

# BUILDING YOUR EFOC/UEFOC HUNTING ARROW

## Summary:

This publication is written to help build a lethal hunting arrow when things go wrong. I've put together steps you need to look at and understand to build this type of arrow. Building arrows is not just buying and doing a quick tune. Building arrows is understanding the physics of it and what it takes.

I've put together what to look at, how to tune them and what you should have in the end. Some of the information is from others testing and studies, and some are from my testing and 20 plus years field experience.

In Dr. Ashby's studies he stated, **"IN BOW HUNTING THERE IS NO SUCH THING AS OVERKILL"** and **"ON A PERFECT HIT VIRTUALLY ANY ARROW SET UP WORKS, BUT ON BAD HITS YOUR ARROW AND BROADHEAD SET UP BECOMES CRITICAL"**

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# **BUILDING YOUR EFOC/UEFOC HUNTING ARROW**

## **Introduction to building your hunting arrow**

**This is an introduction on building your hunting arrow.** I will give some basic information on what to look at when building your hunting arrow. Then go into other parts of the build to put it all together for a complete and tuned hunting arrow.

When deciding on building your hunting arrow, you need to look at what you are wanting for your set up. Hunting arrows can be built as light as 3 gr. per lb. for one bow manufacture, and up to? gr. per lb. depending on what your hunting. For me and how I feel you should always look at building an arrow heavy enough to do the job when all other factors are the same.

When picking your hunting arrows, you need to look at what draw weight your shooting. This is where we see lots of mis informed archers. We have been taught by the archery world that speed is what we need. Speed is fine, but speed is not what kills. The arrow with mass is what kills. It's important that we look at draw weight, lower draw weights with light arrows and speed will not give you consistent results every time. There's an article written on the QDMA sight by Bill Badgley <https://www.qdma.com/momentum-beats-speed-lethal-arrow-hits/>. This is a good quick read. In the end of it it recaps a good list of a average weight listed as grains of arrow weight per lb. This does not mean what is required, it's just a suggestion by the writer on qdma.

6 gr. per lb. for 70-lb.  
8 gr. per lb. for 60-lb.  
10 gr. per lb. for 50-lb.

Over the last 5 years I've realized that this recommendation is a close starting point but not what I would recommend. Based on my experience and data I have collected across the industry, I personally believe that you should start at least around 7 gr. per lb. for 70lb. and at least 8.5 to 9 gr. per lb. for 60 lb. the 10.5 to 11 gr. per lb. on the 50lb. is a great starting point.

The simplest way to think about it is, you want to shoot the heaviest arrow you can, with the highest amount of FOC possible that has perfect flight, and a trajectory that you find satisfactory. But you must always have to remember physics. Heavy will always outperform light arrows. You should always try to start at the weights listed above based on your draw weight.

When designing your hunting arrow, we need to look at several things. What animal or animals we are going to be hunting. This is a factor in choosing the weight of the arrow.

Is there a certain speed you wish to maintain? For some this may be 250 fps or 300 fps. This will be up to you, and maybe speed just may not matter to you.

Total weight of arrow. Do you have the weight you are wanting? This will go with the fps, and the size of animal your hunting.

Next, we need to look at FOC. This is the balance point or center of mass of the arrow. FOC is and will help for penetration by controlling the amount of impact flex and allowing arrows to recover faster

Other ways to improve penetration without having high FOC is running arrows stiffer in static spine and using a system like the concept system by firenock.

Tip weight is another factor we need to look at. How much weight do you want up front. This will tie into the FOC of the arrow and total weight. The type and shape of broad heads also plays a role in what we need to build a good hunting arrow.

The one thing people over look are the vanes/feathers. This is what controls the drag on the back half of the arrow. Too much drag and we lose grouping at a distance. Not enough drag and we have the broad heads trying to control the shaft. This causes poor grouping at all distances.

Here is a list of twelve factors written by Dr. Ashby about designing a good hunting arrow.

## **TWELVE PENETRATION FACTORS**

### **1. Structural Integrity**

The most important factor of arrow penetration is structural integrity. If any component of your arrow fails, then penetration either completely stops or is greatly reduced.

### **2. Arrow Flight**

If an arrow is not flying perfectly, then it's wasting valuable energy that could have contributed to penetration. If an arrow impacts before it has achieved perfect flight, then energy is wasted that could have contributed to forward momentum and penetration. Perfect flight is crucial; you must achieve it no matter what the cost. Pay close attention to the other factors too though or you may find yourself shooting arrows that fly perfectly but can't penetrate well at all.

### **3. Arrow FOC (Front of Center)**

Tests have shown that EFOC, defined as 19% - 30% front of center and Ultra EFOC, defined as over 30% front of center enhances penetration from 40% to 60+%.

### **4. Broadhead Mechanical Advantage**

Long narrow broadheads have an advantage over shorter wider heads. It takes less energy to push them through an animal. That is their mechanical advantage. This is second only to EFOC and Ultra EFOC as a penetration-enhancing factor.

## **5. Shaft Diameter to Ferrule Diameter Ratio**

You'll lose up to 30% of your penetration potential if the shaft diameter is larger than the ferrule diameter where they meet. It's best to be slightly smaller in diameter than the ferrule of the broadhead.

## **6. Arrow Mass or Weight**

Heavier arrows absorb more energy from the bow at the shot and heavier arrows carry their momentum better than lighter arrows, so heavier arrows penetrate better. Bow hunters should use the heaviest arrow that will deliver a trajectory they can live with.

## **7. Broadhead Edge Finish**

Broadhead edges that have been honed and stropped smooth have a 26% advantage over smooth filed edges and a 60% advantage over the coarse "serrated" Howard Hill edge.

## **8. Shaft Profile**

On all shots, tapered arrow shafts show an 8% penetration gain over parallel wall arrow shafts and a 15% gain over barrel tapered shafts.

## **9. Broadhead/Arrow Silhouette**

Smooth transitions and slick arrow finishes greatly enhance the penetration potential of your broadhead/arrow combination. Broadhead ferrules with bumps or any irregular surfaces impede penetration, especially in bone.

## **10. Type of Edge Bevel**

Only if no bone is encountered, then the type of edge bevel ranks 10th. If bone is hit, and more often than not it is, this factor jumps up toward the top of the list. If you can't get through the bone, penetration stops. The powerful rotational force of single bevel broadheads splits bone. Single bevel broadheads regularly turn what would be a wound into a killing shot. Note: Your arrow must be of sufficient weight and strength to drive the broadhead through and withstand the forces involved in breaching the bone.

## **11. Tip Design**

In all testing where bone was encountered, the Tanto tip performed best. It resisted damage and skipped less than any other tip design.

## **12. Arrow Mass 650 grains and Above**

When soft tissue is hit, this factor is ranked last in importance, BUT if heavy bone is hit arrow mass will be near the top of the list. Heavy bone is almost impossible to breach unless you have 650 grains or better in mass arrow weight.

Dr. Ed Ashby

We have looked at an introduction what we want in our hunting arrow it's time to start choosing our broadhead, arrows, set up and tune. When completed you will have a great hunting arrow

