Beach Sprinting

Coaching Manual 5th Edition

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Beach Sprinting Technique

Beach sprinting is a highly complex movement that integrates both the upper and lower body in perfectly timed sequences. Running involves a cyclic movement of the legs underneath the hips. One leg is working through landing, support, drive and release phases whilst the other leg is rotating or cycling in the air. Whilst this action occurs, the arms act to counter balance the leg movement. As the right leg is 'cycling' towards landing, the left arm is swinging from shoulder back to the waist enabling the body to remain straight and stable. As the left leg is 'cycling' towards lifting the right arm is swinging from waist back to the shoulder enabling the body to lift off the ground and remain straight and stable.



Basic Technique Checklist

- □ Running tall
- □ Relaxed with no undue tension in the body
- □ Head alignment with body and spine
- □ Arms and shoulders relaxed
- □ Body weight balanced and leaning slightly forward
- □ Knees tracking straight ahead
- □ Feet pointing in direction of travel

Body Position

- □ Trunk tall
- □ Shoulders steady and relaxed avoiding any twisting action

Arm Action

- □ Arms are held at approximately 90°
- □ Hands held loosely and no clenching pressure
- □ Arm drives upward and forward as opposite knee is driven upward and forward
- □ Hands should drive upward until arm swing is about eye height
- □ Bring arms back behind waist on back swing
- □ There should be no shoulder swing contributing to arm action

The coaching of the beach sprint should be broken down into four sections for ease of learning and coaching. Each section can be coached independently but should be related to each other part in a linear fashion. The four sections of the beach sprint are start, acceleration, sprint and finish.

Running Action

The sprint phase is the body of the race; having achieved maximum velocity from the acceleration phase it is now time to hold that speed as long as possible. The secret of sprinting is simple. The athlete should be lifting their foot over the opposite knee level and driving it back to the ground as quickly as possible. Teaching athletes to do this in the fastest and most efficient way is the job of the coach.

As a coach you need to be using the 'sprint keys' such as running tall in a relaxed and efficient manner. Sprinters need to keep the head and spine in line with the shoulders, relaxed and kept square to the body to avoid twisting.

The arms should be used as levers to assist the sprint in both lift and drive. They should be driven forward and up from the recovery position (wrists beside the hips) with the hands lifting as high as the eyes. The arms should not cross the centre line of the body in a straight sprint when viewed from the front. Equally on the down stroke power should be exerted in a

controlled manner to propel the body forward but must stop as the wrist draws level with the hip. If the drive does continue past this point the forces will reverse the moment arm changing from a power stroke to a braking motion. Likewise the forearm must not extend from the elbow at this point toward the rear of the athlete, this extends the lever and creates a retarding long lever motion behind the runner rather than allowing the forces to move forward or at least in equilibrium.

The hips must be carried high and not allowed to be tilted forward; this will drastically alter the geometry of the stride. As a coach, awareness of the tell-tale 'smile' when viewed from the front is paramount in recognising this tendency to tilt the hips. Beach runners (both male and female) when running in briefs or bathers will display a 'smile' at the waistband level, lower in the middle and higher on the hips if the hips have been tilted forward which will cause the stride pattern to be shortened. This tendency is overcome with an increase in core body strength training and maintenance of a tall running style that in turn will maintain the 'spine line'.

By maintaining this tall running style and high hips, the legs are able to both piston up and down efficiently and maintain the optimum stride length. This will provide for efficient 'stride flight' or the height and distance over the ground each stride drives the body forward.

The Stride Pattern

Coaches need to be aware that there are only two ways to increase the speed of a sprinter once optimum style and form have been adapted to an individual athlete. These two factors are stride frequency and stride length.

Stride Frequency

Stride frequency is simply the rate of turnover of the legs. It is generally scientifically accepted that the human body cannot turn over the legs at a rate higher than 5.5 cycles per second. The average leg cycle speed for an elite beach sprinter is 3.5 cycles per second so there is plenty of room for improvement and should be part of the coach's long term plan for their athletes. Stride frequency improvements are by definition small and take a long time of building strength and power as a base for the proposed increased in speed.

Stride Length

Stride length improvement is the easiest way for a coach to push athletes forward quickly. It is a simple and easy fix to a shortened stride but does risk overlooking more serious flaws such as hip tilt or lack of flexibility. The difficulty arising from stride length extension is that it is extended too far. Encouraging athletes to 'kick forward' at the knee to extend stride can also alter the geometry and increase inefficiency in the stride.

When working on increasing stride length coaches must be aware of the scientific rules of foot placement in relation to the centre of both weight and gravity. It is important that the front foot (drive foot) on each stroke does not strike the ground more than marginally in front of the hips. This will induce a braking force as forward motion is retarded until balance is restored and the body and centre of weight has passed over the strike point of the foot and the pulling action takes over to draw the runner forward.

Stride Recovery

The recovery leg (back leg) needs to be done in an efficient manner that is close to the body. For the coach this means that awareness of the positioning of the rear leg and reduction of its effective length by retracting the lower leg into the top of the leg by bringing the heel close to the buttocks (as in butt kicks) is required. Then use of the quadriceps to recover the leg forward to the high knee position at the top of the drive stroke where the foot is in a position to be driven down under the hips again.

Because of the need for speed of recovery and drive the foot needs to be 'un-retracted' as it passes the opposite leg so the foot will be in a perpendicular position to the upper leg ready to be immediately driven down impacting under the hip again.

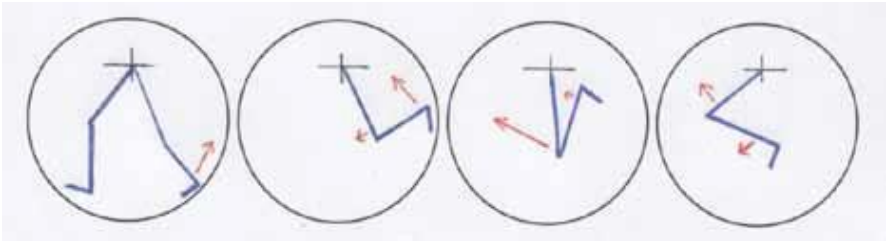


Fig 3. Recovery cycle.

Diagram 1- the leg moves back at the end of the running stride. Diagram 2 -the heel is retracted up toward the buttock to shorten the effective leg length. Diagram 3 -the quadriceps recovers the leg forcefully and quickly forward. Diagram 4 -as the knee approaches the height of the drive stroke the lower leg begins to open up in preparation for the drive downwards.

Speed Endurance

Coaches need to be aware that the velocity (forward speed) of the sprinter will diminish from the end of the acceleration phase (maximum velocity) to the finish of the race. Sprinters must be coached to be able to endure this section of the race with the minimal loss of speed. In essence the winner of the race is the one that slows down the slowest.

Sprint – Running Form:

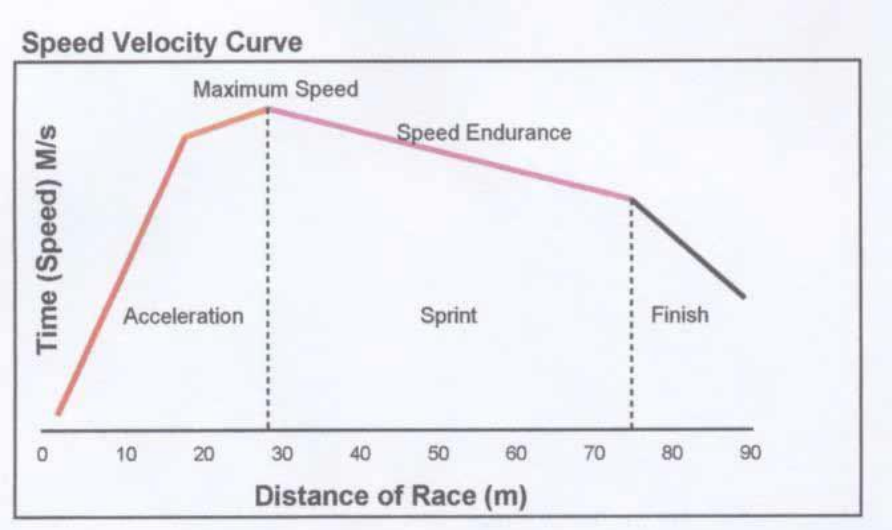


Fig 4. Speed Velocity Curve

Demonstrates the various phases of the race and relative speed demands placed on the sprinter.

It is imperative that a sprinter maintains their form the entire distance of the race and does not let fatigue cause a decrease in their technique.

Summary Checklist

- Body lean: body weight forward of the driving leg
- The athlete drives behind the body
- The front knee is high to allow the drive off the back foot to be completed
- Run tall – hips high and in
- Vigorous arm action co-ordinates with leg drive
- Head is steady, eyes forward, shoulders square, chin in

Drills

Drills should be programmed into the warm up of each session. As well as working on technique, the coach can assess the fatigue level of the athlete. Depending on fatigue levels, the coach may need to alter the session, particularly speed training if the athlete is tired.

- Striding: the practice of applying a push or 'drive' to accelerate the body smoothly. Strength is used to develop and increase leg speed during the stride action and can be trained through activities such as down hill runs. Stride strength training should be trained when the body is fully rested and not after sessions working on the development of drive strength (i.e. weight training, plyometrics).
- Standing arm swings: stand with legs slightly bent and practice the arm swing used in running. The wrists should be shoulder high on the upswing and drive back to the hip on the back swing.
- Seated arm swing: sitting on the ground, practice the arm swing at slow, medium and fast speeds. This teaches an athlete to 'feel' the power of the arm swing by generating enough power to 'pull' themselves forward along the ground.
- Butt kicks: jogging slowly bring the heel of the foot upwards, trying to touch the buttocks and return them back to the ground.
- High knees: running slowly, lean forward slightly and lift knees aiming for a high hip and knee position.
- Ankle skips: the ankles are cycled quickly over and in front of the other one at a time
- Pawing (slow, fast): from a supported position balanced on one leg the other foot moves out in front and snapped back onto the ground in a pawing manner.
- Speed bound: fast push on the ground to lift the knees up again
- Falling starts: leaning forward from a standing position then accelerate forwards when the point of overbalance is reached
- Acceleration runs: short fast bursts of speed that can be done on flat ground, with resistance or uphill
- Flying runs: from a jog or slow run accelerate hard for a short distance, these can be done on flat ground, with resistance or downhill
- Shuttle runs with batons: run towards your partner and either slapping their hand to signal a change or use relay baton
- Ins and Outs: accelerate for a short distance, relax and then accelerate again. Several repeats can be done during a sprint distance run.
- Standing starts: from a standing position lean slightly forward with one arm slightly forward and the other back, then accelerate away
- One hand starts: also known as 'three point starts', one hand on ground, feet behind the hand as a one handed crouch start in the 'set' position, accelerate on command from the coach.
- Crouch Starts: keeping low and driving up out of the blocks concentrating on drive, power and acceleration. Accelerate on command from the coach.

Training

The primary objective of the beach coach and the sprinter is to establish the correct running 'form' or basic running technique. This is natural for some and must be practised regularly by others. Once the sprinter has established basic form, their conditioning can be improved.

The aim of training is to develop the strength and endurance to enable the sprinter to be capable of holding the correct technique for longer periods in a race with the goal of holding technique during the entire race.

Like all disciplines, beach sprinting programs can be broken into general periodisation phases. However, due to the very high intensity and explosive power needed for successful beach sprinting, the training patterns of a sprinter will vary quite differently from those of a swimmer or craft competitor.

Due to the shorter distance raced and related conditioning implications, beach flags training is usually less demanding and takes less time to prepare for than beach sprinters. Typical preparation time for a flags competitor is:

- 4 – 8 weeks preparation
- 4 – 6 weeks basic conditioning
- 4 – 6 weeks speed and power
- 4 – 6 week competition

Training can be demanding and fraught with injury for beach sprinters. If an athlete is not prepared carefully and 'loaded' in progressive steps they can tear muscles or be prone to overuse or sudden impact injuries. The typical preparation for relay sprinters and sprinters is:

- 8 weeks preparation
- 6 – 9 weeks general preparation (general fitness and strength)
- 6 – 9 weeks specific preparation (sprint specific speed, fitness, strength and power)
- 6 – 9 weeks competition (various stages of competition)

In order to achieve optimal training and competition performance, activities used to develop the stride lift and stride strength should be done on days used for the development of the drive phase of the running technique.

Preparation

- Training should be of low intensity with minimal specific activities to help prevent both mental and physical burnout
- Large variations in exercises should be employed (i.e. boxing, cycling, aerobics, etc.) to prevent burnout
- Any specialised programs to overcome diagnosed weaknesses should be implemented in this phase (e.g. core body strength, rehab of prior injuries etc)
- Construction of future training plans can be created in this phase after careful consideration and evaluation of results from the previous year

General Preparation

- The volume should be medium to high and increased step by step
- Intensity should vary from low to high
- The emphasis should be placed on the development of running 'form' or technique and on the development of physical capacities (endurance, strength, power, speed, mobility, etc)
- A main component of training in this phase should be the use of drills to correct faults in running technique or specific skills (i.e. starts, turns in flags)
- The major conditioning objectives at this stage are structural strength, aerobic and anaerobic conditioning.

Specific Preparation

- Volume and intensity in this phase is still progressively increased but should vary according to the individual
- The emphasis is gradually changed from the development of physical capacities to more sport specific fitness
- Running technique is still a primary objective in this phase and should never be overlooked while speed work should also begin to be integrated into training at this time.
- Sport specific skill development (accelerations, starts, turns, striding, baton changeovers) and the use of drills in training is still also a primary objective, preparing the sprinter for competition

Pre-Competition Phase

- Training volume should be reduced whilst the intensity remains high
- Physical conditioning reaches maximum fitness and enters the maintenance phase
- Skill development receives its final polish and is evaluated in a competitive arena (i.e. at carnivals)
- Expansion of competitive experiences takes place through progressively increased levels of competition
- Focus on power and race speeds

Main Competition Phase

- Should include a short cycle of specific conditioning, while also including recovery sessions to emphasise the need for competition preparedness
- 1st half of this phase should use low intensity and medium volumes
- 2nd half of this phase should use high intensity and low volumes
- Refinement of skill occurs during specific conditioning, but with no major changes to technique
- Focus on racing skills and top speed

Training Checklist	Yes	No
Primary objective initially is to find correct running technique which can be built upon		
Components worked on in correct sequence for optimal results and performance		
'Lift' during striding should be aimed for before stride length		
Acceleration 'drive' should be trained before the stride length		
Coaches should use an 'on-off' approach to heavy training		
It is better to focus on one core area (i.e. lift) whilst recovering from drive activities		
Training should follow periods aimed at core development areas		

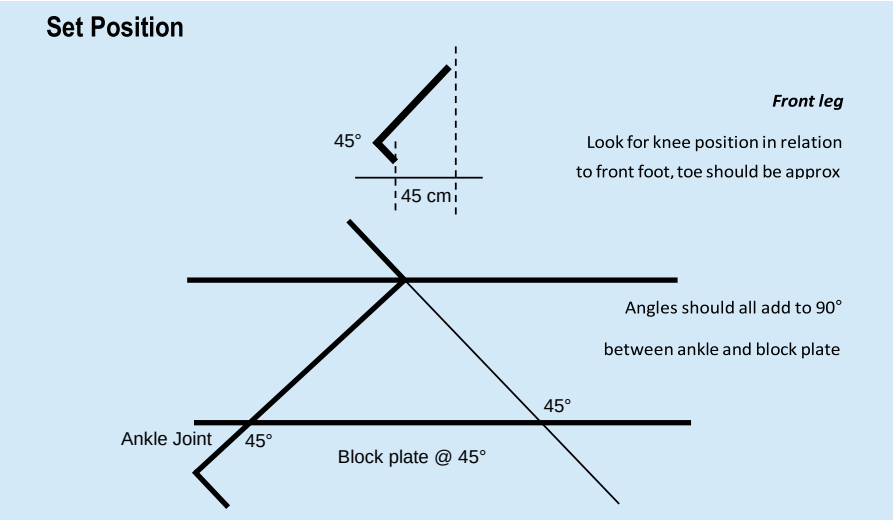
Competition

Beach Sprint

Starts

A good start is a necessary skill for sprinters. While recovery from a bad start or inefficient start is possible it can put undue and unnecessary pressure on an athlete. The competitor does not have to be the fastest sprinter, just the best that each individual athlete can be. Coaches of the beach disciplines should always strive to improve the performance of their athletes at the start of either the sprint or flags.

A good start begins with a good block setting. The blocks should be arranged so that maximum force can be exerted on the front foot in a 45° direction to the ground driving the athlete up and out from the starting line.



After the gun, the body should move out and up following the 45° path. Care should be taken by the coach to ensure that the body line through the sprint to the head remains at the 45° angle and slowly moves up to the running angle, rather than as seen in many runners, the head is kept tilted down while the body is more erect.

Once out of the blocks, coach athletes to adopt the classic 'sprinters T'. This is where the arms are used to propel the body forward and up along the 45° line as the runner emerges from the blocks and should move seamlessly into the acceleration phase.

Fig 1. *The start can be viewed from block position through set position, positive arm action and the 'T' position with the body position following the 45° line through head, spine and legs*

Key Points:

- Beginners or novices can be given the analogy of feeling like a giant spring waiting to uncoil when in the start position
- Start blocks should be dug out facing away from the track to ensure a solid base to push off
- Sprinters should place their arms about shoulder width apart
- Feet should be a comfortable distance apart with one behind the other to a comfortable distance
- On the 'set' command the sprinter should transfer their weight onto the arms and shoulders in a forward direction only, not allowing any upward movement.
- The sprinter should lock the set position awaiting the starter's pistol without rocking or shaking, the sand should be scooped out towards the track, to allow the back of the blocks to be flat and close to vertical, giving the sprinter a solid base to push off
- Do not dig the holes too deep
- Clear the excess sand dug out from the blocks away from in front of the sprinter to help ensure an even surface

Acceleration

As an extension of the start, the acceleration phase is that part of the race where the sprinter attains the maximum velocity and generally takes between 15 and 35 metres to attain, depending on the athlete. This is the most important part of the race, as a good acceleration phase will set the runner for the race. Poor acceleration can expend almost half of the race distance and leave the runner in an inferior position for finishing well if it is inefficient or poorly trained.

The main key to a successful acceleration phase is to ensure the body is properly aligned out of the blocks. This allows the runner to recruit power from the main muscle groups of the gluteal area and hamstrings while using the arms to drive forward and balance the body which can then be propelled forward with the greatest force generating acceleration to maximum speed.

Referring to Fig 1, it can be seen that in a proper start and initial acceleration that the line of the body from the head through the legs is at the 45° angle. This slowly increases to the sprint or running angle of approximately 5° to 7° as maximum velocity is attained. (Fig 2)

In many cases, younger and less experienced athletes will tend to 'pop up' out of the blocks and get the body too high too soon usually teamed with the head held tilted down. Longer strides during the initial early acceleration phase lead to a lower profile of the athlete therefore preventing 'popping up' from the blocks which limits the ability of the runner to recruit maximum power and efficiency from the large muscle groups. Often this is caused by the fact that the centre of balance is required to be forward of the feet so the impression to the runner is the sensation that they will fall. Once this is recognized by both the coach and athlete, and overcome by the speed and power of the driving movements, the athletes will be able to progress rapidly through the acceleration zone.

Fig 2. Demonstrates the progressive rise from the angle of the spine toward the end of the acceleration phase to the sprinting position.

Key Points:

- Accelerate from a low to high striding position
- Keep head down for the first 10-20m, before focusing on the finish line ahead
- Arms are to be 'pumped' as quickly and forcefully as possible to aid the legs in achieving good acceleration to top speed
- Once moving fast another burst of effort may be required, to avoid running the same speed, or slowing through the race

Coaching is making sure that sprinters know that the race does not end until they are over the finish line. Many sprinters, especially younger children run to the line and stop soon afterwards, it must be emphasised that the race is run at maximum speed until after crossing the finish line so sprinters must be coached to cross the line before decelerating.

Sprinters, especially less experienced runners should be coached to maintain running form through the finish line. The common movement of 'dipping' or dropping the head approaching the line will result in the athlete slowing down and bringing the chest across the line slower than if style and form had been maintained. To emphasise this, observe sprinters losing balance just before or after crossing the line. This is indicative of the weight transfer forward beyond the centre of balance by 'dipping' the head.

As athletes improve in both strength and ability, the correct form for 'dipping' can be taught which involves a lunge at the line with the chest which in turn causes the plane of the head to lower while maintaining balance rather than dropping the head and tipping weight forward.

Finish

Key Points:

- Drive through to the finish line
- Hold form until the finish line
- Lean forward (not too far) and thrust chest in a lunge over the last 2-3 metres propelling the body forward when close to the finish
- Keep eyes on the finish line and arms shoulder high

Between Runs

During competition high stresses are placed on muscles, ligaments and other soft tissues. Care should be taken in the time between rounds. If there are several rounds in a day it is imperative that the sprinter remain flexible, keeping their muscles as supple as possible. If races are close together, the sprinter should keep moving, doing some light run throughs and stretching. If there are extended periods between rounds, the sprinter must rest and remember to keep their fluid and food (if desirable) intake up. The sprinter should have a set of warm clothing close by to wear in between runs.

If there are extended periods between rounds, the sprinter should do a full warm up before each race. It is important that the sprinter remains focused on the full day's events and does not get distracted. Equipment such as headphones allow the sprinter to prepare mentally for the race, and also lets others know that they do not want to be disturbed.

Key Points:

- A thorough warm up to be done before each race
- Stay limber and active if successive runs or rounds are close together
- Be ready to rest in suitable clothing, and have something to occupy you (walkman, magazine etc.) if prolonged delays occur
- Keep a set of clothing, and fluids, close by at all times
- Monitor fluid and nutrition levels after and between runs to help prevent dehydration and maintain energy levels

Beach Flags Technique

A flag event only lasts about 3.4 to 4.5 seconds, can stretch over many rounds and is an event where a competitor's ability to be consistent is very important.

Set-Up

After being asked to take a position on the sand:

- Prepare a firm, flat area to lie face down on your stomach.
- The midline of your body must be 90° to the start line
- Heels must be together and not spread
- Hands on top of each other so finger tips of one hand touch the wrists of the other hand
- Elbows must be extended forward so that when in the heads down position the chest is touching the sand. The hand, wrist and lower arm must be in straight alignment and parallel to the start line.
- The Starter shall give the command "competitors ready". You should ready yourself for the start.
- The Starter shall give the command "Heads Down". Place your chin down on top of your hands and focus for the starting whistle.
- Many competitors breathe in and hold their breath until the whistle blows
- Only concentrate on the commands of the starter, rather than the people next to you or in the crowd. Athletes must be trained to focus despite the many distractions
- Competitors must listen for the first noise of the whistle and then react

Flag Start or Turn

The Flag start or turn takes less than one second. It is a very powerful and explosive action. There are many successful individual styles but there a commonly three main types of turns:

- Jump turns (used by children or beginners)
- Foot Pivot turns (used by natural flaggers or trained athletes. More common with females)
- Knee pivot turns (used by natural flaggers or trained athletes. More common with females).

The Foot Pivot and the Knee Pivot turns are generally proven to be the fastest. Whatever turn is used by the athlete, 3 principles should always be adhered to –

1. Push your body back towards the flags and rotate (to face the flags) at the same time. Don't push straight up
2. Keep one foot (fixed leg) on or as close to the start line as possible
3. Keep your body low and tight throughout the turn

Jump Turn

- Push off with arms like a fast push-up
- Jump up fast in the air and start turning body around to the finish line
- Try and keep front foot as close to the line as possible when landing
- After landing, accelerate low and hard

Foot Pivot Turn

On the whistle blast there are three simultaneous movements;

- The hands move out from under chin and back in line with the shoulders.
- With the palms flat on sand, push back towards the start line.
- The free leg bends and moves under or around the body as the body rises and moves towards the flag.
- The fixed foot remains in the starting line.
- The foot of the free leg lands approximately where the hip was in the starting position with the foot pointing parallel to the start line.
- Complete turn by rotating the shoulder, hips and front foot to face the flag.
- Head and shoulders are kept low throughout the turn.
- At the end of the turn phase, be in a low, tight, standing start position, with hips and shoulders facing the flags, before you start to accelerate

Knee Pivot Turn

On the whistle blast there are three simultaneous movements;

- The hands move out from under chin and back in line with the shoulders.
- With the palms flat on sand, push back towards the start line
- Support your bodyweight on one knee while rotating towards the flag so that this leg ends up at least parallel to the starting line
- The fixed foot remains in the starting line and turns in the sand.
- Complete the turn by rotating shoulders, hips and front foot towards the flag

Common Faults for Flag Starts or Turns

- If your hips and shoulders are not facing the flag, you have not attained enough rotation in the turn. Your first step of acceleration will often be weak, off balance to the side.
- If your foot (fixed leg) is moving away from the start line and flags, you are not getting enough push back. Your Push phase should push your head and body towards the flag, not straight up. The angle of your arms to the ground should be approx. 60°, not 90°.
- If you are pushing back towards the flags and your foot is still moving away from the start line, then the most likely causes are poor hand positions or lack of strength in the upper body. Practicing your hand positioning and a strength program are solutions to these faults
- If your body is too high during the turn (not low and tight) you are pushing straight up. You need to push back towards the flags.

Coaching Tips

- Break the start down into phases
- Practice each phase ensuring technique is correct
- Practice just turning all the way to 180°
- Then perform turns taking 1-2 steps
- Keep head and body low
- Accelerate hard and fast after the first 1-2 steps

Acceleration Phase

- Body turn twist is completed so that athlete is running at 90 degrees to start line (or face on to the flags).
- Keep the body low and the weight forward
- Fast arm and leg drive
- Focus on the flag you have decided to go for

Running for the Flag

- Maintain low body position while still leaning forward.
- Run towards the side of the flag (in order to gain an advantage over your opponent.)

Coaching Tips

- Aim for the closest flag, make a choice but be aware of a secondary option
- If a change of direction or flag is needed try and do it early and position your body to attain the new flag
- Practice different situations at training

Diving

- Dive low for the baton (flag) so that your momentum carries your body past the flag position such that your hips end up where the flag was – i.e. don't dive too early
- Eyes on the Prize (flag)
- Both hands extended
- Turn your body away from your opponent to guard your flag
- Grasp the baton firmly and bring to body.

Between Rounds

- Flag events have a series of rounds. In each round there may be 8-10 runs where a competitor is eliminated each time.
- Generally, when there are 8 competitors left, they progress to the next round.
- Subsequent rounds are usually held at a later time.
- Between runs, there may only be 1-2 minutes break.
- These conditions make it crucial for the athlete to warm up before the event, and maintain a good state of preparedness between runs. This can be done through stretches, jumps or power kicks. Competitors should also be prepared for delays and re-runs over contested flags without it unduly affecting their concentration.

Key points at competition:

- Athlete must be completely warmed up
- Have water bottle, warm clothing and sun protection at hand
- Be physically and mentally prepared for multiple rounds (Heats, QF, SF, Final) which may be conducted at different times throughout the competition.

Equipment

- Due to the nature of beach sprinting, there are no compulsory pieces of equipment needed for competition apart from a club costume and cap.
- It is important for beach competitors to have warm clothing to put on in between runs or if there are unexpected prolonged delays to ensure that their muscles stay warm and supple and help prevent injuries.
- Many athletes find listening to 'psych-up' music on their 'ipods' useful as it allows them to focus on their own task at hand and also sends a general message to other people nearby that they want to be left alone.
- Additional equipment such as spikes and track shoes are useful for warming up on grass areas near the beach.
- Other pieces of equipment that can be carried into the marshalling and competition arena are drink bottles and snacks. This is especially important in flag events where competitors can sit around for long periods between marshalling and competing and can often be there for long periods as the competitors are eliminated one at a time