1.0 Moving the boat

In order to understand this, at first it is easiest to think of the boat and the rower as a single object. (Of course, in reality when you row, your body and the oar both move relative to the boat but that doesn't change the following fundamentals).

1.1 What is a force?

When a force is applied to an object, it changes the speed of the object (or more correctly, the velocity of the object). For example, if you were to step off a table, you would start off not moving (at zero speed) but then the force of gravity would change your speed. It would increase your speed as you fell towards the floor.

In rowing, there are two key forces that act on the boat and the rower. The first is the force of the water pushing on the spoon. This helps to increase the speed of the boat and rower. The other force is the drag force on the hull. This works against us by trying to decrease the speed of the boat and rower. These forces are shown in figure 1.0

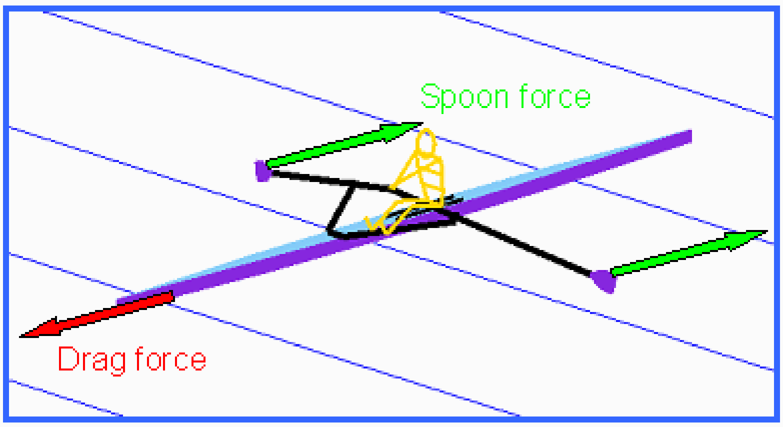

Figure 1.0 – The two key forces in rowing

1.2 The power phase

During the power phase when the rower is pulling on the blade, the force on the spoon is bigger than the drag force and the combined speed of boat and rower goes up (figure 1.1).

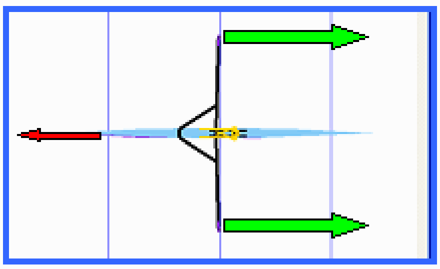

Figure 1.1 – The forces during the power stroke

1.3 The recovery phase

During the recovery, the only force is the drag force, so the combined speed of boat and rower slows down (figure 1.2).

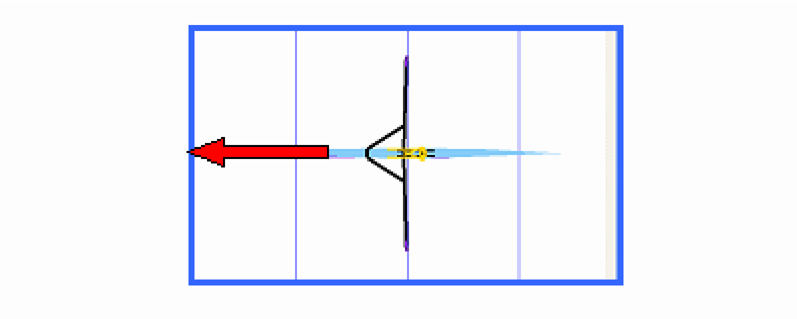

Figure 1.2 – The forces during the recovery phase

1.4 Speed variation through the stroke

This variation in speed through the stroke is shown in figure 1.3. The horizontal axis is time and the vertical axis is speed.

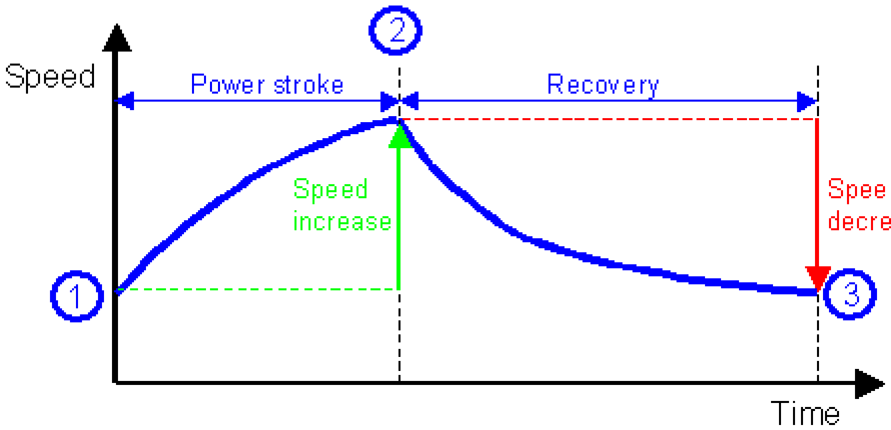

Figure 1.3 – Variation of combined speed for boat and rower through the stroke

1.4 1 The catch

Point [1] represents the catch. At this point in the stroke, the boat and rower together are moving at their slowest speed.

1.4.2 The power stroke

During the power stroke we see the speed increase.

- The larger the force, the bigger that this speed increase will be
- The longer the time that this force is applied, the bigger the speed increase will be.

[Please note. This does not mean that the ‘best’ stroke is to pull as hard as possible for as long as possible. The optimum stroke will be discussed later].

1.4.3 The finish

Point [2] represents the finish. At this point in the stroke, the boat and rower together are moving at their fastest speed.

1.4.4 The recovery

During the recovery we see the combined speed decrease.

The longer the recovery time, the more the boat and rower will slow down.

[Again, please note. This does not mean the ‘best’ stroke is at the highest rating and hence the shortest recovery time. Optimum rate will be covered later].

1.4.5 The catch of the next stroke

Point [3] represents the catch of the next stroke.

3.0 How long does the power stroke take?

To explain this, imagine that the spoon doesn’t move and the blade pivots around the spoon. (Note: This is not quite true because the blade slips at bit through the water but it is all right to ignore this for now).

In the two examples below (figures 3.0 and 3.1) we have used the same span and the same inboard length. In each case the rower’s stroke length is the same so the catch and finish angles are the same in both cases. The red boat and red oar show the position at the catch and the green boat and oar show the position at the finish.

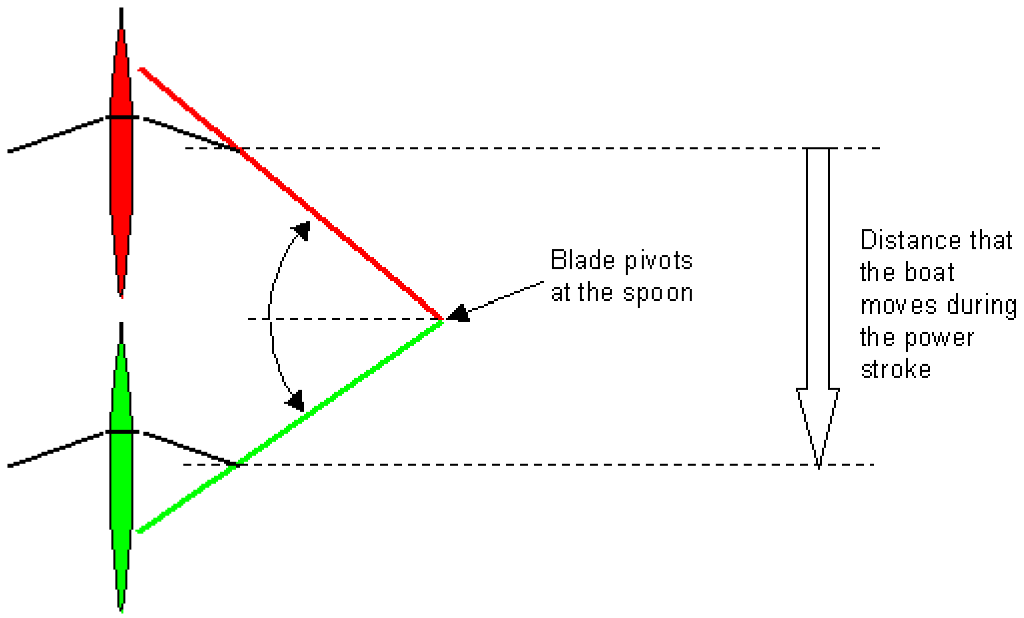

Figure 3.0 – Long outboard blade length

Figure 3.0 (long outboard length) shows how far the boat needs to move to swing the blade around from the catch angle to the finish angle. The faster the boat moves, the quicker the boat will move through this distance and the quicker the power stroke will be. Note. It is important to realise that most of the blade angle change is because the boat is moving past the spoon and not because you are moving the blade through the water. (In a typical power stroke the boat might move 5 metres and the blade would only slip by 0.5 metres).

10.1 Catch and finish blade angles

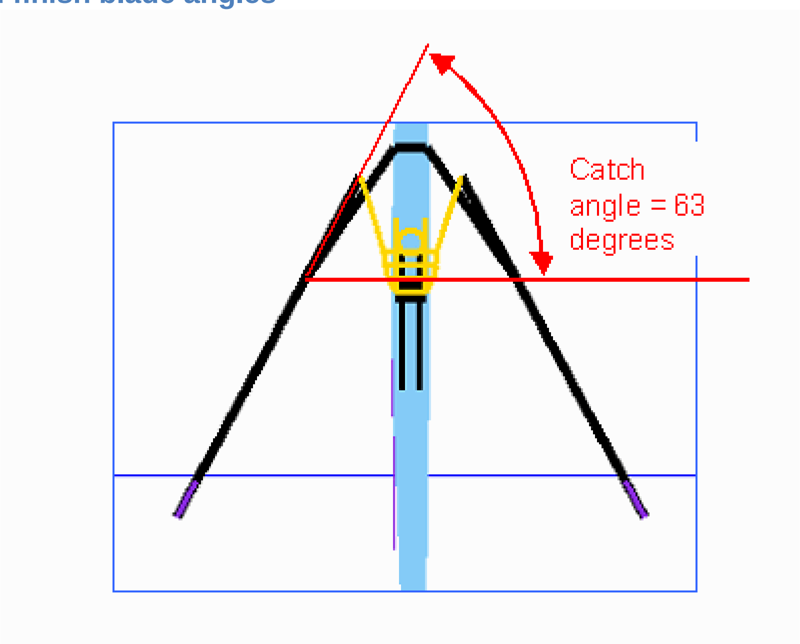

Figure 10.2 - The catch angle

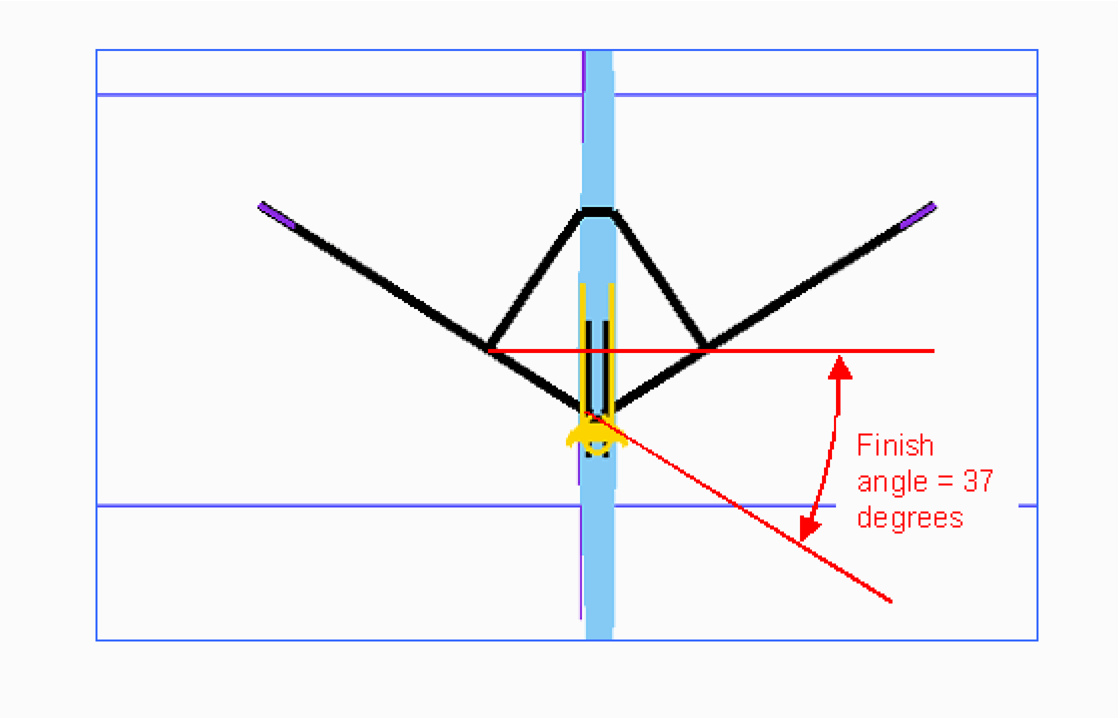

Figure 10.3 - The finish blade angle

The catch and finish angles are shown in figures 10.2 and 10.3. The total stroke angle is the catch angle added to the finish angle. So in this case the total stroke angle is 63 + 37 = 100 degrees.

Inboard span and settings

It is important to set the span, overlap and catch angle to the optimum. If the catch angle is too acute, the force expended on the catch is pushing outwards rather than away from the direction of the stroke. If the finish angle is too acute, the force expended at the finish is pushing inwards rather than sending the puddle away. Obviously, the blade moves in an arc through the stroke so there will always be an element of force expended that is not used to the optimum. Setting the boat up correctly will make maximum use of your energy expended.