

Surfboard Fin Design & Placement (unknown author)

Fin Design

Just like the size, shape, and material of your surfboard's fins will affect how it surfs, so too will the placement and configuration of its fins.

Just as the size and shape of your surfboard determine its agility, buoyancy, and stability, so does your fin set up affect the way your surfboard performs.

When choosing your fin placement, everything has an impact. The number of fins you use, how close to the nose or tail you place them, the angle that the fins face, the size of the fins, and how close they are together will all play a significant role in the way your surfboard handles.

Below is a breakdown of how all these factors affect your ride, and which work best in different situations.

Fin Position Relative to the Board

- Towards the nose: Fins closer to the nose will feel looser as your back foot does not dig them as deep into the water.
- Towards the tail: Fins closer to the tail of your board create more stability and hold, but are less agile. You should expect a larger turning radius when your fins are near the tail of your board.
- Loser to the rails: Fins placed closer to the rails provide less friction and sharper turning angles and reduced stability.
- Closer to the stringer: Fins in the center of a surfboard create extra drag but hold the board more stable in larger or faster surf.

The Fin Toe

The fin toe, also known as the splay, refers to the angle that your outer fins face in relation to the center fin.

Outer fins are usually "toed in", meaning the front of each side fin is facing slightly towards the centerline of your board.

Fins with greater inward angles (toe-in) will respond faster to movements and feel loose while producing more drag.

Twin fins are more stable than single fins but can feel loose in the water as the missing center fin makes deep, sharp angles such as bottom turns tough.

Twin fins are ideal for small and medium surf but will likely slide too much in larger swell.

Twin setups are primarily used on fish boards but it is not uncommon for a surfer to remove the center fin from their shortboard in search of a different experience for the day.

Fin Size: Larger fins hold in the water better as there is more friction. Smaller fins will offer more speed but feel looser.

Fin Flex: Flexible fins are ideal for fast turns but are difficult to control, while stiffer fins will respond quickly to your movements but do not allow much give.

Fin Base/Length: The longer the base of your fin is (the part that touches the board), the more drive you will feel when coming out of a turn.

Foil: The foil is the curve and width of the outer shape of the fins. The thinnest part of the foil would be at the tip of the fin and the thickest near the base.

Flat inside foil provides more balance and control while a concave inside will create less drag.

Fin Depth: The length from the base of the fin to the tip is referred to as the fin's depth. The greater the depth of a fin the more stable it will become, however, it will become harder to turn.

Short fins make quick movements easier by sacrificing stability.

It's worth reiterating that your fins are the part of your board that are in contact with the water more so than anything else.

Since fin placement and configuration is not something you can really change unless you're in the process of shaping a board, it's something you'll want to consider when buying a board or selecting one to surf out of your quiver.

The following information is meant to serve as some general starting points or rules of thumbs regarding fin placement. It is by no means intended as the ultimate source of truth.

Just like with board and fins, the best advice is to surf different equipment in different conditions and figure out what works best for you.

If you are shaping a board yourself, fin placement should be planned according to the design and dimensions of the board from the start.

Generally, you can expect different fin placement to have the following effects on a board:

- A fin cluster that's more spread out will create a larger turning radius.
- A fin cluster that's closer together will have a shorter turning radius and will pivot quickly.
- Fins closer to the nose will feel looser.
- Fins closer to the tail will create more hold and stability.
- Fins that have a greater toe angle will feel looser and be easy to turn quickly, but will also be slower in a straight line.
- Fins with more cant will also be easy to turn, but will have less drive.

Fin Placement Affects Turning and Speed

Surfboard fin placement boils down to angles and measurements – relative to the lines of the board and the fins themselves.

Generally speaking, the more “extreme” a surfboard's fin placement, the less versatile that board will be in all types of conditions.

You'll likely find that a board with fins designed for speed and drive in big surf outperforms a board with a more balanced set up, while that same balanced board is going to be a lot better in mushy, small surf, other than the big gun.

Fin Placement for Drive

A fin cluster that's more spread out and placed closer to the back of the board results in a longer turning radius and more hold.

Fin placement like this is often used for boards designed for big, fast waves and barrels.

Fin Placement for Quick Turns

A fin cluster that's closer together and further up the board will result in a looser feel with a shorter turning radius.

This type of configuration is ideal for quick turns and pivots in medium-sized surf.

Balanced Fin Placement

A more balanced fin placement strikes a middle ground between drive and pivot.

A balanced fin placement is often a good choice for your go-to board in a variety of conditions.

Common Fin Placement Measurements: A Starting Point

Below are some common measurements of fin placements. If you're making your own board, you could use these as starting points and adjust as needed.

On shorter boards with a tri-fin or thruster set up, you'll often see the fins placed as follows:

- Center/rear fin: ~3" to 3 1/2" from the back edge of the board.
- Front/side fins: ~11" to 11 1/2" from the back edge of the board.

On longer boards with a single center fin or 2+1 set up, you'll often find the center fin box placed about 5" to 5 3/4" from the tails.

Sidebites are then placed about 15-16" off the tail.

On twin fins, you'll likely find the fins placed anywhere from 6 1/2" to 10 1/2" off the tail.

On quads, the fins are often placed as follows:

- Rear fins are often 6-7" from the tail edge.
- Front fins are often 11-12" from the rail edge.

Set ups that include rail fins (2+1, thrusters, quads, twins) often have the side fins set about 1 1/4" from the rail.

Again, all these measurements depend on the intent of the board's shape, the size of the board, and the overall placement of the cluster.

Not only will you find that different fin placements and configurations will **perform better in different surf conditions**, but you'll also find different fin placements work better with different fins (smaller vs. larger, higher vs. lower sweep, flexy vs. stiff).

Fin Toe & Cant

One characteristic of a surf fin that's decided when the board is being shaped is its toe angle.

Fin toe refers to the angle the fin points towards the center of the board.

The more toe-in a fin has, the looser the board will feel through turns while adding more drag. More forward facing fins will produce less drag down the line and can build more speed.

Fish

Line up the keels with the top of the butcrack (trailng edge) and the tips. Usually around 6.5 inches up and 1 1/4 off the rail. Double foils straight up, no toe in. Single foils 2-4 degree cant and 1/8 inch toe in. Your butcrack is really shallow for a fish in my opinion. I would not put the rear edges at 3.5 inches. I would put them about 6inches up and lined up with the tips. See what happens. If it tracks too much grind them off and re-mount them. Or, with a crack like that you could put a couple of twin fins on there and a small midline trailer.