



# COMPOUND BOW TUNING

# PAPER TUNING METHOD

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## PAPER TUNING

The paper tuning method has been used for many years and is widely used for tuning compound bows when being shot with release devices. It is not recommended for recurve bows or when shooting compound bows with fingers.

This is because when shooting with fingers the arrow goes into a side-to-side bending action (Archers Paradox) as it leaves the bow. This bending action can give false and misleading readings when arrows are shot through paper.

To carry out this test you need a frame usually constructed of timber mounted on a tripod or similar. The frame should be a minimum of about 60cm x 60cm square and positioned usually about two metres in front of the target butt, the frame holds a sheet of paper (usually newspaper) at shoulder height.

The idea behind paper tuning is to shoot arrows through the paper and observe the tear left by the arrow. This gives immediate feedback as to what the arrow is doing and what adjustments are required.

The objective is to have a clean tear (Fig 1) or as little tear as possible, although this is not always possible. Before carrying out this test you should consider :

- 1) That your equipment has been set up correctly.
- 2) The results you obtain will directly reflect your shooting standard and ability.

This is to say you cannot expect a consistent clean tear if you have been only shooting for a short time or your score and standard of shooting is low or your equipment is not set up correctly.

To expect a consistent perfect tear you should be shooting to a consistent standard. Remember the human factor and the importance of a consistent shooting form and release when carrying out this test.

### **EQUIPMENT SET-UP**

The way in which you have set up the bow can also affect the results you obtain and can make the job of tuning easy or frustrating. You should be aware of how to set up a bow and the factors that will effect tuning. These factors can be –

- **Centershot** - Initially set up a compound bow so the arrow is positioned along the power stroke centre of the bow. This is not the actual centre of the bow but the position established by the wheel (cams) and the string.
- **Tiller** – This is the term used to describe the balance between the limbs. Ideally compound bows should be set up with an even tiller that is to say the measurement between both limbs should be the same. Once this is obtained the next step is to ensure the wheels (cams) are timed equally.
- **Wheel tuning** – Ensuring that the wheels (cams) are timed equally is the most important factor in tuning a compound bow. Wheels (cams) should be timed when at full draw. Wheel timing refers to both wheels (cams) achieving full draw at the same time. Incorrectly timed wheels (cams) will affect the way in which the bow reacts and makes obtaining a nocking point very difficult.
- **String weight** – The amount of strands and the physical weight of the string can effect tuning. The weight of accessories such as peep sight, kissers buttons and nocking points but most important the weight of any binding can also effect tuning.
- **Nocking point set-up** – Tuning involves setting the nocking point position on the string, but also the number of nocking points used and the gap between these points is important in tuning. Always use two nocking points and ensure there is adequate gap between the nocking points when at full draw.
- **Arrows rest location** – The location of the arrow rest in relationship to the bows pivot point is critical. Consideration should also be given to the vertical position of the arrow rest.
- **Release device use** – the way in which the release device is held but most importantly the way in which it is used will greatly effect tuning.

- **Clearance** – Is where the fletching, nock or any part of the arrow strikes the arrow rest or part of the bow upon release giving results that are difficult to interpret. Using spray on powder on the rear of the arrow or bow window is a good method of checking for clearance problems.

## CONDUCTING THE TEST

To carry out the test you firstly stand about two metres from the paper, shooting at shoulder height (shooting up or down can give false nocking point readings).

Only fletched arrows are used for this test.

Shoot a fletched arrow at shoulder height through the paper and observe how the arrow has torn the paper. There are a number of possible tears that can result. The tear will indicate what action should be taken.



**FIG 1**

Fig 1 - this tear indicates good arrow flight with the point and fletching entering through the same hole. This is the tear you are after and if you can perform the tear consistently your equipment is set up perfectly.



**FIG 2**

Fig 2 - this tear indicates a low nocking point. To correct raise the nocking points and repeat the procedure. If the tear still continues to indicate a low nocking point check for arrow clearance or wheel timing and repeat process.



**FIG 3**

Fig 3 - this tear indicates a high nocking point. To correct, the problem lower the nocking point and repeat procedure. If the tear continues to indicate a high nocking point, again check for clearance or wheel timing.



**FIG 4**

Fig 4 – Usually the advice is with a tear such as this the arrow is over spined and to **Increase the bow weight**.

**But before you make any adjustments consider your shooting technique may be responsible for the tear.**

**For a right hand archer this tear would indicate the tail has moved to the right upon release.**

**This can be caused by –**

- 1) **Excessive bow torque related to having too much bow hand on the grip.**
- 2) **Your bow hand is too tense particularly your thumb, always use a sling, but beware if you use a finger sling which attaches between your thumb and first finger the natural tendency with these is to tense the thumb and fingers. Try using a wrist or bow sling.**

- 3) You have face contact with the string (your draw length may be too long) creating clearance problems forcing the string off a straight path upon release.
- 4) Check arrow rest position, it may be too far out from the bow window.
- 5) You may have clearance problems associated with the arrow hitting the rest or bow window as it passes by, use the "Powder Test" to detect any arrow/rest/bow contact.
- 6) Check for clearance with your chest and armguard, if you have chest clearance problems you can –
  - a. Check your clothing is not loose and interfering with the string, particularly important in cold and wet conditions when you wear bulky clothing.
  - b. Wear a "Chest Protector" but make sure it is tight fitting and smooth and will not create further interference to the string.
  - c. You may be leaning back when at full draw, causing the string to come into contact with your clothing and chest.

Go back to the basics, look at your stance and where the pressure is on your feet at full draw.

Your body weight should be evenly distributed on both feet or with 5% to 10% more on your front foot and with 60% to 70% of your body weight on the balls of your feet and 40% to 30% on your heels.

You can even try and load up the weight on your front foot (about 70% of your body weight) at Predraw, when you draw back you will find your have evenly transferred your weight onto both feet and are now standing upright.

If you feel the problem is not associated with clearance, you can also try:

- a) Change arrows to weaker (softer) spine arrows
- b) Increase the weight of the arrow point, although this will have little effect
- c) Use longer arrows, this will change the stiffness of an arrow significantly
- e) Using a lighter bowstring or cables (less strands) which are not recommended, as a lighter string will create an unstable set-up



**FIG 5**

Fig 5 – Usually the advice with a tear such as this, is the arrow is under spined and to **Decrease the bow weight**

As mentioned above, before you try any adjustments to the bow check out your shooting technique.

For a right hand archer this tear would indicate the tail has moved to the left upon release.

This can be caused by:

- 1) Excessive bow torque related to having not enough bow hand on the grip.
- 2) Bow hand may be is too tense particularly your fingers and you may be grabbing at the bow upon release
  - a. At full draw bend your finger slightly into the hand, this removes the tendency to grab at the bow.

- b. Always use a sling, but beware if you use a finger sling which attaches between your thumb and first finger the natural tendency with these is to tense the fingers. Try using a wrist or bow sling.
- 3) You may face contact with the string (your draw length may be too long) creating clearance problems forcing the string off a straight path upon release.
  - 4) Check arrow rest position, it may be too far into the bow window.
  - 5) You may have clearance problems associated with the arrow hitting the rest or bow window as it passes by, use the "Powder Test" to detect any arrow/rest/bow contact.
  - 6) Check for clearance with your chest and armguard, if you have chest clearance problems you can –
    - a. Check your clothing is not too loose and interfering with the string, particularly important in cold and wet conditions when you wear bulky clothing.
    - b. Wear a "Chest Protector" but make sure it is tight fitting and smooth and will not create further interference to the string.
    - c. You may be leaning back when at full draw, causing the string to come into contact with your clothing and chest.

Go back to the basics, look at you stance and where the pressure is on your feet at full draw.

Your body weight should be evenly distributed on both feet or with 5% to 10% more on your front foot and with 60% to 70% of you body weight on the balls of your feet and 40% to 30% on your heels.

You can even try and load up the weight on your front foot (about 70% of your body weight) at Predraw, when you draw back you will find your have evenly transferred you weight onto both feet and are now standing upright.

If you feel the problem is not associated with clearance you can also:

- a) Change arrows to heavier (stiffer) spine arrow
- b) Decrease the weight of the arrow point, although this will have little effect
- c) Shorten the arrows but be careful this will change the stiffness of an arrow significantly, cut off a small amount at a time
- e) Using a heavier bow string and cables (more strands)

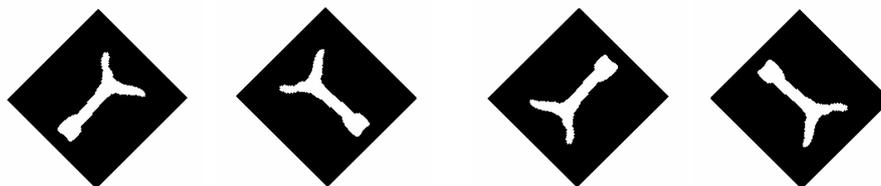


FIG 6

Fig 6 - these tears indicates a combination of problems, nocking point and arrow movement to the side upon release.

Try a combination of methods detailed above but remember clearance is the most common problem.

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