What function is required for bow?

Kyung-Rae Park

Win & Win Archery Co., Republic of Korea

In general, the capacity of limbs is measured by three factors: speed of arrow, stability and smoothness. Many manufacturers promote the fastest speed in the world, top stability and smoothness of their bows. However, no one specifies exactly what are stability and smoothness for a bow and how important they are. Little has been known about how to measure these qualities.

1) Speed of Arrow
2) Stability : ① accuracy and ② consistency
3) Smoothness

1) Speed of Arrow

Naturally, faster arrow is an advantage. If arrows fly faster, the less wind or rain influences as well as the more concentration, with fewer impacts from mistakes. The speed of arrow can be measured easily with speed gauge.

* History of archery equipment development is in line with the improvement of speed all the time. You can see how meaningful to increase 1 foot from the following chart.

Variable		Speed Increase
bow weight	1 pound increased	about 2 f/s
draw length	1 inch longer	about 3 f/s
brace height	1cm lower	about 1 f/s
string strands	2 strands less	about 1 f/s
bow length	2 inch shorter	about 3 f/s
arrow	X7(2114) to X10(410)	about 6 f/s

2) Stability

Stability is more important than speed and smoothness. Because there are many torque when shooting and the torque directly influence to arrow flight and arrow grouping. Stability can be divided into accuracy and consistency. Accuracy means the capacity to minimize error at the moment of shooting, and subtle movement of limbs and accurate balance between upper and lower limbs are important for accuracy. Consistency refers to uniformity of each shooting; in other words, capacity of limbs must be consistent during hundreds of shooting and in particular despite striking changes in temperature and humidity.

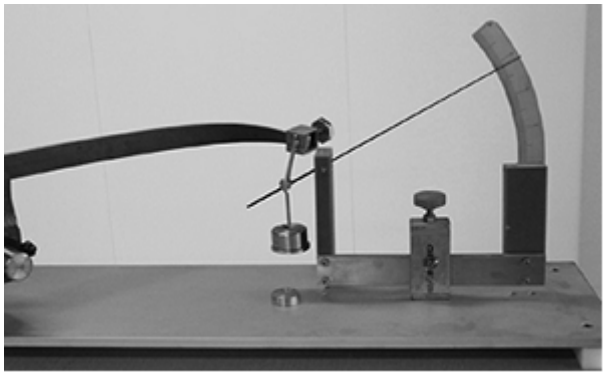
* Important factor to get stability.

① Torsional strength of limbs

The most accurate way to measure stability is to measure torsional strength. Stronger torsion results in higher level of accuracy and consistency in shooting. I will show how torsion has effects on the accuracy of shooting using motion pictures.

As you see from this picture, torsion is measured with torsion testing machine and

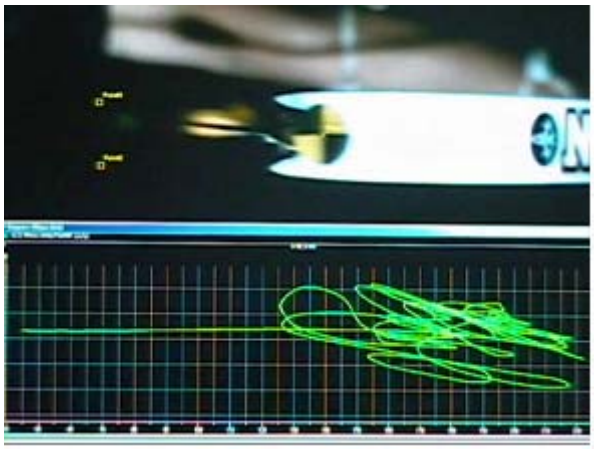
indicated with angles.



torsion testing machine

* Torsional strength gives effects on the movement of tip in shooting.

The limbs with stronger torsional strength is narrow and greatly irregular. Such movement of tip is directly related with stability of limbs. This is, of course, the movement after the arrow is left from string, but stable follow through means higher stability at the time of shooting.



The movement of the tip is directly related to that of string. If the movement of the tip is unstable, that of string will also get unstable. In his way, at the time of shooting, the string moves back and forth irregularly to a larger extent just as the movement of the limbs. For the most cases, the string hits the arm as seen in this picture.

② accurate balance between upper and lower limbs

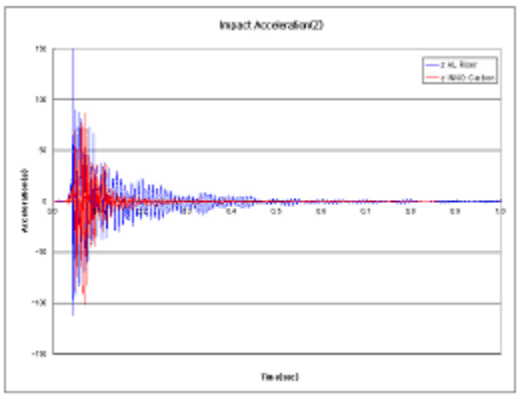
③ Stregngth against High tempruture

The weight of the limbs is decreased under the heat over 40 degrees. And tortional strength is also weacken. The best limbs has to be stability even under hot weather.

④ Stability of Riser to get bow stability.

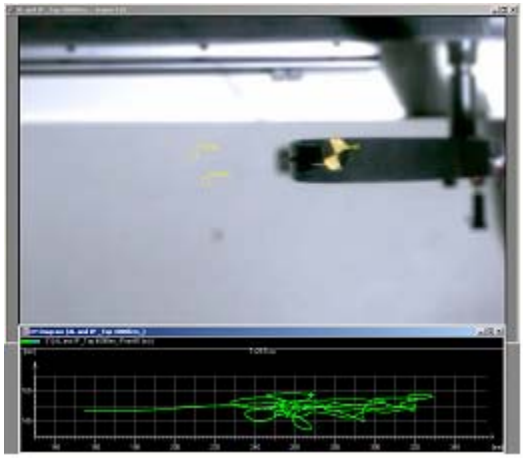
In order to get stability, riser role is important. riser is the basic for limbs movement.

ⓐ Absorbing vibration. Carbon is better at absorbing vibration. As vibration is reduced quicker, shooting is clean and stable, which makes shooting comfortable and accurate.

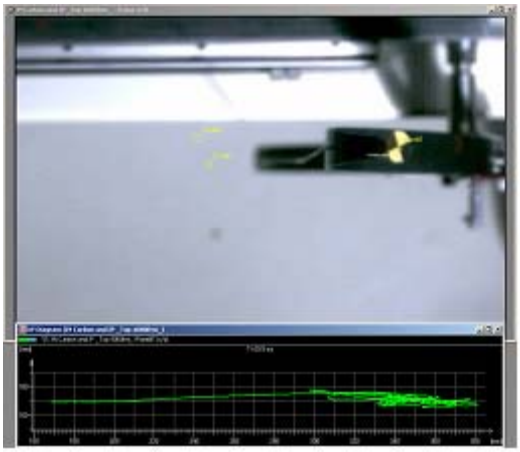


the diffrence between carbon and all riser.

ⓑ – INNOCARBON absorbs the shock effectively at the moment of the shot and makes the release clean. Finally, it gives you the confidence of feeling the shot smoothly and accurately.



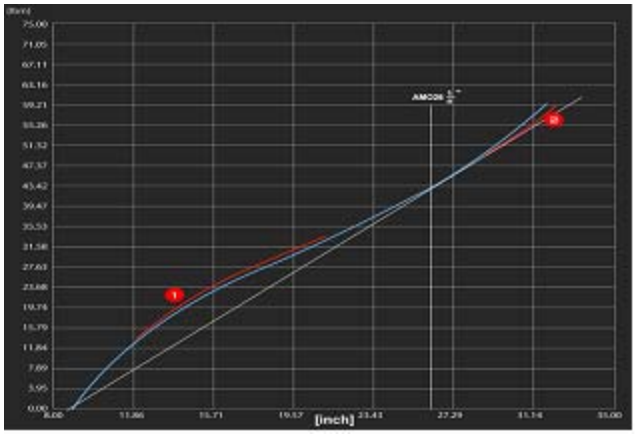
limbs movement on the all riser



limbs movement on the carbon riser

3) Smoothness

Smoothness directly relates to the feeling of shooting. Generally, when the bow is smooth, it is easier to draw the bow, aim and extend to clicker. More importantly, only when the bow is smooth, in spite of the same mistakes, the arrow is influenced relatively less by mistakes. It's more forgiving.



fx curve