1 Erging

Ideally, college crews should spend as much time on the water as possible, to improve their technique on the water, their fitness, but also to improve how well they are rowing together. However, conflicting schedules, bad weather, river closures, and equipment problems often limit that to less than desired. Under these conditions, erging becomes the most important fitness tool for the average college rower. Wolfson rowers have the advantage of having easy access to ergs on College grounds – all the more reason to use them properly. The following sections are meant to serve as pointers for the most important considerations with regards to using rowing machines.

1.1 The machine

Summary: The erg monitor allows you to set up exercises, and shows you relevant information during the piece. On the most modern version, you can save this in a personal logbook on a USB drive.

Around the world, the normal standard for rowing machines are the Concept 2 (C2) ergs. They have not changed much in the last decade or so, but the different models are identified with letters: the newest one is the Model E, the previous version – the only other one also still sold by C2 – the Model D. Apart from the Model E standing higher off the ground, there is hardly a difference: they all consist of an internal flywheel with a bungee pulley system providing the resistance to the handle, a rail on which the sliding seat is mounted, the footplates to strap your feet into, and a monitor showing you information during the workout.

This latter comes in different versions too: the newest one is the PM5 with backlight and USB flash drive support, the previous one was the PM4, which in turn barely changed from the PM3 that came before it. All of them allow you to set up workouts, as either single distances or time periods, or repeated intervals of a certain distance or time period with a rest time that you can choose.

During the exercise, they will show you:

- The rate (in strokes per minute, spm)
- Your current performance, either as your split (min/500m – lower is faster!), the power output (Watt), or in calories (not recommended for general use). You can cycle through these units by hitting the 'Units' or 'Change Units' button.
- Your average performance over the whole piece, units as above
- The time or distance remaining if you're currently erging, or the rest time remaining if you are in-between intervals.
- The current interval you are on (if applicable)

On the newest monitor (the back-lit PM5), this can all be saved on your personal workout logbook on any standard USB flash drive. This can then be viewed e.g. as a spreadsheet on a computer, which is useful to track performance over time.

1.2 Setting up

Summary: Move the foot retention to the correct height for you. Set the drag factor to 115 – 130.

When you get on the erg, there are two things that are adjustable: the footplate, and the erg resistance.

The foot retention can be moved up or down, mostly to adjust for the size of your feet, in some cases also to adjust for people's leg length. As a start, it is sufficient to move it to the position in which the strap passes across the foot just below the toes – sufficiently close to the ankle to give you a solid hold, but also sufficiently close to the toes to allow your foot to still lift off unimpeded.

The **damper setting** can be selected on the right-hand side of the flywheel, and it goes from 1 to 10. Turning it up allows more air to enter the flywheel cage, which increases the resistance you feel while erging. However, the amount of dust in the flywheel affects this as well – the more dust, the less air, the less resistance. This means the same damper setting does not always equate the same actual resistance!

Luckily, C2 have provided a solution for this: the *drag factor*. This is the 'actual resistance' provided by the machine on a given damper setting, calibrated across all C2 machines, and it takes into account the current machine condition. To ascertain it, select 'more options' in the main menu of the monitor, and then 'display drag factor'. Row a few strokes, and a number between 90 and 200 will pop up. On a new erg, a damper setting of 1 will show about 90 – 100, and a damper setting of 10 will give you a drag factor of 210 – 220. On a gym erg abused over the years, the same damper setting of 10 might only be enough to result in a drag factor of 115, which indicates a *really* poor erg condition.

So what drag factor should you be erging on? In general, it is chosen to somewhat match the feeling of the boat you would be rowing in. For women, it is common to choose a drag factor between 110 and 125, while men tend to sit on something between 115 and 130 – there are exceptions though. I have done nearly all of my workouts at 125. I figured that if this setting is good enough for triple Olympian, 2m, 100kg, NZ single sculler Mahe Drysdale, it is probably good enough for me and it's not worth worrying about it further.

Something very important to understand on a conceptual level: higher is not better. It does *not* make your scores better or worse – no matter which drag factor you are on, the power displayed is the power you're applying to the machine. Don't be intimidated by some guy coming in and setting the damper to 10 – there is a 1% chance he's doing a max power workout, and a 99% chance he's just absolutely wrecking his back.

1.3 Maintenance

Summary: After your session, wipe the slide down!

One reason why Concept 2 rowers are so popular with most gyms and rowing clubs is their sturdiness. They can generally take a beating and require fairly little upkeep. There is however *one* important bit of maintenance that goes ignored far too often: CLEAN THE SLIDE. When I get on an erg, I don't care whether the seat or handle is sweaty from the person who previously used it. What I do care about however is a smooth slide!

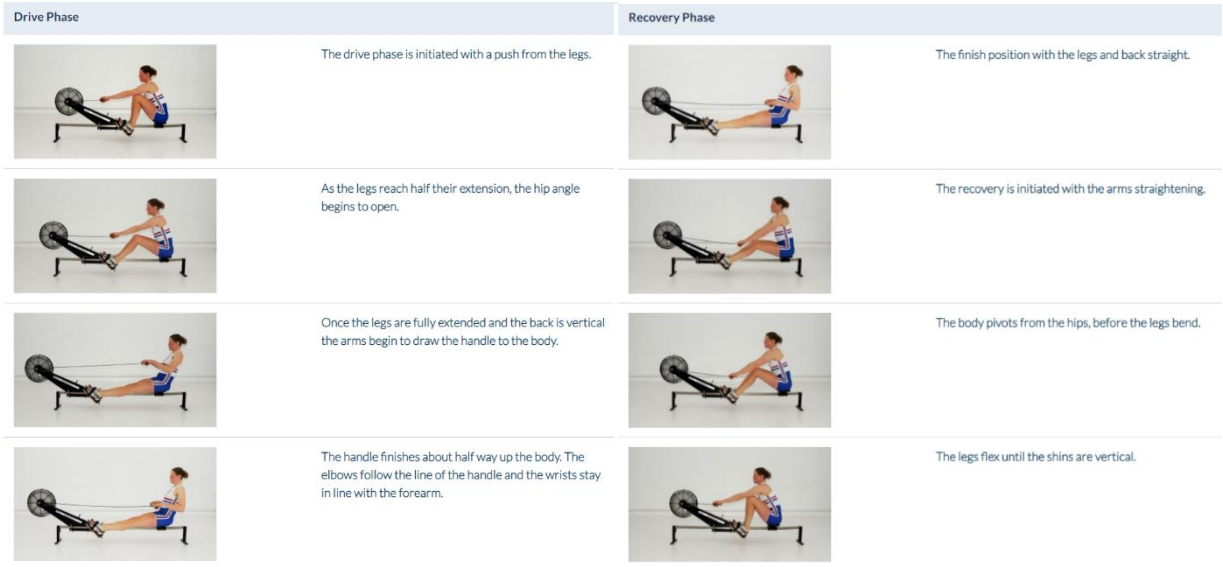
Each workout leads to little bits of dust / grime / wear from the rollers accumulating on the slide, being compacted every time your seat rolls over it. It manifests itself as black 'stuff' clearly visible on the slide (see picture). A wet cloth or paper towel is enough to clean it off after using the erg. However, if it is left on, it'll get compacted further over time, become much harder to clean, and you will start noticing a rumbling sensation as the seat passes over it.

You don't want that. You want a smooth ride. Say no to dirt on the slide! Wipe it down after use!

1.4 Technique

Summary: Legs, body, arms, arms, body, legs.

The correct technique has been described many times, in many different places, and is probably best taught either in person – i.e. by your coach! – or at least through a video. Regardless, the image below shows the key points, after which I will list a few things not readily apparent from the pictures.



Relaxation is very important. I've personally come to the conclusion that rowing as a sport is not really about learning which muscles to use – instead, it's more important to learn *not* to use a lot of muscles. Reducing the entire motion of the stroke down to the essentials, eliminating all movements that don't contribute to boat speed, I often found to be the most difficult bit. An important start to that is to get rid of unnecessary tension. Common issues include gripping the handle too hard (this also leads to more blisters) or tensing the lats and other back muscles during the recovery, anticipating the load of the stroke. You should maintain an active, but not rigid posture, shoulders relaxed, chest out, head up.

Ratio refers to the time spend on the drive phase compared to the time spent during recovery. This should be somewhere along the lines of 1:2 ~ the recovery takes about twice as long the drive. This

makes less of a difference on the erg, but its importance becomes very apparent in the boat. On the water, the rower is not so much moving on the slide as the boat with the slide is moving under the rower. If the crew gets the ratio and relaxation right, this will fee! almost like ‘gliding’ up the slide, in a very efficient and smooth movement. On the erg, that feeling is more difficult to replicate, but it should be attempted regardless as training for time spent on the water. The key to this is to be really relaxed during the recovery motion, almost consciously slowing down into the front stop position. As an aside, this will often also improve connection at the front.

Flow is a much more subjective thing. I found that thinking of rowing as a continuous cycle rather than a repeated single motion helped to reduce brief periods of pausing that can otherwise appear. For example, it is easy to see the last bit of the drive phase, when the arms are brought back in, as the 'end' of the stroke. This often leads to people pausing in that position for a brief moment before 'starting' the next stroke. In order to avoid this, it might be helpful to think of that motion not as the end of one thing and the beginning of the next. Instead, think of it as the continuous motion of bringing the arms in and back out, maintaining the flow in a cycle of motions, each connecting seamlessly to the next one until the piece ends.

1.5 Training Fundamentals

Summary: Endurance and power are usually trained separately, in a ratio of about 80 to 20. Stay in the correct heart rate zone to maximise the training effect.

In general, your coaches and captains will provide more detailed guidance with respect to the sessions they expect the crew to do. Therefore, this section will only touch on some theoretical points. It is meant to provide a simplified overview of what the different bits of rowing training are for.

Rowing is a sport which sits at the intersection of endurance and power. The most common type of race, in fact the *only* type of race at world championship / Olympic level, is the multi-lane 2000m race. Depending on conditions, boat type, and level of the athletes, this will take between 5:18.68 (German Eight / Deutschlandachter, World Rowing Cup II 2017, Poznan) and, apparently, 12:04.17 (if you capsize during the race – Rio Olympics 2016). For this kind of distance, rowers need to both have high power, and the endurance that carries them through to the end. For training, on a basic level this translates to a splitting your workouts about 80/20 for endurance sessions / power or sprint sessions.

Endurance is trained at relatively low stroke rates of 18 to 20 strokes per minute (spm). The sessions, also called steady-state, are low intensity – it is commonly said you should just about still be able to speak whole sentences and carry a conversation – but rather long: 60 to 90 minutes are not unusual, generally split into blocks of 20 to 30 minutes with 1 to 2 minutes of rest in-between. If you prefer to work off distance, doing it in blocks of 5000 to 8000m is common. During the rest period, get up from the erg, do a quick stretch, drink some water, and get ready again.

Power sessions are often either at low stroke rates, e.g. 20spm, but high effort – possibly even going 'all out' on each stroke, close to a high-weight squat – or at mid-ranged stroke rates, such as 24 to 26spm. These erg pieces can be in the range of about 30 minutes, or repeated shorter intervals with a few minutes rest in-between.

Sprint sessions are done to translate the technique, power and endurance learned in the other sessions into high stroke rates, from 30 up to 36spm or more. They usually consist of 6 to 10 short

intervals with brief rest periods, or possibly a low number of mid-length intervals such as repeated 1000m pieces.

A very important point is that in order to get the best training effect, the workouts need to be done in the spirit they were designed. A long, low-intensity workout is meant to be long and actually low-intensity, a hard sprint workout is meant to be hard and taxing. Nothing is gained from chasing splits in steady-state sessions (beyond possibly an initial period when you first take up rowing and your body gets quickly accustomed to performing better and better), and conversely, nothing is gained from doing sprints or power sessions half-heartedly. The idea is to gain endurance with a minimum amount of stress to the body, but to really go for it when the time has come to build power.

But how do you determine **what split** you should be aiming for? There are two ways of going about it – the probably less exact, but easier way is to base it on your 2000m (2k) maximum effort. The rule of thumb is that your steady-state split should be around 50 to 55% of the 2k power in watts – this can be calculated using the C2 split-to-watt calculator (https://www.concept2.co.uk/indoor-rowers/training/calculators/watts-calculator). The other, more scientific but also more accurate way is to use a heart rate (HR) monitor. Wrist-mounted ones often don't work for rowing, so one mounted on a chest strap might be necessary – the fancy ones like the Polar H10 will not only work with the erg itself (PM4 / PM5), but also with almost any wrist sports watch, or your phone. Now you can check that you are within the correct HR band, and adjust your power accordingly.

In rowing, the common HR bands used are based on your resting heart rate (RRH) and maximum heart rate (MRH). The calculation is done based on a percentage of your heart rate range, with the following numbers:

- UT2 (Utilisation 2): RRH + 70% of your range. Light aerobic work, general cardiovascular (CV) fitness. Most endurance training happens in this zone.
- UT1 (Utilisation 1): RRH + 70 – 80% of your range. Heavier aerobic work, higher-level CV fitness.
- AT (Anaerobic Threshold): RRH + 80 – 85% of your range. Aerobic limit, pushing into anaerobic area, high level of CV fitness. Power training usually happens in this zone, though it will often push up into the TR zone.
- TR (Oxygen Transportation): RRH + 85 – 95% of your range. Developing oxygen transport to the muscles under stress, hard work. Sprints will usually end up in this HR zone.
- AN (Anaerobic): RRH + 95 – 100% of your range. Unsustainable maximum effort, short bursts. Your true maximum heart rate will not be reached every time you go 'all out' – the heart needs some time to rev up to absolute maximum effort too.

As an example, my maximum heart rate is (actually more like 'used to be' - I'm getting older…) around 200. My resting heart rate is around 50 (best measured in bed right after waking up). This means my range is (200 – 50) = 150. So my UT2 heart rate band stops at about 50 + 70% of 150 = 50 + 105 = 155.

As with all of these things, there are a lot of individual variations, and nothing is absolute – but this list is always a good starting point. If you are not sure about your resting heart rate, assume something like 60ish.

Pacing:

This is a very important factor: even in hard sessions, apart from the ones meant to be 'all out' all of the time, you want to aim for a split that will make you fight hard through the session, but which you are physically able to achieve. There is no point in starting a 6x500 off with a record split on the first

500m only to die very quickly on the second one and end up pulling an average 20 seconds higher than in the beginning – that would be referred to as a 'fly and die'.

Physically speaking, the most efficient way of achieving a specific split is to hold *exactly* that split for the entire duration of the piece. Psychologically, most people find it easier to follow one of two strategies: the *pyramid* means going fast for the first few strokes, which is helped by the adrenaline and excitement – especially during erg tests or competitions. The split is then allowed to creep up to a more sustainable level through the middle of the piece, before you start to pile on the pressure again, up to a sprint in the last ca. 10% of the piece. *Negative splitting* on the other hand refers to starting at a lower power than what you know is sustainable, to increase your confidence. You then aim to drop the split bit by bit as you go through the piece.

1.6 Erg piece examples

Steady-state (UT2):

- 2x30min, rate 18, 1min rest
- 3x20min, rate 20, 45s rest

Power:

- 10x(1min on, 1min off), rate 20. Go all-out (at rate 20!) during the 'on' minute, row very lightly (but still at the same rate) during the 'off' minute.
- 3x6min, rate 26, 3min rest. Aim to maintain the same split throughout the entire 5min piece, and aim to lower the split by a second or more on the next 5min. Once you start to improve, increase the time to 3x8min or more.

Sprints:

- 10x250m, rate 30+, 30s rest. Go all-out on each one.
- 6x500m, rate 30+, 1min rest. Aim to maintain the same split throughout the session, and sprint for all you've got on the last one.
- 3x1000m, rate 30+, 2min rest. Again, aim to maintain the same split throughout each 1k, and to make the next 1k at least as fast.

All of these numbers can of course be varied to make a session lighter or harder.

Common erg tests:

These are pieces that you will all end up doing at some point, sooner or later. Often, they play a big part in crew selection. The two most common ones are:

- 2k (2000m): the big one, standard around the world, the same distance as standard rowing races.
- 30r20, or '30 rate 20': 30 minutes at rate 20. While this may not show the current race-readiness at higher rates, it's a good indicator of underlying fitness and power.

What split should you be aiming for in the first erg test? That is almost impossible to say. The very first time, you will most likely go too hard in the beginning. It takes some practice to know your fitness and your ability and to get a realistic idea of what you should probably be aiming for. However, there is some help in this. For example, the 6x500m can be a good '2k predictor', i.e. the split you achieve is similar to the best split you can achieve on a 2k erg test. Sometimes 8x500m (still with 1min rest in-between) is recommended, personally I've found 6x500m to be closer.