

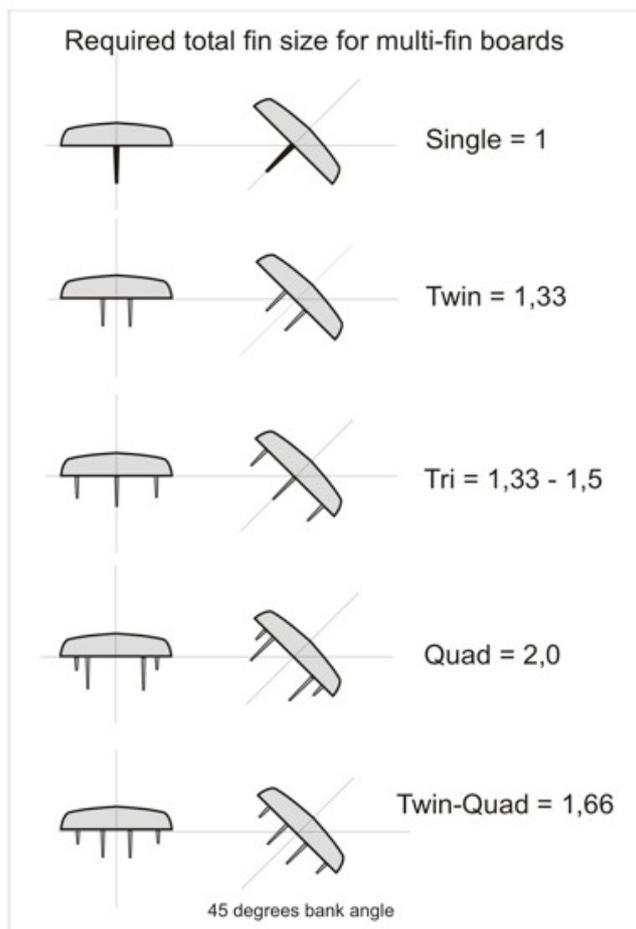


## Multi fins Area Calculation

The purpose of this article is to analyse how much fin area is needed for multi-fin boards compared to a single fin board.

Multi-fin boards have been developed by utilizing shorter fins compared to one longer single fin in order to improve agility for wave riding.

The required fin area can be illustrated by a simplified sketch showing different multi-fin configurations from the rear in a tight turn.



With multi-fin configurations, some of the fins are partially or completely out of the water and therefore not performing under those conditions.

That means the effective fin area is reduced in a tight turn. In order to be stable and avoid a spin-out, the remaining fin area must be equal to that of a single fin. As a consequence, the total fin area of any multi-fin board must exceed that of a single fin.

If we set the single fin area to one it can be illustrated how much fin area must be provided.

As an example: Starting off with a single wave fin of 22 cm with 200 cm<sup>2</sup> then the multi-fin boards need the following area:

- Twin fin board: 266 cm<sup>2</sup>
- Tri-fin board: 266 - 300 cm<sup>2</sup>
- Quad fin board: 400 cm<sup>2</sup>
- Twin-Quad board: 332 cm<sup>2</sup>

We should keep in mind that 400 cm<sup>2</sup> fin area is identical to the area of a 48 cm slalom fin!

That means that there is about twice as much fin surface area installed in a Quad fin board than normally necessary in order to improve the turning response.

The additional fin area of multi-fin boards help to improve upwind performance but provides more drag compared to a single fin configuration. Further flow-interaction between tightly-set fins reduces their efficiencies.

Further there is a mode switching, in tight turns some fins are 'out' while at normal sailing all fins are 'in'.

All these interactions will provide for some interesting developments in the future!

We will help to supply the best fins possible for multi-fin boards.