



Cam Timing vs. Cam Synchronization on Compound Bows

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Cam Timing

Definition:

Timing refers to the rotational position of the cam (single cam) or cams (dual cam systems) during the entire draw cycle especially how they are aligned at brace height and during the transition into the valley.

Why it matters:

A cam out of time won't allow the bow to store its maximum potential energy. This throws off the draw-force curve, affects consistency, and reduces arrow speed and the bow's energy storing efficiency.

Both brace height and axle-to-axle length influence how and when the cam "rolls over" during the draw. In other words, they impact when and how much energy the cams help the bow store. A perfectly timed setup (e.g., 30" draw, 60# draw weight) might store about **1.3 foot-pounds of energy per pound of draw weight** (SE/PDF). If out of time, it could only store **1.25 FP/lb**. In rare cases, a bow could store more than 1.3 FP/lb if timing is off in a way that reduces let-off significantly.

Let-off is also affected by timing. Out-of-time cams may shift the valley or let-off percentage, impacting hold and shot feel. Minor draw length changes made by twisting cables or strings often shift timing slightly as a side effect. Interestingly, a few archers **intentionally run cams slightly out of sync** for specific holding characteristics or tuning advantages.

Applies to:

- Single cam bows
- Two-cam or binary cam bows

How to check:

- Inspect **timing marks** on each cam at brace height
- Ensure they align consistently with cables or reference points

How to fix:

- Adjust control cables (twist/untwist) to rotate the cam back into spec
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Cam Synchronization

Definition:

Synchronization refers to both cams **hitting the draw stops at the same time** during the draw cycle.

Why it matters:

If cams are out of sync, one stops before the other, resulting in **verticalnock travel**, poor tuning, and inconsistent arrow launch especially noticeable with broadheads.

Applies to:

- Two-cam bows
- Binary cam systems
- Not relevant to single cam bows

How to check:

- Use a draw board to pull the bow slowly
- Watch when each cam hits its stop they should do so **simultaneously**

How to fix:

- Twist/untwist cables to delay or advance one cam to match the other
 - Start with small adjustments one or two twists at a time
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At a glance comparison

Feature	Cam Sync	Cam Timing
Focus	Both cams hitting draw stops together	Individual cam rotation & orientation
When Checked	At full draw using a draw board	At brace height using timing marks
Why It Matters	Controls nock travel & arrow stability	Affects draw cycle feel, tuning, and energy storing efficiency
How to Adjust	Twist cables to sync draw stop timing	Check bow specs - brace height & axle length. Twist cables to align cam rotation

Troubleshooting Symptoms

Symptom	Likely Cause	Fix
One cam stops early at full draw	Out of synchronization	Adjust control cables
Uneven timing marks at brace height	Cam out of time	Twist/untwist cable
Arrow tears up/down in paper tuning	Poor sync or timing	Verify both
Bow feels dumpy or stacks mid-draw	Cam timing off	Correct rotation

Final Summary

- **Cam Timing** = Rotation **throughout** the cycle
- **Cam Synchronization** = Cams finishing **at the same time**

Both must be correct for your bow to hit peak performance especially for consistent paper tuning, broadhead flight, and energy storing efficiency.

Some of the concepts in this article were inspired by the work of archery expert Dave Holt. His insights on cam systems helped shape this explanation for everyday archers.