

Merlin Bows
Technical Advice Sheet

Cams Or Wheels?

Can a compound bow, with cams, be as accurate as a compound bow with round wheels? Or to rephrase; as forgiving.

The consensus of opinion was always No!. And the reason this opinion was formed was based on the following:

1. Cams are always associated with hunting or 3D bows, Round wheels are always associated with target bows. The assumption being target bows, by their definition, are more accurate and forgiving to shoot.
2. Cams are put on short axle bows with reflex handles. Round wheels are put on longer axle bows with D-flex handles.

So, is it the cam that is less forgiving, or is it the combination of cams, short axle lengths, low brace heights, and the speed generated from this combination that makes the bow less forgiving to shoot? i.e. less accurate.

Cams versus wheels.

Is the cam, by its design, less accurate, or less forgiving than a round wheel? Both a wheel and a cam, excluding a Solo Cam, are designed with two string tracks. The outside and larger portion of the cam or wheel is directed to the bow string. The inner, or smaller track is designated to the internal cable; the power cables, the shape of which determines what is called the force draw curve.

Its shape influences when and how long the peak weight of the bow is reached prior to the let off. Also, the position of the axle hole within this cable track determines the let-off or lever ratio. Round wheels generally exhibit let-offs between 55-65%. Cams exhibit let-offs between 65-80%.

The outside of the cam, compared to a round wheel, always seems larger, although the shape may assume an elliptical shape as opposed to a round shape. The larger diameter is purely for the fact that the cams are put on shorter axle length bows, so the outside diameter has to be larger to let out more bow string to a given draw length. The actual elliptical shape of the cam has some, but little effect on the speed of the bow.

The inside of the cam compared to the round wheel is significantly different. Its design allows the cam to reach peak weight sooner and to last longer than the inside track of the round wheel. This design, more than anything, contributes to the speed of a bow, and in my opinion, does not affect accuracy or forgiveness, plus the added benefits of certain cam configurations significantly increases the string tension at brace.

This in some ways is more preferable than a round wheel as the tighter the string tension at brace, results in less forward string movement after the shot resulting in an arrow detaching itself from the bow string sooner.

The let-off, however, does have an effect on accuracy and forgiveness. Where we can see a perceived benefit of having a tight string tension at brace on a bow, having a higher let-off on a cam compared to a round wheel has less tension at full draw. The higher the let-off, the easier it is to displace the string during the draw and to set it outside of its natural path.

So the cam, in itself, versus the wheel is no less accurate or forgiving than a round wheel, exhibiting the same let-off.

Only when the let-off is increased and the holding weight decreased does a bow with a cam become less forgiving to shoot.