

## Insights to the Sport of Rowing

- **The Sport:** Steeped in tradition, rowing arrived in America as one of the first and highest paying professional sports. Today, it is one of the few remaining amateur sport. Rowing is a total body workout. Although it looks like an upper body sport, approximately 65% of rowing strength comes from the legs, 25% back, and the balance arms. Rowing is one of the few athletic activities that involve all major muscle groups. It is a great aerobic workout that is a low-impact sport on the joints, similar to cross-country skiing.
- **The Athlete:** Rowing is the second most strenuous sport. Rowers are probably the world's best conditioned athletes. When done well, it looks graceful, elegant, and sometimes effortless. At competitive levels, the sport demands endurance, strength, balance, mental discipline, technically efficient and an ability to continue when your body demands you to stop.
- **Rowing Disciplines:** The sport is made up of two disciplines; *sweep* is like using a broom and *sculling*, like the motion your hands make while treading water. *Sweep rowers* hold one oar with both hands, while *scullers* use two oars, one in each hand.
- **Name Game:** Rowing boats are known as *shells*. Although spectators may see many different events in a regatta, there are only six basic shell configurations. *Sweep rowers* each have one oar, rowing in pairs (2s), fours (4s), and eights (8s). *Scullers* that have two oars, sculling in singles (1X), doubles (2X), and quads (4X). Sweep shells may or may not carry a *coxswain* (pronounced cox-n , literally the 'boatswain' or 'boatsman', and is abbreviated as cox'n), who is the on-the-water coach and steering person. All eights have cox'ns, but fours and pairs may or may not have a coxswain. Racing sculls do not have a coxswain. All sculls and shells without cox'ns, usually designates the bow most rower to steer by either using a rudder connected to a foot-stretcher, or by calling the crew to apply more (oar) pressure on one side or the other.
- **Race Categories:** Races are categorized by ability, gender, age, and weight:

*Ability* - There are three national achievement categories; *Intermediate, Senior, and Elite*. Winning a first place in a 'status changing' race, such as the nationals, the rowers will advance one category (example from *Intermediate* to *Senior*). Once an athlete advances, they must race the higher level for one year. *Elite* rowers compete at the World Championships and Olympic Games. As Rowing is one of the few amateur sports in America remaining, earning a National Title, or earning a place on a US National or Olympic team is our highest honor.

There are two *School* categories including *High School* and *College* events. Within these categories are *Freshman, Junior Varsity* and *Varsity* crews, each with their own subset categories like Freshman A or Freshman First boat.

Two categories remaining are *Club and Recreational*. *Club* rowers are non-school affiliated, and may be of any category. *Recreational* rowers train and may compete in singles and doubles that are shorter, wider and often heavier than their racing equivalent. Because these shells are less delicate and more stable, they are preferred for learning to scull and open water racing and touring.

*Gender* - Events are offered for both men and women. In casual events, mixed crews are comprised of men and equal or greater number of women.

*Age* - There are two age categories. *Junior* rowers are 18 years and under who have attended high school within the previous year. *Masters* rowers are 27 years and older. Larger regattas subdivide Master's categories into 10 year increments.

*Weight* - There are two weight categories; *lightweight* (women up to 130lbs, with a crew average of 125 lbs., men up to 160 with a crew average of 155 lbs.) and *open weight*. Lightweights are able to row in open weight events, but open weight athletes cannot row in light weight events.

- **The Equipment:** Originally made of wood, today's shells are made of composite of materials (carbon fiber, honeycombed &/or fiberglass). FISA (*International Federation of Rowing Associations* - English translation) specifies minimum weight limitations for each class of shell, to reduce based uneven monetary / technological advantages. Racing singles are up to 27 feet long, 10 inches wide, weighing up to 35 pounds. Recreational singles can be up to 24 inches wide, only 24 feet long, and weighing more than a racing single. Eights are up to 60 feet long, up to 24 inches wide, and weighs up to 200+ pounds fully rigged. Rowers propel and balance their shells with oars. Sweep oars are approx. 12'-6", longer than sculling oars at approx. 9'-6". Originally made of wood, today's oars are carbon fiber with wood or composite handle that is often covered with a rubber grip.
- **The Crew:** Although the word crew is often used to identify the sport, *crew* actually refers to the persons in the shell (like the persons on a navy vessel). The two sides of any vessel are *port* (e.g. *the shell's left side*) and *starboard* (e.g. *the shell's right side*). Rowers are identified by the side they row (port or starboard) and/or the position they row in the shell counting from the bow (bowman, #2, #3 etc). Rowers face the stern (the part of the shell that crosses the finish line last). Only the cox'n faces towards the bow (the part of the shell that crosses the finish line first). The person sitting bow-most is bow or #1 seat. The person in front of the bow man (toward the stern) is 2, then 3 and so on. The rower closest to the stern is known as the stroke or by the number of their seat (such as 4 in a four or 8 in an eight). Most commonly, the stroke rows on the port side, with the oars alternating port, then starboard. The stroke of the shell must be a strong rower with excellent leadership, and technical skills, since it is the stroke who sets the rhythm, cadence and perseverance of the crew.
- **Strokes Per Minute:** Rowers speak in terms of strokes per minute (spm), literally the number of strokes the crew completes in a minute's time. In competitive racing, an eight stroke rating at the beginning of the race is high (38 – 45spm), then "settles" to a race cadence typically in the mid to lower 30spm. During the race, the cox'n or steering bowman will call "Power 10 for ...", a command for the crew to concentrate on strength or technique for 10 strokes. Crews take the rate up once again as they approach the finish of the race.
- **The Ultimate Team Sport:** Rowing isn't a great sport for athletes looking for MVP status. Rowing is made up of individuals willing to sacrifice their personal goals for the good of the team. It is teamwork's best teacher. Every crew is only as strong as the weakest link. The athlete trying to stand out in an eight will only make a crew slower. Winning teammates successfully

match their desire, talent and technique with a whole crew. In fact, a crew who rows well is greater than the sum of its parts, due to this synchronicity.

## Glossary of Common Rowing Terms

**Blade:** The end of the oar/scull that is in the water. Most blades are painted designated colors sporting the team or country pattern.

**Bow:** The front of the shell.

**Bowman:** The person in the seat closest to the bow.

**Bow Ball:** A rubber ball that is secured to the front of the shell to protect the boat and others in case of impact. The bow ball has the same function as a bumper.

**Button:** A wide adjustable ring affixed to the *sleeve* that keeps the oar/scull from slipping through the oarlock.

**Catch:** First of four parts of the stroke. As the stroke begins, the rower is coiled forward on the sliding seat, with knees bent, arms outstretched. The blade is dropped vertically into the water.

**Coxswain:** (cox'n abbreviation) originally the "boatswain" or "boatsman", they are the person who steers the shell and is the on-the-water coach for the crew. Cox'ns are included in three competitive events; pair with (cox'n), four with, and eight. Traditionally a megaphone and today an electronic speaker system is used to communicate the length of the shell.

**Crab:** A stroke gone wrong, like a trip while running. When the *blade* does not enter the water properly, or rough water catches the blade so it cannot be removed in a timely fashion, the rower "catches a crab". A rower can usually recover from a small crab... or be launched out of the shell with a big crab!

**Crew:** The persons in the rowing shell, or any floating vessel. This term is often mistakenly used to designate the sport of *rowing*. Should you use the term *crew team* instead of *rowing team*, you are in effect saying *team team*.

**Deck:** The portion of the shell to the bow and stern of the crew that is covered with a fiberglass, fabric or thin plastic. These sealed compartments offer buoyancy to the shell and thus safety to the crew.

**Drive:** Second of four parts of the stroke. Initially the body position remains constant from the catch. The legs begin by prying or *driving* the oar through the water. As the body begins to uncoil, the arms and back "hang" on the oar through to the *layback* position (aaah, the layback – almost like sitting comfortably in a living room chair).

**Ergometer:** Often called an *erg*, the ergometer has a long, grueling tradition of shapes and sizes. Today's rowing machine approximates the actual rowing motion. Used indoors for training as on or off-season exercise, ergs have a digital readout that displays information including the *Strokes per Minute* (spm), a calibration of effort (e.g. 500 meter split, watts, or calories) and distance rowed.

**Feathering:** After the *finish* of the *stroke*, the blade is extracted from the water, then rotated from vertical to horizontal to the water (feathered) thus reducing wind and water resistance.

**Finish:** Third of four parts of the stroke. After the *Drive* the rower presses down the oar's handle to remove the blade from the water at the *finish* of the stroke, then feathers the blade to begin the recovery.

**Foot Stretcher:** The structure in the shell that holds the shoes, or *foot stretchers*, secures the athlete in the shell. The *stretcher* consists of a straps or easy release shoes attached to a footplate.

**Gate:** Originally called the “keeper” this bar is fixed across the top of the oarlock holding/keeping the oar in the oarlock.

**Gunwales:** Structural “saxboards” that used to be made of wood, now composite materials, run the length of the shell’s cockpit, providing strength to the length of the shell and helping to keep water from entering the cockpit.

**Length:** Refers to the overall measurement of a rowing shell. This unit is also the measure often used to describe margins in a race (e.g. lane 1 has a length on lane 2).

**Lightweight:** Is a class of rowers, not the boats. A women ‘s lightweight crew must not exceed 130 and men’s crew are not to exceed 160 pounds (crew average), in order to qualify to race in a lightweight event.

**Oar:** Used to pry the boat through the water, Sweep *oars* are approximately 12’6” long and sculling *oars* are approximately 9’ 6”. Rowers use oars, sculls, or blades, not paddles.

**Oarlock:** The “U” shaped component located on the outer most reaches of the rigger that holds the oar in place. The *oarlock* swivels on the ‘pin’ to accommodate the full arc or swing of the oar.

**Port:** The left side of a water vessel, when facing forward. Note: the coxswains face forward toward the bow of a shell, while rowers face backwards toward the stern. The origin of this word comes from seafaring Norsemen who would put their left side of the vessel to the *port* (wharf or dock), because their steering board was afixed to the right side of their vessel.

**Power 10:** This is a command for rowers to concentrate on 10 strokes, offering their best strength or technique. Using “Power 10s” a crew intends to bring a crew together, pull ahead or hold off a competitor.

**Recovery:** Fourth of four parts of the stroke. After the oar has been extracted from the water, the *recovery* begins when the rower move their hands & the oar away from their body, over their knees. The body follows the hands, thus engaging the sliding seat to roll the athlete forward until knees are bent and the rower is ‘coiled’, ready for the next catch. This is the time of rest during the rowing stroke.

**Rigger:** The second greatest invention in rowing, this tubular structure holds the oarlock, and thus the oar off the side of the shell. Traditional riggers are anchored on the gunwales, whereas the more recent configuration of wing-riggers is set on top of the gunwales, thus reducing the strain and stress placed on the hull.

*Rigger* is also the name for the person who maintains, adjusts rigging, and repairs rowing shells.

**Rowing:** The sport of *rowing* involves athletes who propels a shell by means of a primary lever (the oars) and a secondary lever (the oarsman’s back), using an *oarlock* as the fulcrum point. Some rowing vessels have sliding seat, like in the sport of *Rowing*.

**Run:** The distance a shell moves during one full stroke (measured from the puddle the blade makes from one catch to the puddle the blades makes entering the next catch). The *run* is measured by sighting the distance between these puddles made by one oar in the shell.

**Sculling:** One of two rowing disciplines, where the athlete (a “sculler”) use two oars (“sculls”). Sculling shells include single (one sculler, two sculls/blades), double (two scullers, four sculls/blades), and quads (four scullers, eight sculls/blades).

**Shaft:** The tubular section of the oar/scull located between the handle and the blade.

**Shell:** Rowing boats are known as *shell*. Like an egg, these watercrafts are lightweight, structurally resilient enough to take a man's full force during a rowing stroke, yet extremely delicate.

**Sleeve:** The wear surface of an oar that is placed in the *oarlock*. This fulcrum point is adjustable by the relocation of the *button*.

**Sliding Seat:** The first and greatest invention in rowing. Prior to the slide seat, grease was applied to the seat board, so chamois covered rowing trousers would ease the rowers sliding action. Today the seat's wheels roll in a set of tracks mounted on the seat-deck of the shell. This sliding seat enables the rower to fully coil their body at the catch, and then press to a full "layback" at the finish, prying the shell through the water.

**Slings:** A portable cradle used to support the shell for washing, rigging or storage.

**Starboard:** The right side of the vessel when facing forward. Note: coxswains face forward in a shell, while rowers face backwards. The origin of this word comes from seafaring Norsemen who would attach their *steering board* to their right side of the vessel, thus requiring their left side to dock on the *port* (wharf or dock).

**Stern:** Rear end of the boat. Note: rowers face toward the stern. Last over the finish line!

**Stroke Rating:** The number of strokes a crew rows in a minute. More accurately, Strokes per Minute (spm) is a unit of measure used to discuss the 'speed' of the rowers in the shell.

**Stroke:** The stroke is comprised of four parts; *catch*, *drive*, *finish*, and *recovery*. It is this action that moves the shell through the water.

*Stroke* also refers to the stern-most rower who sets the pace and technique for the rest of the crew.

**Sweep:** One of the two disciplines of rowing, Sweep rowing where the athlete (sweep rower) only use one oar (sweep). Sweep shells include pairs (two rowers), fours (four rowers), and the eights (eight rowers). Pairs and fours come with and without coxswain. Eights always have a coxswain, as steering and coordinating a ton of weight (when including eight heavy weight rowers, oars and shell) is a great challenge.

**Swing:** Literally the rower's body angle when shifting from a 'layback' at the *finish* to a forward angle position at the *catch*. This term also applies to the effect the team feels when they *swing* in unison. It is an elation that is brief and heady, as the crew feels their perfect synchronization. For when a rowing crew is rowing well, they are greater than the sum of their parts. As air bubbles are captured under the bow, the crews' stealth motions do not dislodge those bubbles, enabling the shell to raise ever so slightly. As a result, the shell slips more easily thru the water for that one or few strokes. A crew rowing with excellent technique in unison can hold this perfection for several strokes at a time, several times in a race. In short, proper technique that includes *swing* enhances the shells performance and speed.

## Types of Races

**Head Race:** Traditionally these events take place in the fall on rivers, hence the term "*head race*" (e.g. Head of the Charles, the largest two-day regatta in the world). Crews cross the starting line in approximately 10 -15 second intervals, one after another, to navigate miles of river, around bends and under bridges. Typically head races are conducted over a three mile distance although race length can vary at different venues. Whoever completes the course in the shortest amount of time, wins. Although course time is announced and recorded, course times from year to year, or race to race are not discussed as course, wind speed, current and weather conditions dramatically affect times. The origin of this word comes from *head* of the river races, a *British tradition*.

**Sprints:** These spring and summer races are shorter, thus the term *sprint*. These races are 1500 meters for Juniors, 2000 meters for Collegians and Open, and 1000 meters for Masters events. These races begin with all crews aligned at the start. The line-up can be free floating, held by an exceptionally hardy person in a stake boat or on a starting platform. The aligner (one of the judge-referees) ensures each bow ball is even with the others. It is the coxswain's responsibility to ensure their crew is aligned squarely on the course.

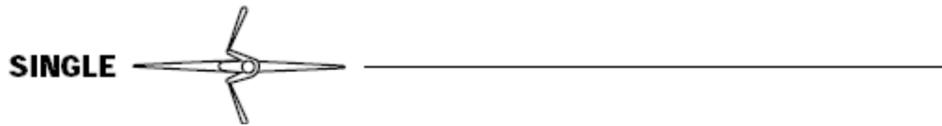
Once aligned, the starter (also a judge-referee) will raise a red flag, calling "Attention" while polling the crews in French (the official national and international language of rowing) or English "Lane one, ready?". A crew's coxswain can indicate the crew is not ready by holding up their hand. However, if a crew member of that crew is not taking action, the referee will ignore this coxswain's indication. The starting command in French or English is two part; "Are you ready? Row!" or one part "Go" as indicated by sharply bringing the red flag down to horizontal. Each crew is allowed one false start. Two means disqualification. If within 100 meters, there is a legitimate equipment breakage (e.g. an oar, or rigger), or the starter believes the start should not occur, the red flag will be raised, and the race halted. Once the equipment is repaired or replaced, the race will be realigned and restarted.

Upon starting, the referee launch(es) follow the race to ensure safe conditions (e.g. out of lane steering, or interference during the race & debris removal between races), and that each crew has an equal opportunity (e.g. remaining in their lane) to win. The job of the referee is not to steer the crews. Crews can leave their lanes, as long as they do not interfere with other crews. If a crew is close to interfering with another crew, the judge-referee will call that crew by name, while pointing a white flag at that crew, then indicate clearly with the flag the direction the crew is to go. The launch must not follow in the path of a 'blind boat' such as a single, as that sculler uses the stern wake created by their shell to steer.

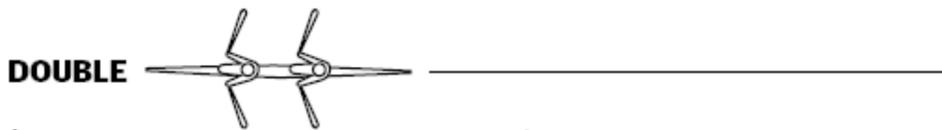
The on-the-water judge-referee keeps the official time, calling the winning time to the finish line judges. In turn, the finish line judges are each assigned a lane, adding the difference from the first crew to the time of their lane's crew in order to establish all other times in the race. If a crew feels they had an unfair race (e.g. interference by another crew) the stroke must raise their hand upon crossing the finish line. The judge-referee will note the complaint for assessment.

Upon completion of the race, the on-the-water judge-referee raises a red flag indicating the race was fair and no protests lodged. If a protest is lodged, then the athlete testimonies will be heard on land. The results announced later.

## Rowing Shells



One sculler, two oars (sculls). The sculler sits on top of the **single** scull, not in it. It is the smallest of shells in the sport of rowing. The art of sculling is said to take more than 5 years to perfect. Single sculling is the best overall method to learn to row because performance feedback is direct, immediate, and unencumbered. If there is a technical flaw, only the sculler can fix it! Sculling is an excellent club sport as individuals can combine with other scullers to create a fairly balanced crew with less attention spent on height, weight and strength of each sculler. A world-class sculler is capable of rowing approximately 10.5 mph. This shell is called a single, or scull.



Two scullers, each with two sculls. The scullers sit on top of the **double** scull, not in it. It is the most common club team sculling boat. It is a great teacher for individual sculler learning to coordinate with other scullers. Reduced to only two, each must emulate the other in technique, length, application of endurance and strength to find synchronicity.



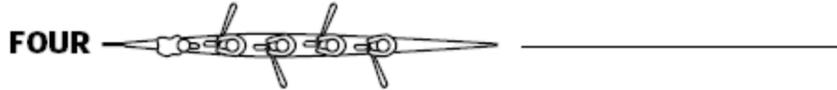
Four scullers, each with two sculls. The scullers sit on top of the quad, not in it. Scullers combine to row this light weight, narrow, and fast **quad**. Found most often in clubs who have sculling as a focus, these shells build the greatest of sculling teams. The quad is the fastest shell on the water for the first 500 meters.



Two rowers with one oar each, with or without coxswain, this is the most difficult shell to row. Great attention must be spent while rowing a **pair** on height, weight, and strength of each rower in order to create a balanced crew that rows straight!

In a **pair without coxswain** (shown above), usually the bow-most rower steers while rowing, using a rudder affixed with cables to the foot stretcher. Not an easy task! This shell is also called a 'straight pair', 'pair without', or a 'coxless pair'.

There is no heavier shell on the water than a **pair with coxswain**! Two rowers, and one coxswain to relieve the steering effort, unfortunately adds approximately 120 pounds to the weight of the crew. That is significant weight for each oarsman to ply quickly and efficiently! Thus this is the slowest of shells. It is also called a "pair with" or a "coxed pair".



Four rowers with one oar each, with or without coxswain, this is the second most difficult shell to row. The hull is relatively narrow thus harder to stabilize with a great number of moving rowers! Rowers sit in this hull, rather than on top of it. As sweep rowers, coordination between port and starboard, strength and length are key!

A **four with coxswain** (shown above) is most common sweep shell in clubs, requiring relatively few crew (four rowers vs eight), yet having a coxswain to steer and coach the crew. The coxswain is usually seated in the stern, as they are able to see the crew. In less common instances, the four is a 'bow loaded' shell, where the cox'n is not able to see the crew, yet weight assists to level the shell. The cox'n lays below waterline to the bow of the bow-most rower. Head on a rest, still steering with cables attached to a rudder their legs are outstretched under the bow deck. This shell is also called 'coxed four', 'four with' or 'four'.

A **four without coxswain** also requires (usually) the bow-most person to steer while rowing, using a rudder affixed with cables to the foot stretcher. Due to the steering, looking over one's shoulder and balancing logistical difficulty, this is the most unusual configuration to see on the water. This shell is also called 'straight four', 'coxless four', or 'four without'.



Eight rowers with one oar each, always with coxswain. Rowers sit in this hull, rather than on top of it. This is the most common shell found in high school and university programs. To fulfill the requirements of Title IX\*, often rowing (especially women's rowing) is used to counter balance larger athletic teams on college campus (such as football). Thus teams of 75 athletes are common. **Eights** are invaluable when putting large crews on the water on a daily basis. As with all sweep rowers, coordination between port and starboard, strength and length are important, but scale is the greatest challenge. Any action accumulated over the 60 foot length, multiplied by eight persons is significant! Teamwork, selfless dedication, and keen attentiveness to remaining consistent in every aspect is key! The eight is the fastest shell on the water. A world -level men's eight is capable of moving almost 14 miles per hour.

\*Title 9 came into effect 20 year after it was passed. **Title IX of the Education Amendments of 1972**, the statute prohibits sex discrimination in educational institutions that receive federal funds, thus protecting against discrimination in college and high school athletics.