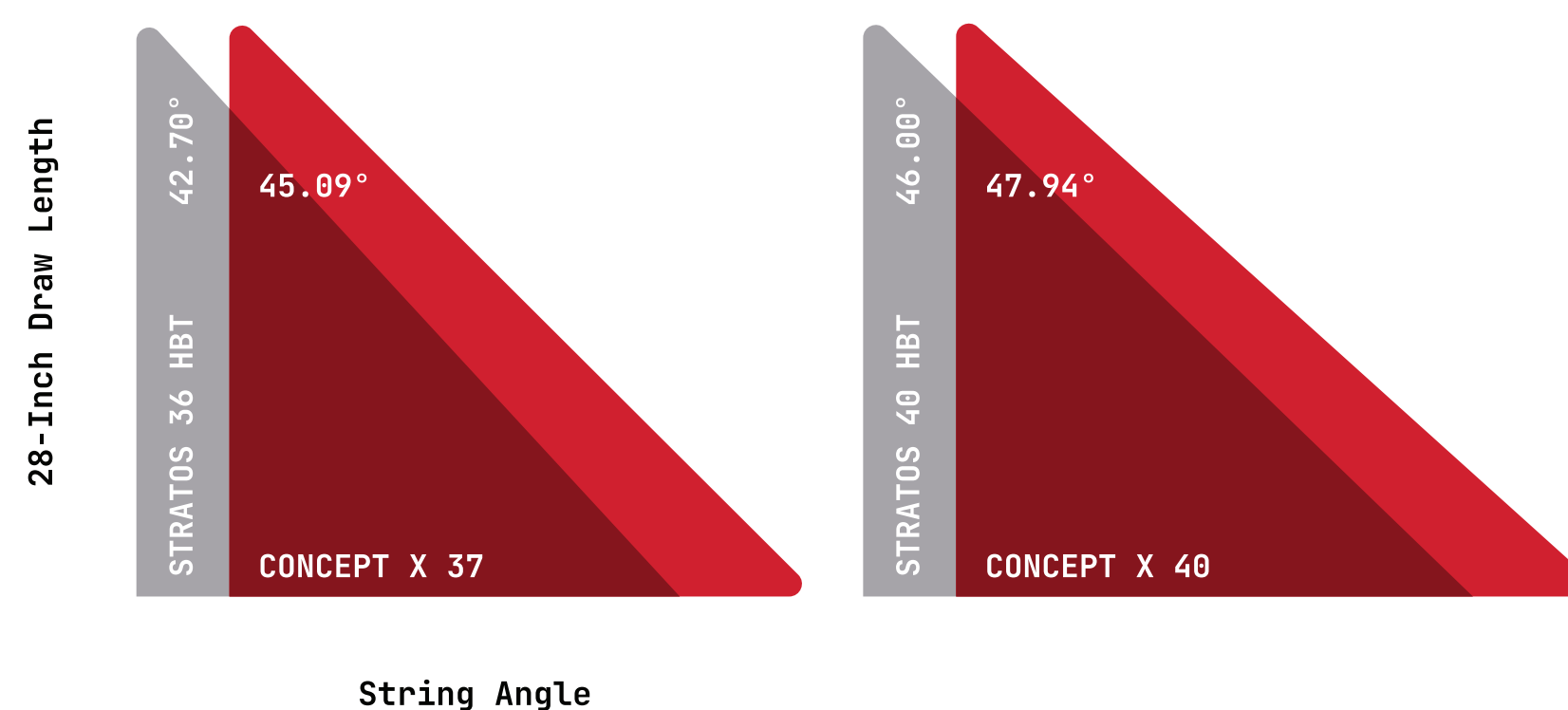
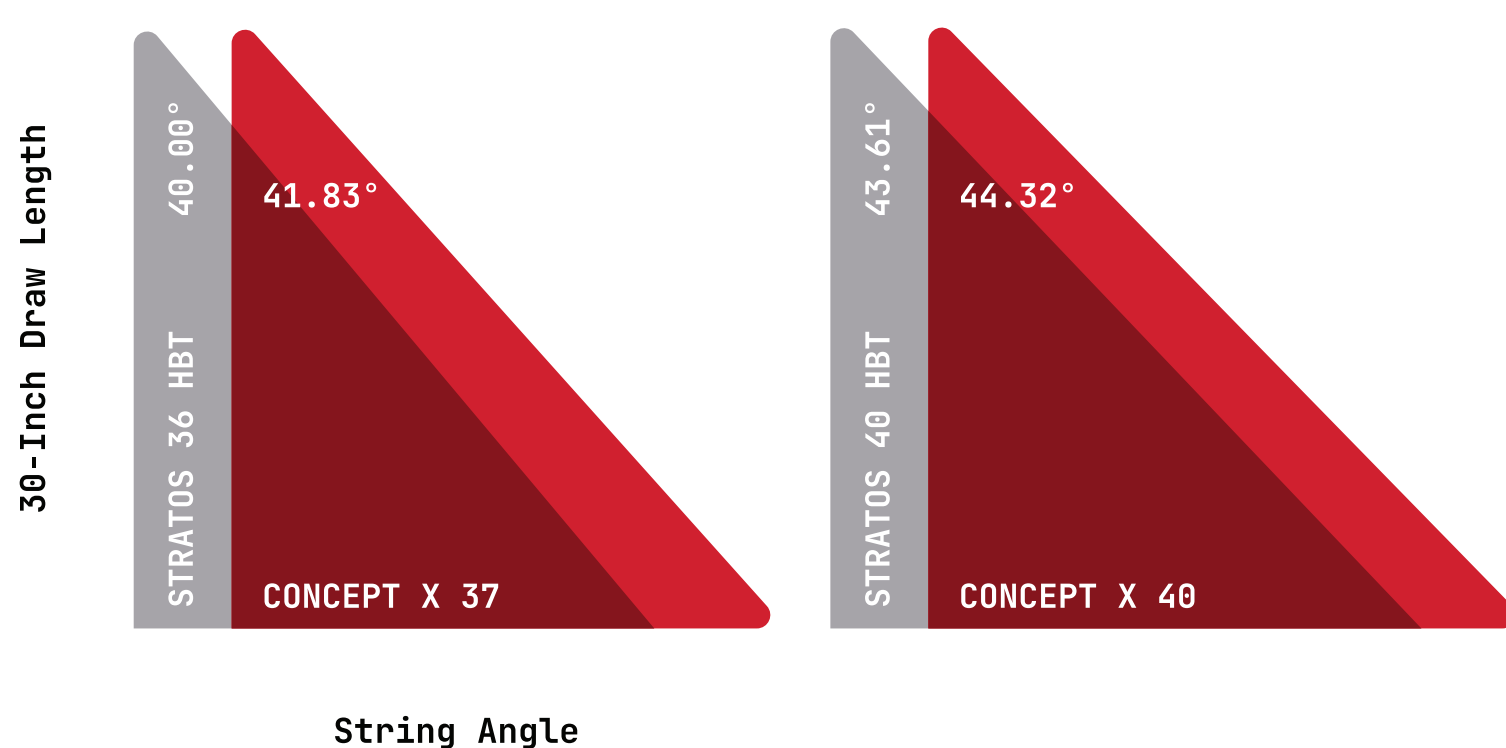
Axle-to-Axle Length

In general, longer bows are considered to be more stable. Some of this perception arises from the greater moment of longer risers and their mass distribution. Another portion of this feeling of stability and full draw comfort is generated by the larger string angle and tighter peep-to-eye distance that longer bows produce.

The Concept X 37 riser is **2.75" longer** than the riser on the Stratos 36. The Concept X 40 riser is **1.75" longer** than the riser on the Stratos 40. While the two models might have the same axle-to-axle length, the longer design of the Concept X riser maximizes in-hand stability. Additionally, total limb flex and cam size will have an effect on the string angle, which is a key component to the feel of a bow in a shooter's hands and while at full draw.

For most shooters, a larger, more obtuse string angle will be preferred as it gives a more comfortable anchor point and brings the peep sight closer to the eye.

The following data shows the improvement in string angle afforded by the Concept X design versus equivalent models in the prior generation Stratos line.



Brace Height

Brace height has long been considered to be a measurement of bow "forgiveness." While it certainly plays a factor in lock time [the time it takes to get an arrow out of the bow], it's debatable as to what the ideal brace height is.

Brace height is only one component of bow accuracy and is viewed with less importance today than it was decades ago. Designs of the past relied on long brace heights upwards of 8", attempting to increase forgiveness by masking other shortcomings such as riser twist and inadequate limb stability. Testing revealed that the brace heights across the Concept X/FX give the best balance of performance, stability and accuracy.

Longer draw length archers may prefer a longer brace height, shorter draw length archers may prefer a shorter brace height. Concept X 37 puts the brace height at a balanced **7 inches**, the Concept X 40 offers **7.25 inches**, while Concept FX shortens that to **6.5 inches** to help achieve superior short draw length performance.



Weight & Stabilization

The Concept X represents approximately **.2 pounds saved in mass weight** of the bare bow when compared to the Stratos HBT, while benefiting from a longer, stiffer riser and more torsionally stable limbs. With archers often loading significant amounts of stabilizer weight onto the bow, mass weight of the built-out bow becomes the key factor.

Understanding the relationship between an archer's strength, day-to-day condition, mass weight of the bow and overall weight distribution is key to achieving an optimal aiming pattern. Shedding weight was a priority that was achieved in the Concept X series, and many who tested the prototype felt that it was even lighter than what is reported, likely due to the weight distribution and balance of the riser design.

Lowering the mass weight of the bow has the effect of increasing the leverage effect of a given stabilizer setup, which can help contribute to an improved aiming pattern. The Concept X/FX feature a lower stabilizer mounting point. This stabilizer bushing will allow shooters to mount their main stabilizer in a very low position, dropping the overall center of gravity (CG) on a fully rigged bow. Shooters may find this extremely low CG to be beneficial by creating a plumb-bob effect of the bow, with the weight of the bow being very distant to their hands and slowing shooter inputs. While this may be ideal for indoor and outdoor target archery contested on flat fields, shooters may find that it is not ideal in field archery scenarios where

angular terrain becomes part of the game and shooters are needing to make corrections to keep the bow level in different shooting scenarios. Archers competing in disciplines requiring varying angles will likely find that the traditional stabilizer mounting location is the preferred point of attachment.

This lower position sits approximately 5" lower and 2" in front of the traditional stabilizer mounting point on a Concept X 37.



SCTR Cam System



The SCTR [pronounced "SECTOR"] cam system is the pinnacle of Hoyt cam performance and shooter customization. It is the culmination of two decades of Hoyt Cam & 1/2 technology rolled into Hoyt HB technology. The SCTR Cam design targeted the performance characteristics of the SVX cam, while offering a smoother draw and the ability to customize valley and wall feel with the adjustable module foot.

Through feedback gathered from top professionals and an application of Hoyt's vaunted engineering prowess, the **SCTR cam was created to work in collaboration with the Concept X riser design and the TXL limb system**. It provides some very key features:

- High String Tension
- Easily adjustable wall firmness
- Let-off adjustability feature from Hoyt HB systems to improve upon SVX cams
- Multiple module foot/draw stop options to allow for a change in full-draw feel to match shooter preference
- Optimization with larger, stiffer, 1/4" threaded axle system
- Cam design that eliminates unwanted leverage, reducing cam twist and cam lean throughout entirety of cam's operating range
- Split Cable harness system to enhance stability and reduce rotational translation – this gives us the most accurate shooting platform we have ever built in tightly controlled testing parameters

The success of the Hoyt Cam & 1/2 system is undeniable. That Hoyt-patented cam system produced countless victories at the highest level of competitive archery. The SVX cam was the last iteration of the Cam & 1/2 system and has been at the forefront of competition in recent years. The decision to change that system was not something taken lightly by Hoyt and its team of experienced engineers and competitive archers. However, the SVX cam had reached the limits of design improvements.

This decision has made it possible to introduce the latest innovations in both cam and limb design, including the TXL limb system from the Concept X, creating the most torsionally stiff limbs to be utilized on a Hoyt target bow; and enabling our new, larger diameter and stronger 1/4" threaded axle system.

Additionally, Hoyt also received feedback from top-level professionals who were seeking a cam that offered adjustable let-off and a full draw feeling that could be less demanding than what SVX offered. Ultimately, the SCTR cam system provides ALL archers with the best qualities of the SVX cam system, with improved bow stability, and full customization of feel at full draw.

SCTR CDM & Spec Mod Systems

The SCTR **CDM** Module gives users a **3-inch draw length range adjustment**. It is designed to cover the most common draw lengths. As an example, the Concept X 37 with a CDM mod will fit draw lengths from 26 to 29". The CDM module features ½" draw length adjustments in each position.

The SCTR **Spec** mods are a fully optimized, draw length specific version, giving the preferred full draw feel that professional level archers seek, while also providing that feel and speed efficiency across every draw length position.

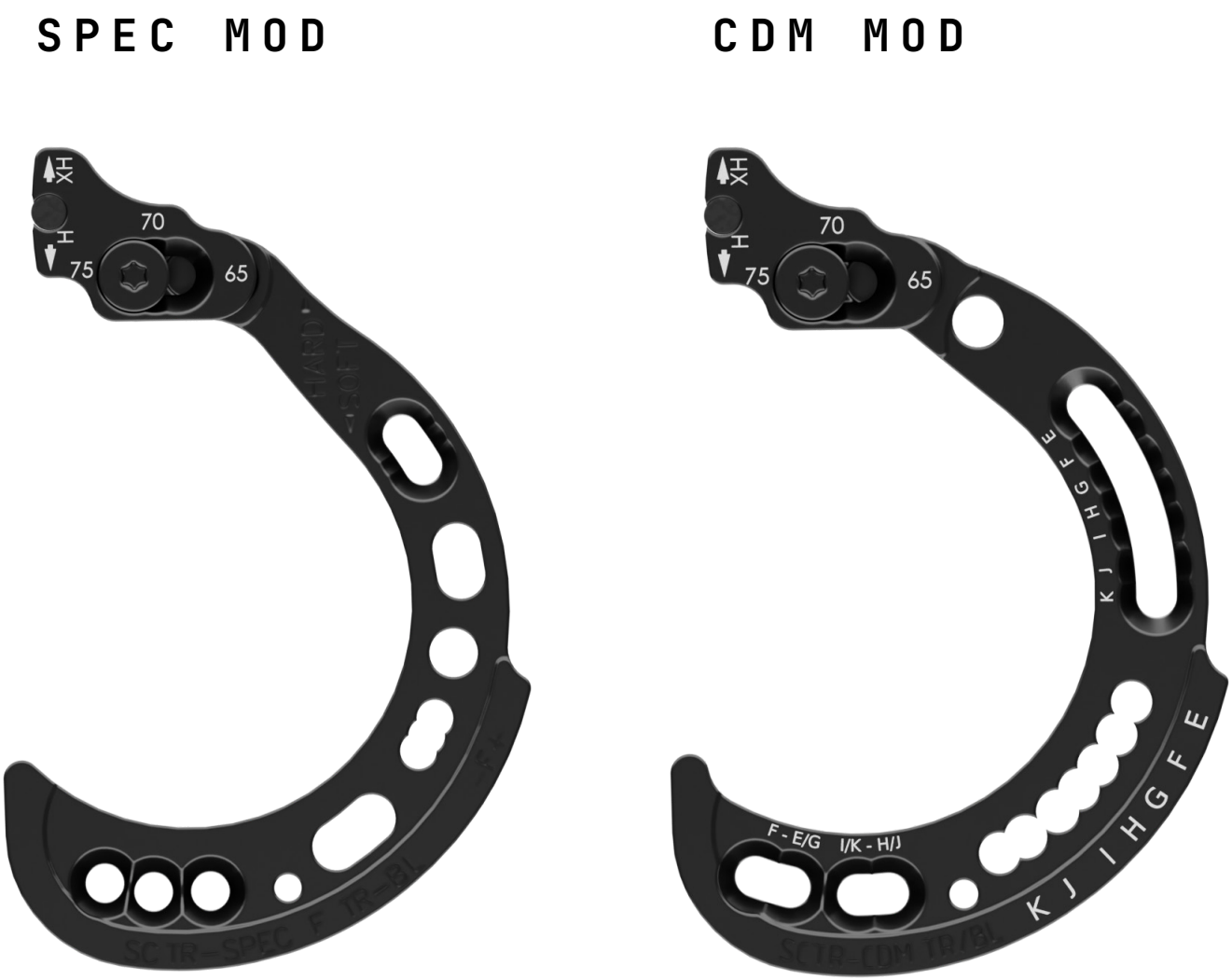
Typical rotating modules are often not as efficient as draw length specific modules, and can compromise feel during the draw cycle and at full draw. Hoyt's CDM module is specifically engineered to provide impressive speeds, building energy in the early part of the draw force curve and

providing performance that is similar to that of the Spec mods, with a feel that some shooters may prefer. With the CDM module, the speeds are very impressive, building energy in the early part of the draw force curve and only trailing the Spec mods in speed by about 5fps at worst. However, the CDM and the Spec mods do differ in full draw feel.

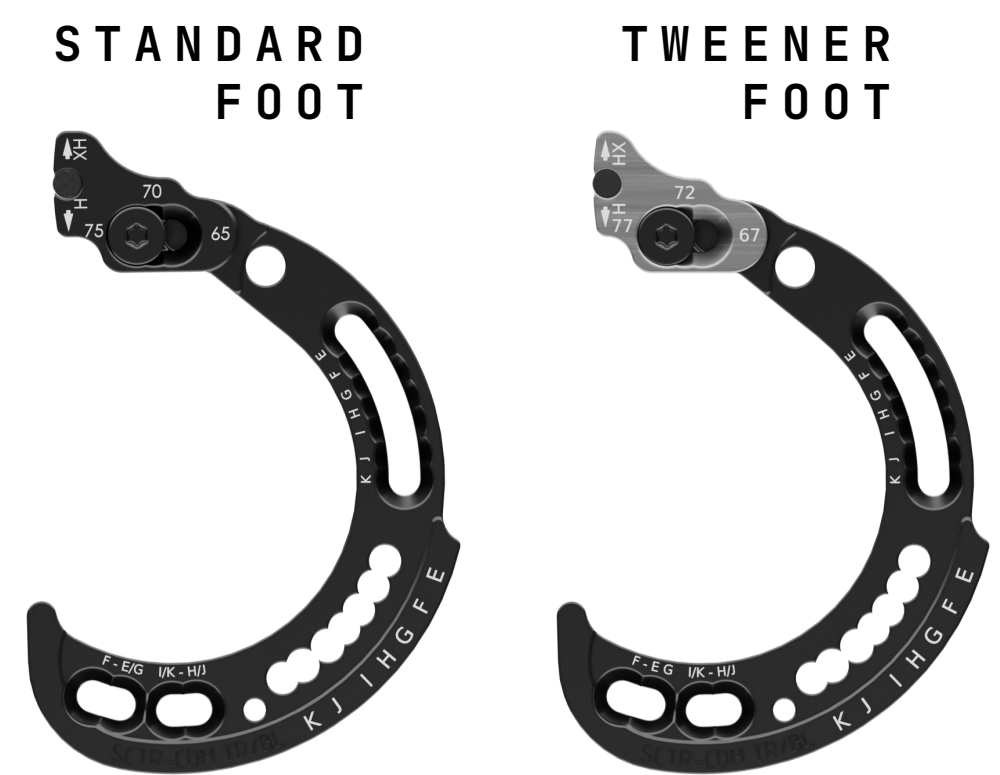
As with most everything in archery, shooter preference will be the deciding factor for those who have a choice between the CDM and the Spec mod, and those who test both will find different characteristics in each. For those who liked the SVX cam, the Spec mod will be the mod of choice. The Spec mod will have a harder wall at full draw, and a feel that is more reminiscent of higher performance cam systems that load into the valley definitively. The CDM mod will be less aggressive as it rolls into a softer wall feel.

Speed Comparison

Concept X 37		Velocity	
DRAW LENGTH	MOD POSITION	SPEC MOD	CDM MOD
31	A	335	N/A
30.5	B	334	N/A
30	C	330	N/A
29.5	D	325	N/A
29	E	320	321
28.5	F	314	315
28	G	308	307
27.5	H	303	302
27	I	298	296
26.5	J	292	287
26	K	287	282
25.5	L	283	N/A
25	M	279	N/A



SCTR Cam Let-Off Adjustment



The SCTR™ cam system makes use of Hoyt's adjustable draw stop, otherwise known as the "module foot" or "mod foot." or, as we will discuss here, simply the "Mod Foot."

All Concept X/FX™ bows will ship from the factory with a **standard mod foot that allows let-off adjustment of 65%-70%-75%.**

Available for purchase separately is a **"Tweener Mod Foot" that allows the discerning user to precisely select "in-between" let-offs of 67.5%-72.5%-77.5%.** This "tweeter" mod foot is distinct from the standard by being gray anodized (as opposed to black for the standard) and is laser engraved to indicate 67-72-77.

The SCTR Cam let-off positions delivered by either mod foot are indexed on the module and allow for easy and concise adjustments that match between the top and bottom cam. Indexing these adjustments allows shooters to easily verify that their draw stops are in matching positions, and once set, users can easily time the cams to match.

Indexing these adjustments to precise locations ensures that the draw stops on the top and bottom cams do not have a slight deviation between each other - A condition that is difficult to detect without precision measuring tools and the knowledge to use them.

The optional "Tweener" mod foot allows shooters to fine tune holding weight. The holding weight change for every 2.5% of adjustment equates to approximately 1.5 pounds when measured on a 60lb bow.

Additionally, the mod feet can be swapped between the top and bottom to change the feel of the wall. The feet are labeled as "H" [Hard] and "XH" [Extra-Hard] and flipping the mod feet from top to bottom will change changes their contact position on the cable, thereby giving shooters a firmer or softer feel of the wall as desired.

The approximate draw length change for each 2.5% of let-off adjustment is 1/16". Most archers will find that they can easily achieve a preferred feel at full draw by adjusting the mod foot between let-off positions, and/or adjusting wall feel. Advanced users with a good understanding of bow mechanics are enabled to precisely tune the bow's feel by utilizing the draw stop adjustments of the standard and Tweener mod foot, and applying micro adjustments to strings and cable lengths to fine tune draw length, valley and holding weight.

Important Note: *Let-off and holding weight numbers are something precision factors which archers should understand and note for their reference. However, it is important to remember that data which can be measured with archery scales that are available to consumers should not be treated as absolute. Hoyt's experience shows that these such scales often have great variability from one draw to the next and can easily be unintentionally manipulated to an incorrect absolute reading if a scale is not drawn at the exact same angle and with the same tempo each time.*

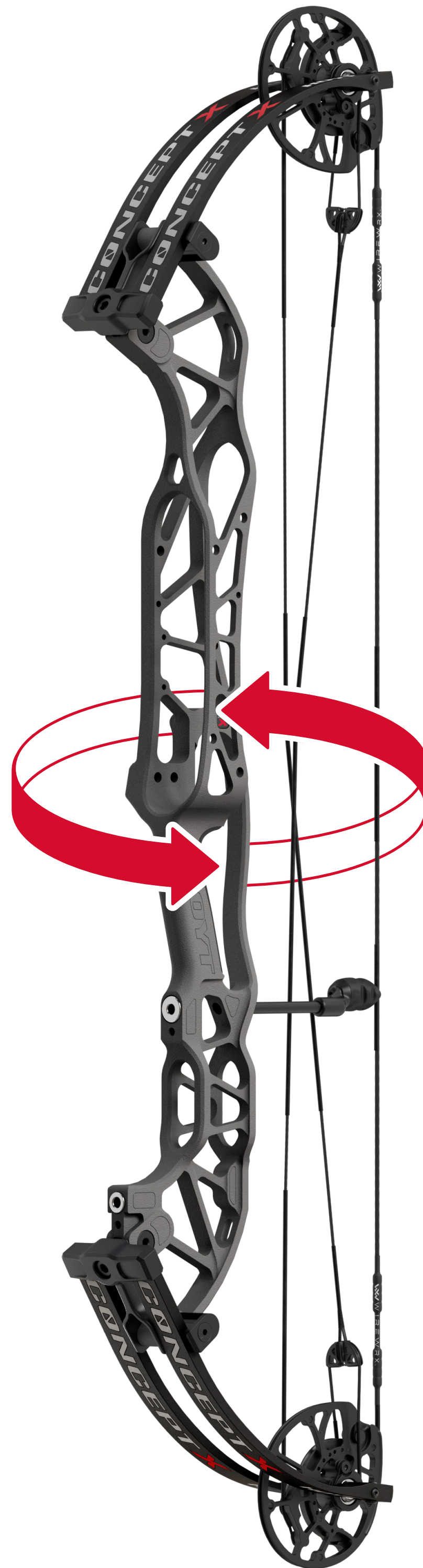
Additionally, variations in string and cable construction, serving diameters, and loop lengths can cause variations in draw length, cam timing, feel and efficiency. Hoyt Factory WireWRX™ strings and cables are specifically engineered for optimal performance on the SCTR cam system. Dimensions required for aftermarket strings and cables are noted elsewhere in this white paper.

Rotational Torque Resistance

Concept X was developed to specifically address bow alignment and the influences of rotational translation. This provides the shooter with natural alignment at full draw and less horizontal nock travel during the power stroke. Low rotational translation aids the shooter in maintaining natural bow-to-target alignment without the need to manipulate the grip or creating forces that work against the shooter's natural aiming pattern.

Addressing how the bow aligns at brace, aims throughout the shot process, and drives the arrow nock through the shot cycle improves tunability across different spines and diameters. This also yields a bow that is more natural to hold when shooting at angles, and provides a more forgiving bow under competitive pressure.

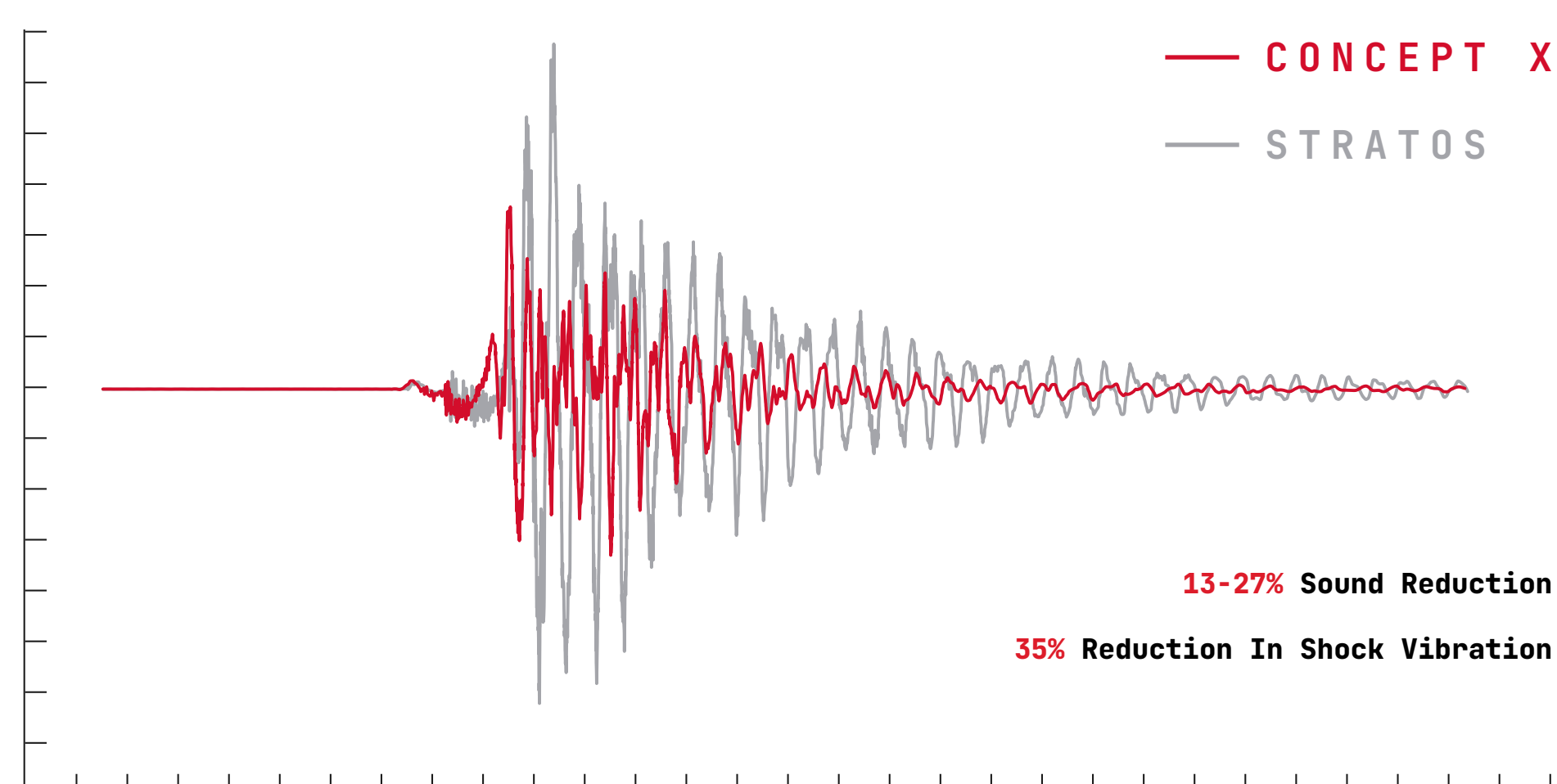
All of these accomplishments were made possible by the design integration of the Concept X riser, TXL limbs and SCTR cam system.



Shooter Experience

Concept X is the **quietest and softest shooting Hoyt target bow to date**. Shooters experience a sound reduction of 27% compared to Stratos with SVX cams, and 13% when compared to Stratos with HBT cams. The vibration has also been reduced by 35%.

This is largely accomplished due to cam and limb design, but the riser design also plays a part in reducing residual vibrations. It's important to note that the classic target bow feedback has not gone away. Shooters will still be able to get the "feedback" of their shot execution based on the feel of the bow at the shot. However, that feedback will not come with the vibrations that causes premature wear on sights, loosening of bolts and other negative experiences that are generated by bows that have excessive vibration.



Harness Specs

The SCTR cam system uses a **5-piece harness system** and includes Hoyt WireWRX strings and cables. WireWRX represents a project two years in the making, along with a significant investment in state-of-the-art string making equipment that was purpose-designed by Hoyt Engineers. WireWRX strings are designed as part of the bow system as a whole; and Hoyt bows are designed to operate at peak performance with WireWRX strings. WireWRX strings are designed to achieve maximum speed and tunability, with minimal noise and vibration, ensuring your Hoyt is competition ready straight from the factory.

It is critical to note that aftermarket string systems can often influence the speed, sound, vibration and tunability of the bow. Factors such as string material, serving material, twist rate, serving tension, finished diameters and end-loop length all play critical roles in harness function.

Hoyt's WireWRX specifications are as follows:

Material – BCY X99

String Strand Count – 28

Cable Strand Count – 28

Yoke Strand Count – 28

Center Serving Diameter Service Range - .108-.115"

End Serving Diameter Service Range - .100-.110"



Tuning Guide

SCTR cams can be tuned utilizing an aluminum cam spacer system. Below is a guide that will aid shooters in completing tuning shifts.

Note: Cam spacer configurations do not need to match from top cam to bottom cam.

It is also important to note that grip pressure, an archer's natural torque, and stabilizer bias will influence the way that a bow tunes. It is Hoyt's recommendation to set centershot at 13/16"-7/8" and use spacers to correct the paper tune as close as possible. If more correction is needed, then it can be found with arrow rest micro-adjustments.

To correct a tail LEFT tear you want to move the cam to the LEFT by increasing the spacer thickness on the right side of the cam and decreasing spacer thickness on the left side of the cam. To correct a tail RIGHT tear you want to move the cam to the RIGHT by increasing the spacer thickness on the left side of the cam and decreasing spacer thickness on the right side of the cam. (Left and right orientation is designated when looking at the cam from the rear of the bow, or the string side of the bow, not when looking at it from the front of the bow, or the riser side of the bow.)

It is best to adjust one cam at a time and test to see if the tear is corrected. If the tear is not corrected, make an adjustment to the other cam, too. If the tear still is not corrected, increase the spacing again. Continue increasing cam spacing until the tear is corrected. Always use the same color spacers on an individual cam.

The chart below is an example of how to correct a tear by swapping spacers. The large the tear, the further up or down the chart you may have to travel to correct the tear. This chart is for reference only and may not match the "baseline" or starting position of the spacers on your bow, but the concept is still the same – move the cam the direction of the tear.

SCTR Cam Tune Table

The Hoyt SCTR cam system does not have yokes to aid in tuning but it responds very well to spacer tuning. If after making adjustments to the arrow rest you still have a right or left tear, you can correct the tear by adjusting the cam spacers found on both sides of the cams. The following directions apply for both RH and LH bows:

