

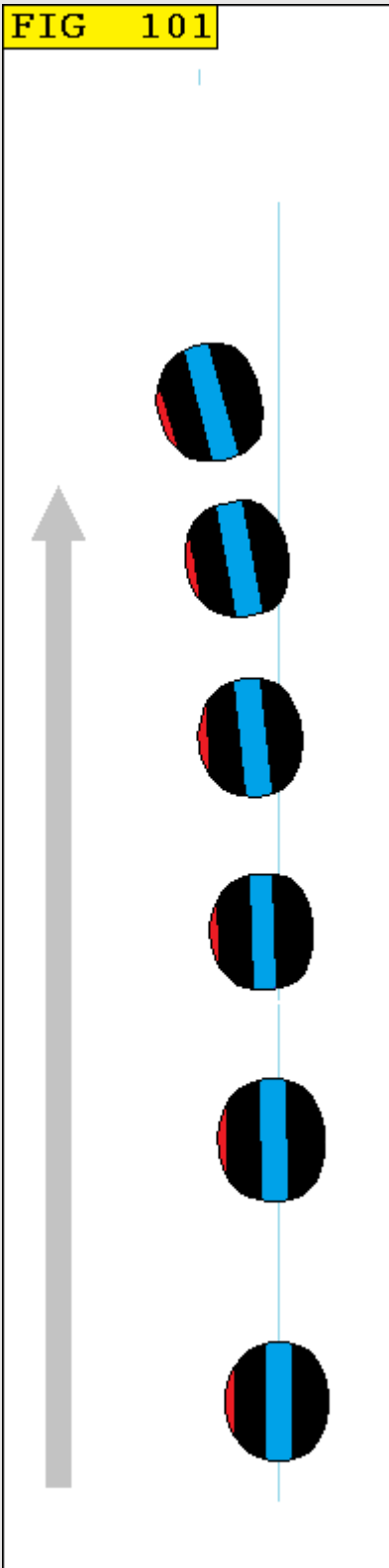
page 1

ch #04 **BIAS**

ver: 25/10/26

This chapter tells you how woods behave after they have been thrown.

FIG 101



TILTING & VEERING

A running wood tilts and veers towards the heavy side. This behaviour is called **bias**. Therefore the heavy side is called the **bias side**.

So: bias side = label side = heavy side.

When a wood is running fast it appears to run in a straight line. As it slows, it tilts further and drifts away from the line.

Orientation refers to whether the heavy side is on the L or R.

If you want the wood to veer R, the label must be on the R.

If you want the wood to veer L, the label must be on the L.

To **orient** the wood means to grip it with the required orientation,

To **change the bias** means to use a different orientation.

FIG 102



THE RELEASE AND CONTACT POINTS

The **release point (RP)** is where the wood is released when you throw it.

The **contact point (CP)** is where the wood hits the floor.

Mathematically, the position of the CP is important because it marks the beginning of the woods path. Bias doesn't start until the wood is running.

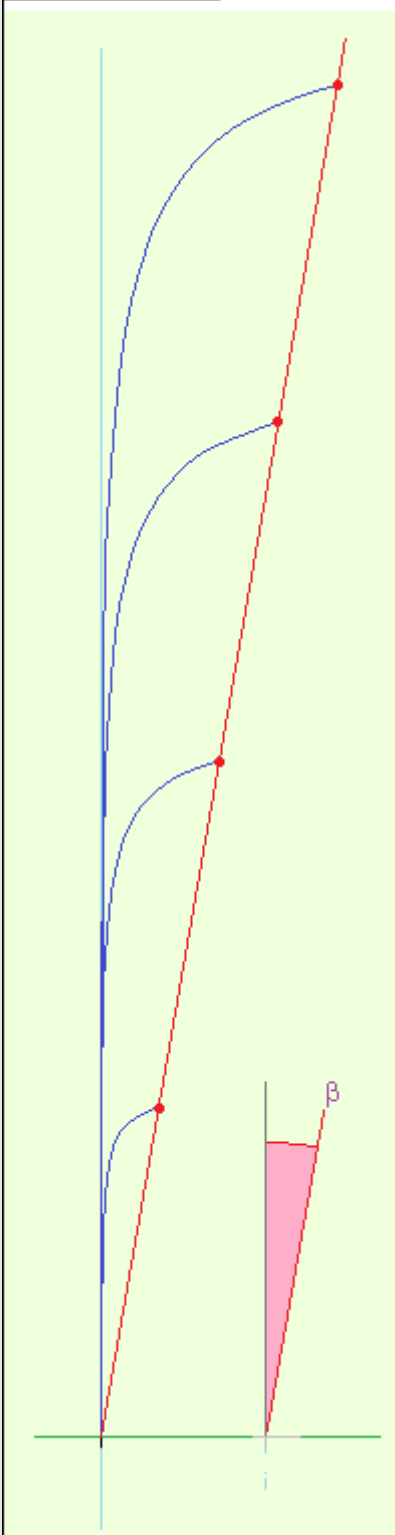
If you want to be absolutely correct, the wood behaves differently for the first few cm because it skids rather than rotates but I ignore this.

For most bowlers the difference between the RP and the CP is insignificant.

If you release the wood high above the carpet it makes a loud noise when it lands. It is considered bad form to **dump** a wood during the kata unless you find it difficult to bend down.

FIG 103

INTERNET STANDARD DIAGRAM No 1



If you search the internet to learn about bias, you will see diagrams like this. They are telling us that if you throw a set of woods at different speeds along the CL, they will come to rest in a straight line Assuming they are thrown with the same orientation. Correct.

This line is called the bias line and the angle from the CL is the bias angle which is denoted by β (beta).

NOTE

The paths start from the CP.

FIG 104



INTERNET STANDARD DIAGRAM No 2

You will also see diagrams like this.

They are telling us that if you throw woods along the bias line they will arrive on the CL.

Are woods made deliberately to not run straight ?

Yes. In fact it's illegal to use woods that run straight.

Why ?

To make the game more interesting (and difficult).

FIG 105



VARIATIONS IN BIAS

The Laws say that every wood in a set must behave the same. However, sets of woods may differ from each other.

The drawing shows three categories of bias.

Blue is **narrow**, red is **medium** and green is **heavy**.

NOTE

There is some dithering over categories. Some people put some woods in one category while other people put the same woods in another category.

The blue path is symmetrical (the 2nd half is a mirror image of the first half). This is called **mid point bias**.

The green path veers severely during the final few yds. This is called a **hook**.

The Laws say β should not be less than that of **The Master Bowl** (which is more secret than the inside of a nuns knickers).

DETERMINING THE BIAS ANGLE OF YOUR WOODS

In theory you should be able to determine β by rolling a wood down a ramp aka chute as follows:

- point the chute along the CL
- release a wood on the chute
- when it stops running, measure X and Y
- eg $X = 5.9$ $Y = 34.1$
- repeat several times
- calculate the average X/Y
- $\tan(\beta) = X/Y$
- so $\beta = \tan^{-1}(X/Y)$

eg:

- average $X/Y = 0.18$
- $\beta = \tan^{-1}(0.18) = 10^\circ$

In practice the woods start tilting as soon as I release them. Before they hit the carpet they are wobbling and then they run in various directions. I was told that the chute was the wrong shape for my woods. When I held the chute steady, I eventually got 9.6° .

A year later when my throwing was more consistent, I repeated the above by throwing (no chute) and got $\beta = 9^\circ$. Different values can be explained by change in the speed of the green.

β is not a fixed value unless the variables are held constant in a laboratory.

<eof>