

Placing the Mat

The mat provides a base for delivering the jack and bowls. It provides some protection against local wear and tear of the green surface. Its front edge (or 'mat line') provides a mark for measuring distances to bowls, to the jack, or to a ditch, as necessary.

The skips decide which team will begin play on the toss of a coin. The lead player begins the first end by placing the mat aligned with the centre line of the rink, and with its front edge 2 metres from the rear ditch. Leads may place the mat further from the rear ditch on subsequent ends, but may not place it nearer than 23 metres from the front ditch. White markers on the side bank indicate that alignment. Following a tied or dead end, the team that was first to play in the previous end again plays first. Players may not relocate the mat during an end, but may straighten it, or temporarily lift it to allow a bowl from an adjacent rink to pass.

Once the mat is in position, players can 'kick' bowls to a collection area safely to the rear of it. Kicking is the act of moving a bowl with the sole of a shoe so that it rolls a short distance. A bowler places the instep of the sole lightly on the bowl and either rakes it backward, whereby the point of contact moves towards the toe, or rolls it forward, whereby the point of contact moves towards the heel. This method of kicking avoids discolouration of either shoes or bowls by transfer of polish.

Delivery Action

Bowlers should move so that they bring their shoulders to within an arm's length of the playing surface, enabling smooth grassing of a bowl free of any dumping. They bend their legs to lower their centre of gravity, thereby providing bodily stability. They advance one leg, normally the one opposite the bowling arm, to extend their base of support, thereby enhancing stability. Their advancing of one leg creates the concept of a leading foot and a trailing foot. The trailing or the 'anchor' foot should remain in contact with the mat to preserve the bowler's orientation of the required delivery line. The bowler should position the toe of the trailing foot approximately 10cm behind the mat line. There it is far enough forward to ensure that the heel of the leading foot will always clear the mat, and it is far enough back to avoid any risk of foot faulting. The centre point of the heel of the trailing foot should be over the mat centre line.

Foot Faulting

Unless a player has at least one foot wholly on or over the mat at the moment of delivery, a foot fault occurs. Players who position their feet almost touching the mat line commonly foot fault. At the moment of delivery, the leverage of the horizontal trailing leg causes the shoe to flex. The back of the shoe may then not only overhang the toe but also overhang the mat line, thereby producing a foot fault. If an opponent draws the umpire's attention to foot faulting, the umpire

must apply the penalties provided in the laws. Beginners should adopt a routine that avoids any risk of infringing. This will avoid incurring unsettling penalties at crucial times in important games.

Jack Delivery

Recommended techniques for delivery of jacks and bowls have many features in common. This section describes only those features peculiar to delivery of the jack, which mainly occur in the preparation for the delivery. The movement and follow through phases of delivery of each have no significant differences.

The jack serves as a focal point for the building of a head, which opposing players consolidate by alternately delivering into it the allowable number of their bowls. Provided it stops in bounds, any drift off line of a jack in course causes no disadvantage because players centre it before delivering their bowls. Nevertheless, bowlers should always try to make the jack follow the centre line as closely as possible. The centre line is the aiming line to a centred jack. The delivery is valid provided the centred jack is at least 21 metres from the mat.

Characteristics

Bowlers can ascertain a suitable bowl size by encircling a bowl so that the tips of middle fingers and thumbs can just touch. Alternatively by placing the thumb against the stop on a card indicator, they can read the required size from the scale against the tip of the extended middle finger. In most instances, bowls that are too large cause greater difficulty than bowls that are slightly smaller than the measured size. Heavyweight bowls are about 4% heavier than medium weights of the same size. Extra-heavyweights are about 3½% heavier than heavyweights of the same size.

Bowls have bias because of their asymmetric shape. The side of a bowl identified by the smaller engraved ring is slightly heavier than the opposite side as a result of factory machining. This causes a bowl to follow a path that curves inward towards the biased side. This characteristic provides a bowler with a multiplicity of tactical options. It provides separate forehand and backhand approaches into a head, according to which side the bias faces when the bowl begins its run. Furthermore, by varying the delivery line and delivery speed combination, the bowl will turn to a greater or lesser extent in course to the head.

If a bowl is to come to rest in the head a bowler must deliver it at an angle that counteracts the effect of bias. The shoulder is the segment where the bowl stops diverging from the centre line and runs parallel to it before converging on the head. Depending on the profile of the bowl, the shoulder is 55% to 70% of the distance to the head. Note that by the time a bowl reaches the shoulder, it will have undergone at 1/5th of its ultimate draw, or turn. Therefore a bowler must aim wider than the shoulder to avoid a narrow delivery

Foot Positioning

A bowler should prepare for a draw shot by locating the centre of the trailing foot heel over the mat centre line, and aligning the toe with the required aiming line. The leading foot should be parallel with, but slightly apart from, the trailing foot. For a fixed stance, a bowler advances the leading foot a normal pace and continues delivery preparation in that position. With other stances, a bowler advances the leading foot during the delivery movement. New Zealand and South African bowlers advance the leading foot 15-35cm during preparation, and complete the pace during delivery. Australian bowlers commonly prepare by aligning their toe caps square to the aiming line, and they advance the leading foot a full pace during delivery. International bowlers use all of these methods with comparable effectiveness. The 'Australian' method may use body momentum in the delivery phase a little more efficiently, so it may be marginally better for slower greens or faster shots.

Bowl Grips

The force applied to a jack or bowl is most efficient when acting through the centre of gravity. A bowler achieves this by positioning the tip of the middle finger, the last point of contact during delivery, under the running circumference. To ensure that a bowl will run free of wobble, a bowler should avoid a grip that causes its engraved rings to cock or tilt. The main differences are the positioning of the thumb and the separation of the fingers. The finger grip provides good 'touch' for play on medium or fast greens. A claw is a secure grip for fast shots and for play on slow greens. The cradle grip suits players with small or weak hands.

Stance

The characteristics of the recommended stance on the mat are:

- Fairly upright posture; avoid crouching and consequent stress on leg joints.
- Trunk inclined forward so that body weight is poised on the balls of the feet.
- Shoulders square to the aiming line.
- Bowling arm aligned with the aiming line; avoid angling it across the body.
- Knees slightly flexed.
- Focus of attention directed forward.

Delivery

The principal action in any method of delivery is the pendulum-like back swing and forward swing of the bowling arm along the required delivery line. However gravity is never the only force involved in the action of the bowling arm. Lawn bowlers and ten pin bowlers alike use some muscular force in their deliveries. The slower the green and the faster the required bowl speed, the greater is the contribution of muscular force. The main muscles involved are the deltoid in the

back swing and the pectoral in the forward swing. There is no physiological means of neutralising these powerful muscles, but there is no need to do so. Bowlers intuitively integrate gravity force with muscular force in a co-ordinated and consistent way to produce a technically good delivery arm action.

Freeze-frame analysis of video-taped actions of champion bowlers under identical conditions typically show great differences in the elevation each gives a bowl in the set up and also at the end of back swing. The reason for this is that each bowler augments gravity force with muscular force to differing degrees. Bowlers who use relatively more muscular force tend to have a compact action sometimes called 'pushing'. History shows that bowlers with a pushing delivery action have not been at a disadvantage in international competitions.

Other features of recommended delivery technique are:

- The opposite arm moves towards a steadying position on the thigh of the leading leg.
- The step begins as the bowling arm passes through the vertical in the back swing.
- The leading foot advances directly forward; should the leading foot ground anywhere near the delivery line, the base of support becomes too narrow and sideways instability is likely.
- The knee of the trailing leg should drop to a position near the heel of the leading foot.
- The bowling arm brushes close to the side during the swing.
- The hand releases the bowl once it passes the toe line of the leading foot.

Follow Through

Features of good follow through technique are:

- Complete the delivery swing by extending the bowling arm along the delivery line, palm upward.
- Stay down to confirm that the bowl is following the intended line.
- Recover and take a pace forward with the trailing foot.
- Watch the bowl come to rest to assess any correction required.

Pace of Green

The pace of green is the time in course of a bowl that comes to rest 27 metres from the delivery point. Many Australian bowlers would regard greens producing times below about 12 seconds as 'slow', and above about 14 seconds as 'fast'. Grass surfaces that are green, damp, and leafy are commonly slow. Those that are brownish, dry, mown and rolled are commonly fast. The faster the green, the slower is the required delivery speed of jacks and bowls to run a given distance. The faster the green, the greater is the required aiming angle to offset the bias. However, the wider line of bowls on faster greens does not greatly increase run distance. For example, the curved path of a bowl to a jack 30 metres away on a 17-second green is only 31 metres.

Aiming Line

A cross-wind towards the biased side of a bowl in course will cause the bowl to turn less because the wind force partly offsets the force of bias. The hand on which the bowl is then running is the 'narrow' hand. The opposite hand is the 'wide' hand. The wind assists the bias of bowls delivered on the wide hand. Consequently, a bowler should allow for any cross-wind in choosing aiming line.

Some bowlers adopt landmarks, such as rink markers and boundary pegs, and some visualise the path of a bowl to determine a suitable aiming line. Beginners sometimes benefit from temporary use of a contrived aiming reference, such as a disc or a cotton wool tuft on the green, until they are able to adopt an aiming line without such assistance. The aiming line is the required delivery direction. Most bowlers then choose a convenient aiming point along that line towards which they direct their bowls.

Some bowlers choose an aiming point on the bank. A distant point facilitates fine control and adjustment of aiming line. However it requires a bowler to get the knee of the trailing leg down almost to the playing surface. This posture minimises sloping of the trunk and uncomfortable arching of the neck in directing attention well forward.

Some bowlers choose a jack high aiming point. Just as a skip's shoe guides required line and length for jack delivery, so a jack high aiming point guides both line and length for bowl delivery.

Some bowlers choose an aiming point short of jack high. Bowlers who position the knee of the trailing leg behind the calf of the leading leg, usually stoop in getting their shoulder down low enough to avoid dumping. From a stooped posture, use of a distant aiming point would cause too much neck discomfort for most bowlers.

Many aspects of technique can cause inaccuracies in delivery line. In the course of a game, a bowler should correct any tendency towards narrow deliveries by taking a wider aiming line, and correct wide deliveries by reducing the aiming angle. Bowlers should correct any technique problems during practice sessions. Should they encounter difficulty in diagnosing a problem, the best course of action is to go back to the basics and work forward from there. If no coach is available, bowlers can help one another with reciprocal observation and suggestion.

Bowl Speed

Beginner bowlers have busy minds. They think about things like arm elevation, timing, step length, trailing leg positioning, and follow-through posture as they deliver a bowl. These busy thoughts are an unavoidable phase in the process of learning delivery technique.

With regular practice, their movements become less awkward, more precise, and more consistent. Eventually their delivery technique becomes almost as automatic as blinking or breathing. Their minds are then clearer, and they can give full attention to judging the line and length required for each delivery.

Champion bowlers prepare for a delivery by confidently 'saying' to themselves that their bowl will run its course and stop precisely at the right spot. They use imagination to 'see' their bowl following the exact path to accomplish that result. They develop a 'feel' for a good delivery from the weight of the bowl, their perceptions of the pace of green, and senses in their bowling arm and shoulder. Such rehearsal provides a mental pattern for their largely automatic delivery movement to produce the bowl speed required. They use hand and eye co-ordination for intuitively integrating gravity force with muscular force in executing the movement.

A corrective delivery for a bowl that stops a metre short requires only 2½ more revolutions. Bowlers should make such fine corrections by 'sensing' the extra bowl speed required to reach the objective. Conscious adjustment of arm elevation can easily cause over-correction. Undue conscious attention to limb movements during delivery can lead to a condition called 'paralysis by analysis'. Bowlers should condition themselves to trust their practised delivery technique to make appropriate adjustments subconsciously.

Many aspects of technique can cause inaccuracies in delivery speed. In the course of a game, a bowler should correct any tendency towards short deliveries by increasing bowl delivery speeds, and correct long deliveries by reducing bowl speeds.

Bowlers approach the mat with at least two bowls at their disposal. Some coaches over-emphasise the use of the second of those bowls to correct any error made with the first. However top bowlers concentrate on achieving the right result with the first of their deliveries. In that way their second bowl becomes a bonus delivery which they can then play under less pressure.

Beyond the Basics

Few bowlers would forget their first game as lead in the lowest grade of pennant competition. Only a few bowlers achieve promotion easier from there by stepping sideways through the skip position than by steadily climbing through the lead positions in higher grades of pennant. Before moving sideways, competent leads should ensure that the scope for climbing upward has diminished.

Just about all novices engage in graded singles games, or play the third (and lead) position in pairs games quite early in their careers. Understandably new tactical situations confront them. Development of necessary new skills is easier if a

bowler receives help from a coach or an experienced player. Should help be unavailable, a bowler can master the new skills through persistent and intelligent practice. One point for novices to remember is that all the special shots are merely draw shots in disguise. Nearly all the shots merely require a draw to an imaginary jack.