3 Basic Rowing Technique

3.1 Introduction

An athlete's technical proficiency, combined with a good physical capacity, can greatly enhance the level of his performance. Although the role of technique is common to every sport, rowing must be considered a sport that requires considerable technical proficiency to achieve a high level of performance.

Many different factors are combined in rowing, but only if we understand and master the technical factors will we be able to realise the complete benefit from training.

Although the technique of sculling and sweep rowing is essentially identical, the symmetrical movement of sculling is recommended for beginners. Therefore, the Basic Rowing Technique section of the FISA Coaching Development Programme Course presents a basic description of sculling technique.

There are many possibilities for defining a particular technique. The system presented is one used by many countries around the world.

3.2 Why technique?

It is of little value to develop strength, endurance and other physiological capabilities if these qualities cannot be used to increase the speed of the boat. As stated in the introduction, a benefit from training that increases the speed of the boat is realised when the athlete understands and practices an effective rowing technique.

3.3 Physical laws

When analysing rowing, we observe that the movement of the athlete and the boat are based mainly on physical laws that are the foundation for any discussion about rowing technique. The goal in rowing is to have the athlete, the moving power, propel the boat through the water.

In other types of boats the moving power can be a sail or a motor. Continuously turning a propeller or filling a sail provides the power. In rowing, the moving power is determined by the athlete's physical capacity of the level of technical proficiency.

In rowing boats, the propulsive force is supplied intermittently because the oar is both in the water, with force being applied, and out of the water, with no force being applied. During the stroke cycle, the athlete is moving forwards and backwards on the sliding seat creating positive and negative forces.

The positive force causes the boat to advance forwards and the negative force causes this advancement to be hindered (figure 1). This fact compels us to concentrate our efforts to increase the influence of the positive force and to limit, wherever possible, the influence of the negative force.

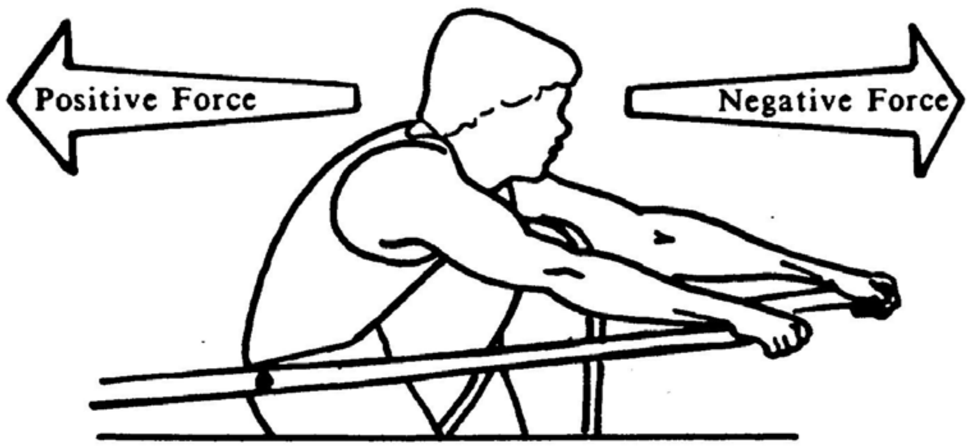


Figure 1 – The directional forces of rowing

3.4 Dynamics of rowing

To understand how these forces are working, we can study diagram 1 to examine the velocity changes of a competition boat during the stroke cycle. These curves are the result of a study conducted by Wenzel Joesten of Berlin who analysed a film of the boat's movement and the athlete's technique.

1. Velocity of the boat (curve a)
2. Acceleration of the boat (curve b)
3. Bow and stern pitching (curve c)

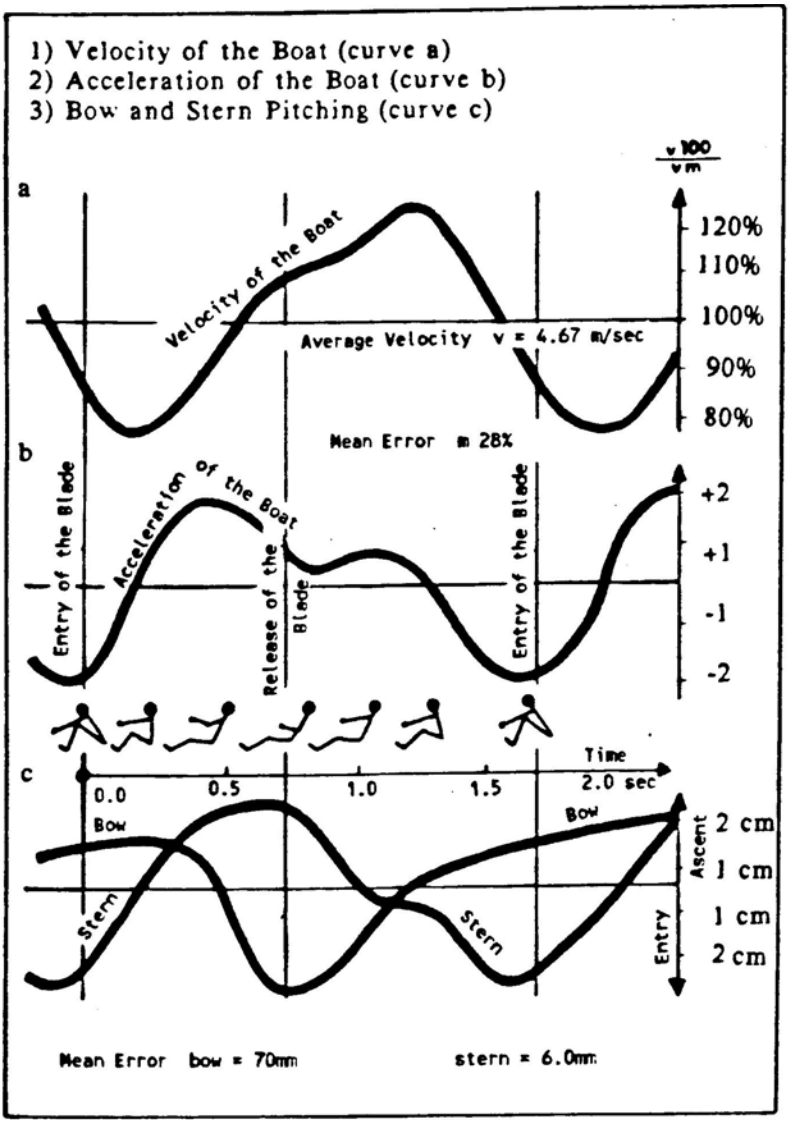


Diagram 1 – Analysis of a competition rowing boat

The curve of velocity in the diagram (curve a) is the most interesting for it demonstrates the velocity variation of the boat during one stroke in relation to the average velocity. We can use this curve to analyse the technique of a good or a bad crew. A good crew has less variation from the average velocity while the characteristic of the curve does not vary.

The curve of acceleration (curve b) shows the acceleration of the boat. The boat attains the greatest acceleration during the drive and the least acceleration during the recovery. The stick figures located below curve b demonstrate the athlete's position during the stroke cycle and in relation to time in seconds. The curve of pitching (curve c) in the diagram demonstrates pitching, the longitudinal oscillation of the boat. There are two curves, one indicates the bow movement and the other shows the stern movement.

3.5 Mass + movement = force

Our analysis will now be focused on curve a, the curve of the velocity variation, and on the stick figures of the athlete during the stroke cycle as they both appear in diagram 1. As you can observe in the diagram, the maximum velocity is achieved immediately after the extraction of the oar from the water and the minimum velocity immediately after the oar has entered the water. To explain the observations of maximum and minimum velocity, we must examine the athlete's movement from the extraction of the oar to the entry of the oar in the stroke cycle. During this period the athlete's body weight moves from the bow to the stern (figure 2). For example, in a men's eight-oared shell with an average weight of 85kg per athlete, there are 680kg of mass in movement.

If we now consider the formula MASS + MOVEMENT = FORCE, the question must be raised: Where does this force go?

When the new drive starts, the mass in movement towards the stern has to stop and change direction and, at this moment, a large quantity of force is produced which opposes the velocity of the boat. This negative force is transmitted to the boat by the foot stretcher (see A in figure 2). In the release, the opposite occurs. The body mass is inclined towards the bow of the boat and this allows a free movement of the boat with a minimum of resistance.

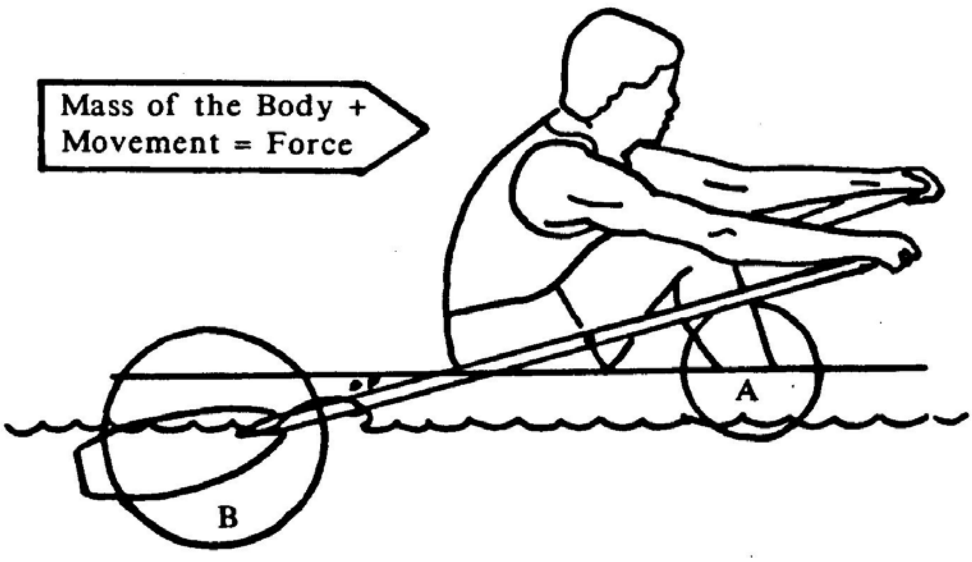


Figure 2 – Points of contact

The only way to reduce the influence of the negative force is with a proper entry of the oar to the water (see B in figure 2).

Remember, one of the purposes of good technique is to limit the effect of the negative forces. Here we can clearly observe the difference between good and bad crews. It is not an exaggeration to state that the most important point of the stroke is the entry. With a direct entry (the oar must enter the water before all the force is pushing on the foot stretcher), we can reduce the influence of the negative force by transferring that force to the blade.

However well the entry is performed, there will always be some negative force and we will always have the lowest velocity immediately after the entry. Our objective in improving technique will be to reduce the variation in velocity.

This effect of interaction between negative and positive forces is repeated between 220 and 250 times within the 2,000m race distance. A small loss of velocity during each stroke will result in the boat having a lower average velocity and covering less distance per stroke. For example, a reduction of 5cm per stroke in distance travelled multiplied by the number of strokes in a race, results in a loss of about 12m5 over 2,000m.

3.6 Phases of the stroke

We will now examine, one by one, the phases of the stroke cycle and provide technical explanations based on the effectiveness of the various movement possibilities. There are various possibilities for technique; the one we are presenting is a clarification of the movements that is relatively easy to understand.

Preparation

It is important that the athlete utilises his total height in a natural position and that he does not push his shoulders ahead too far assuming an unnaturally forced position. The angle of the body (approximately 45 degrees) allows the adequate use of the slide and is ideal for the transmission of the leg force to the stroke (figure 3).

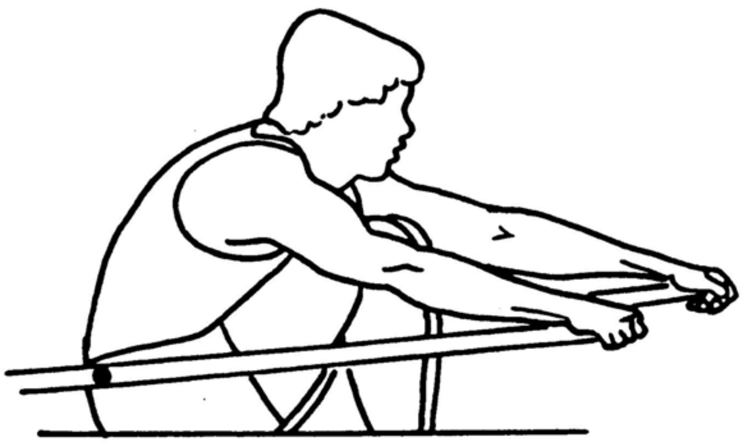
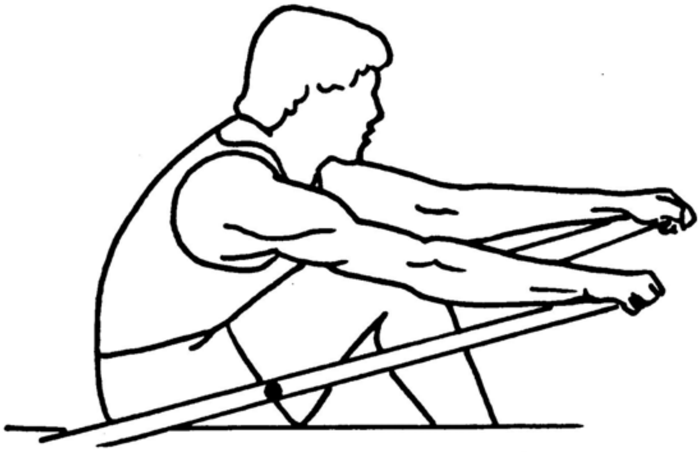


Figure 3 – Preparation

Entry and first half of the drive

During the entry the body weight is transmitted to the foot stretcher using the force of the legs; this is especially noticeable in this first phase of the stroke. At the same time, the athlete is actively utilising the other body muscles to produce efficient work in the water (figure 4).



4 – The entry and first half of the drive

Finish of the drive

In relation to the muscular force, the first half of the drive is relying primarily on the legs. Further in the drive, the back muscles enter into action and, towards the end, the shoulders and the arms.

It is important that the body weight is utilised at all times and that the work is transmitted to the oars (figure 5).

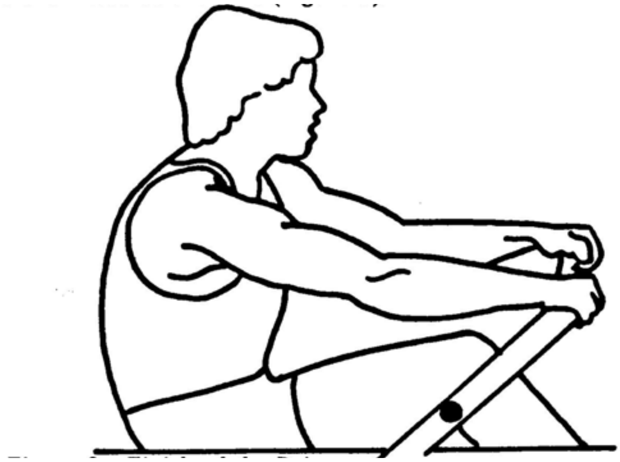


Figure 5 – Finish of the drive

Finish and release

As described for figure 5, the shoulders and the arms close the drive. During this part of the stroke it is important to always keep the body weight behind the oars to achieve the maximum effect at the finish of the stroke (figure 6).

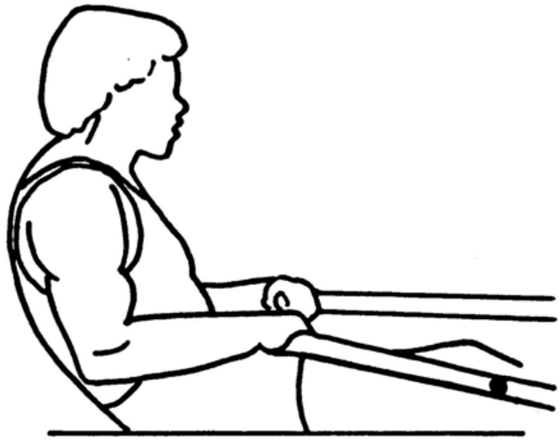


Figure 6 – Finish and release

First half of the recovery

In the recovery, it is necessary to think that the hands are directing the movement by quickly and fluidly pushing the oars away from the body after the release.

The movement that follows starts when the arms are fully extended (figure 7).

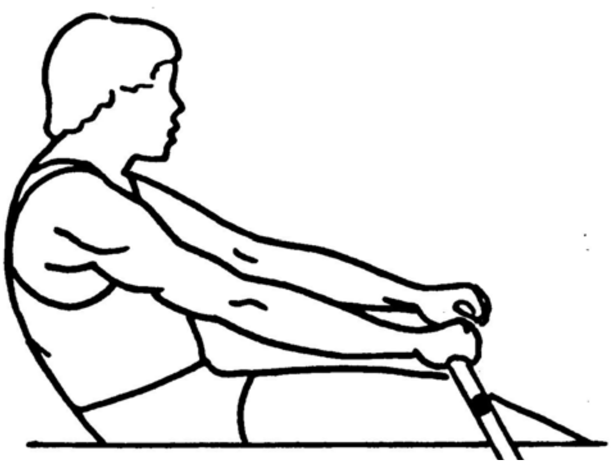


Figure 7 – First half of the recovery

Second half of the recovery

While the hands continue to advance, the upper body starts fluidly to lean forward until it reaches the correct position of the entry (45 degrees). When the arms are extended and the upper body is in the entry position, the athlete starts moving the seat forward to initiate the new stroke (figure 8).

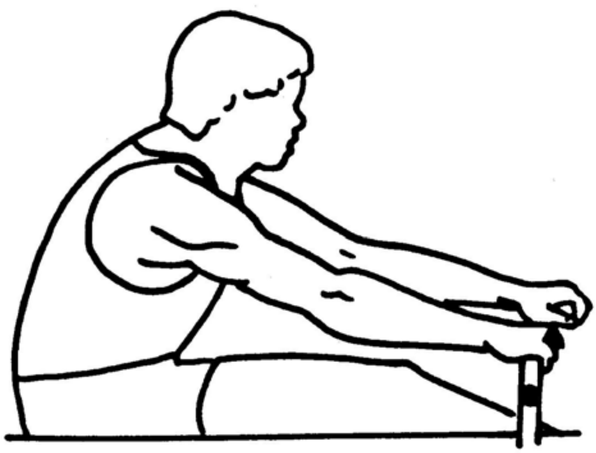


Figure 8 – Second half of the recovery

It should be noted that, in the sculling movement, the FISA Coaching Development Programme recommends the adoption of a standard hand position with the left hand in front of the right hand during the drive and recovery.

3.7 Summary

This analysis is technical and, in practice, all movements have to follow each other in a fluid, continuous cycle. It is extremely important that the upper body is properly prepared for the next stroke before the seat begins to move forward.

As stated in the introduction, the technique of sculling and sweep rowing is essentially identical, though the asymmetrical movement of sweep rowing does require an adaptation of the body to the movement of one oar. This adaptation will be discussed in Levels II and III of the FISA Coaching Development Programme Course.